Ajaykumar Guggilla

ServiceNow IT Operations Management

Demystifying IT Operations Management

Packt

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Ajaykumar Guggilla

BIRMINGHAM - MUMBAI

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About the Author

Ajaykumar Guggilla is the holder of a masters in computer applications and is certified in Project Management Professional (PMP), information technology, and Infrastructure Library (ITIL) Expert, Microsoft Certified Professional, PRINCE2, and ServiceNow administrator. Ajay has 19 years of experience in the IT industry. Ajay started his career as a hardcore programmer and evolved to take on many positions at reputable organizations, including Cognizant, PwC, and Sathyam. Ajay has diversified his experience to include IT service delivery, IT infrastructure, enterprise systems, improving quality and maturity, CRM solutions, adopting service management solutions, SAP support, data center migrations, IT Service Management (ITSM)/ITIL, and ServiceNow solutions.

His experience from previous job roles extends to program manager, IT architect, process owner, process lead, director, project manager, engagement manager, process manager, reporting champion, and global production. Ajay has worked with fortune customers in oil and gas, chemicals, automobiles and parts, healthcare, retail, media, travel and leisure, insurance, telecommunications, banks, media and entertainment, insurance, financial services, technology, and intergovernmental organizations.

His knowledge has helped many organizations, including defining the strategy, streamlining the service management process, optimizing the cost, adhering to compliances, increasing the customer satisfaction, process maturity, technology adoption, infrastructure transformation and consolidation, and much more.

Ajay started working with ServiceNow five years back. He has worked on different engagements in helping organizations select their service management tool, has managed ServiceNow programs, has solutioned, architected, and handled end-to-end implementations, and performed process automation and version migrations. He is passionate about working on ServiceNow and loves the product, which has lead him to write this book on ITOM, which will help individuals and organizations improve their operational excellence by implementing ITOM capabilities.

Acknowledgments

Thanks to my parents: my dad, the late Mr. Subramanyam, and my mom, Mrs. Surekha, who gave birth to me, and all the sacrifices they have made to raise me and my siblings. Without them I would not have gained the knowledge I have. Mom and dad, you have been there day after day, to make sure my life turned out this way. I miss you dad. Thanks for the support mom.

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Thanks to all my colleagues, especially Mr. Raja Rangenathan and Mr. Praveen Challa, my friends, my family, and all others who have helped me either directly or indirectly to complete this book.

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Last but not least, I cannot forget to thank Mr. Fred Luddy for creating such a wonderful product, ServiceNow.

About the Reviewers

Chatarina Lyth has 20 years of experience in the IT industry and 10 years of work experience in IT Operations Management. She has, over the years, worked as a consultant, implementing several of the leading ITOM tools in large enterprises, in the private as well as public sectors. Chatarina joined the ServiceNow ITOM team in 2014, and has been part of the journey ServiceNow has made since then.

Tcat (formerly Tim Catura-Houser) transitioned from vacuum-tube (valve) computers in 1965. He got really excited when the Altair got Microsoft BASIC around 1973, because he could have a computer at home. More recently (March 2017), he was surprised with the President's Award from http://www.eta-i.org/ for being a dedicated volunteer.

His career as a global road warrior has included both being a field geek and trainer, only sometimes to his extreme peril. His MCP number 416024 in 2017 marks 20 years as an MCSE.

While some of the titles he has worked on are lost to history, he quit counting after 50. Some of them can be found on Amazon by his former and current names.

Certainly, it is easy for me to say I cannot remember doing a tactical editing project that brought me so many smiles. Your author did an amazing job. On the internal side, I experienced equal pleasure. In my own mind I call it the tale of 2 Jays. Judie and Juliana at Packt are two astounding individuals! To me, they are more than professional. They are what I would have to call, buddies.

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Preface

ServiceNow Information Technology Operations Management (ITOM) teaches you about different applications and plugins that provide different capabilities to reduce disruption caused to the business. The key differentiator between other tools available in the market and ServiceNow ITOM is that the functions are available within ServiceNow to easily leverage the data natively. Each component of the ITOM suite has different capabilities that can be tied to each of the individual components and business services. We can predict outages well in advance and hence take proactive measures to avoid them.

The book's chapters cover the architecture and description of the each of ITOM's components, prerequisites for setting up the capabilites, installation instructions, and then finally explain the important settings and properties.

The book evolved from the Geneva release and has been updated to the Istanbul release. The author has taken all measures to provide improved service availability, immediate visibility of vital business services, and much more, all from the convenience of your single screen.
By the end of this book, you should understand how ServiceNow ITOM functions within the ServiceNow ecosystem.

What this book covers

Chapter 1, *Introduction to IT Operations Management in ServiceNow*, introduces ServiceNow IT Operations Management, the importance of each of ITOM's components, and ITOM's high-level architecture.

Chapter 2, *MID Server Essentials*, walks through all the necessary steps to install MID Server and configure roles.

Chapter 3, *Configuration Management Using ServiceNow Discovery*, covers the different phases available, the ECC queue, and configuring discovery the easy way.

Chapter 4, *Creating and Managing Dependency Views*, focuses on learning the prerequisites, understanding the tables and properties, and learning about how to load and view dependency maps.

Chapter 5, *Cloud Management*, dives further into using cloud functionalities and capabilities, understanding the various out-of-the-box plugins available, understanding the different roles available, and exploring the cloud operational portal. Here, our focus will be on configuring Amazon Cloud Services, and we will touch on how other cloud providers can be configured.

Chapter 6, *Automation Using ServiceNow Orchestration*, discusses orchestration prerequisites and capabilities. Learn about orchestration workflows and run through a real example of using Active Directory objects.

Chapter 7, *Exploring Service Mapping*, discusses the service mapping architecture, what a business service is, how to set up service mapping, and how to perform service mapping using discovery.

Chapter 8, *Monitoring Using Event Management*, deals with event management architecture; setting up the MID Server for event management; exploring event sources and properties; how to configure alert rules, threshold rules, and event transform rules; and exploring the dashboard.

What you need for this book

This book assumes the reader has a good understanding of the Linux operating system, basic knowledge of cloud computing and big data, and some experience with OpenStack software. The book will go through a simple multi-node setup of the OpenStack environment, which may require a basic understanding of networking and virtualization concepts. If you have experience of Hadoop and Spark processes, this is a big plus. Although the book uses VirtualBox, feel free to use any other lab environment, such as a VMware workstation or other tools.

OpenStack can be installed and runs either on bare metal or a virtual machine. However, this book requires that you have enough resources for the whole setup. The minimum hardware or virtual requirements are as follows:

- CPU: 4 cores
- Memory: 8 GB RAM
- Disk space: 80 GB

In this book, you will need the following software:

- Linux Operating System: Centos 7.x
- VirtualBox
- OpenStack RDO distribution, preferably the Liberty release. If you intend to use the Juno or Kilo releases, make sure to change the plugin versions when launching clusters to comply with the correct supported OpenStack version.

Internet connectivity is required to install the necessary OpenStack packages, Sahara images and Sahara image packages for specific plugins.

Who this book is for

To make use of the content of this book, a basic prior knowledge of ServiceNow is expected. If you feel you do not have that knowledge, it is always possible to catch up on the basic requirements by quickly reading up on the major components at the ServiceNow wiki page (http://wiki.servicenow.com/index.php?title=Main_Page#gsc.tab=0). This covers the latest updates on ServiceNow Istanbul and future releases. This book provides an overview of the ITOM applications and setting up ITOM's capabilities, using a quick and detailed guided setup. If you currently work with other toolsets, this book also gives you an idea of how ITOM is handled in ServiceNow.

Conventions

In this book, you will find a number of text styles that distinguish between different kinds of information. Here are some examples of these styles and an explanation of their meaning.

Code words in text, database table names, folder names, filenames, file extensions, pathnames, dummy URLs, user input, and Twitter handles are shown as follows: "Credentials are encrypted automatically with a fixed instance key when they are submitted or updated in the credentials (`discovery_credentials`) table."

New terms and **important words** are shown in bold. Words that you see on the screen, for example, in menus or dialog boxes, appear in the text like this: "Now right-click on Windows and right-click on 32 bit, and then download to the server or the local machine where you are going to install the MID Server."

Warnings or important notes appear in a box like this.

Tips and tricks appear like this.

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Introduction to IT Operations Management in ServiceNow

This chapter is an overview of **IT Operations Management** (**ITOM**) and it will explain the ServiceNow ITOM capabilities within ServiceNow, which include:

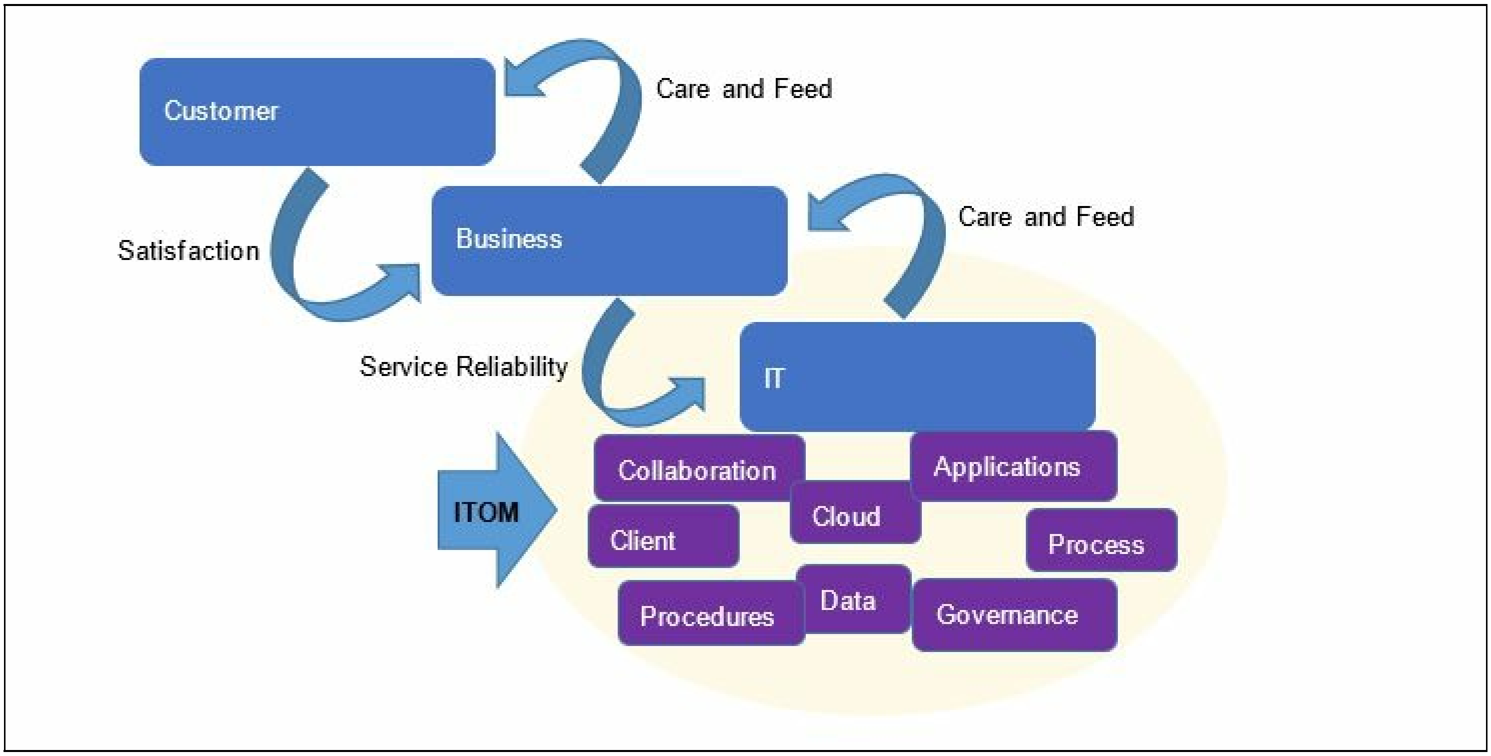
- ServiceNow ITOM overview
- MID Server
- Credentials
- Service mapping
- Dependency views
- Event management
- Orchestration
- Discovery
- Cloud management

ServiceNow IT Operations Management overview

Every organization and business focuses on key strategies, some of them include:

- Time to market
- Agility
- Customer satisfaction
- Return on investment

Information technology is heavily involved in supporting these strategic goals, either directly or indirectly, providing the underlying IT Services with the required IT infrastructure. IT infrastructure includes network, servers, routers, switches, desktops, laptops, and much more. IT supports these infrastructure components enabling the business to achieve its goals. IT continuously supports the IT infrastructure and its components with a set of governance, processes, and tools, which is called *IT Operations Management*.



IT cares and feeds the business, and the business expects reliability of services provided by IT to support the underlying business services. A business cares and feeds the customers who expect satisfaction of the services offered to them without service disruption.

Unlike any other tools, it is important to understand the underlying relationship between IT, businesses, and customers. IT just providing the underlying infrastructure and associated components is not going to help; to effectively and efficiently support the business IT needs to understand how the infrastructure, components, and process are aligned and associated with the business services to understand the impact to the business with an associated incident, problem, event, or change that is arising out of an IT infrastructure component.

IT needs to have a consolidated and complete view of the dependency between the business and the customers, not compromising on the technology used, the process followed, the infrastructure components used, which includes the technology used. There needs to be a connected way for IT to understand the relations of these seamless technology components to be able to proactively stop the possible outages before they occur and handle a change in the environment.

On the other hand, a business expects service reliability to be able to support the business services to the customers. There is a huge financial impact of businesses not being able to provide the agreed service levels to their customers. So, there is always a pressure and dependence from the business to IT to provide a reliable service and it does not matter what technology or processes are used.

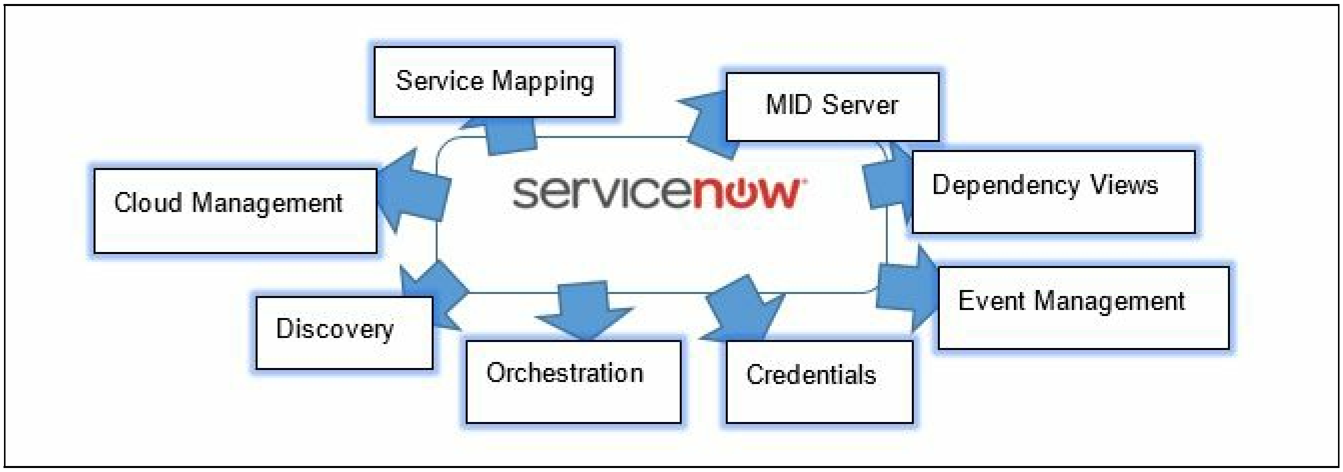
Customers, as always, expect satisfaction of the services provided by the business, at times these are adversely affected by service outages caused by the IT infrastructure. Customer satisfaction is also a key strategic goal for the business to be able to sustain in the competitive market. IT is also expected to be able to integrate with the customer infrastructure components to provide a holistic view of the IT infrastructure view to effectively support the business by proactively identifying and fixing the outages before they happen, reducing the number of outages and increasing the reliability of IT services delivered.

Most of the tools do not understand the context of the **Service-Oriented Architecture** (**SOA**) connecting the business services to the impacted IT infrastructure components to be able to effectively support the business and also IT to be able to justify the cost and impact of providing end to end service.

Most of the traditional tools perform certain aspects of ITOM functions, some partially and some support integration with the **IT Service Management** (**ITSM**) tool suite. The missing integration piece between the traditional tools and a full blown cloud solution platform is leaning to the SOA.

ServiceNow, a cloud based solution, has focused the lens of true SOA that brings together the ITOM suite providing and leveraging the native data and also connecting to the customer infrastructure to provide a holistic and end-to-end view of the IT Service at a given snapshot.

With ServiceNow IT has a complete view of the business service and technical dependencies in real time leveraging powerful individual capabilities, applications, and plugins within ServiceNow ITOM.



ServiceNow ITOM comprises the ServiceNow application and plugins. Not all the applications and plug-ins come out-of-the-box, some of the plugins, and applications have license restrictions that require separate licensing or subscriptions to be purchased. More detailed information is given in the subsequent chapters. The following are different components of plug-ins and applications and that make up ServiceNow IT Operations Management.

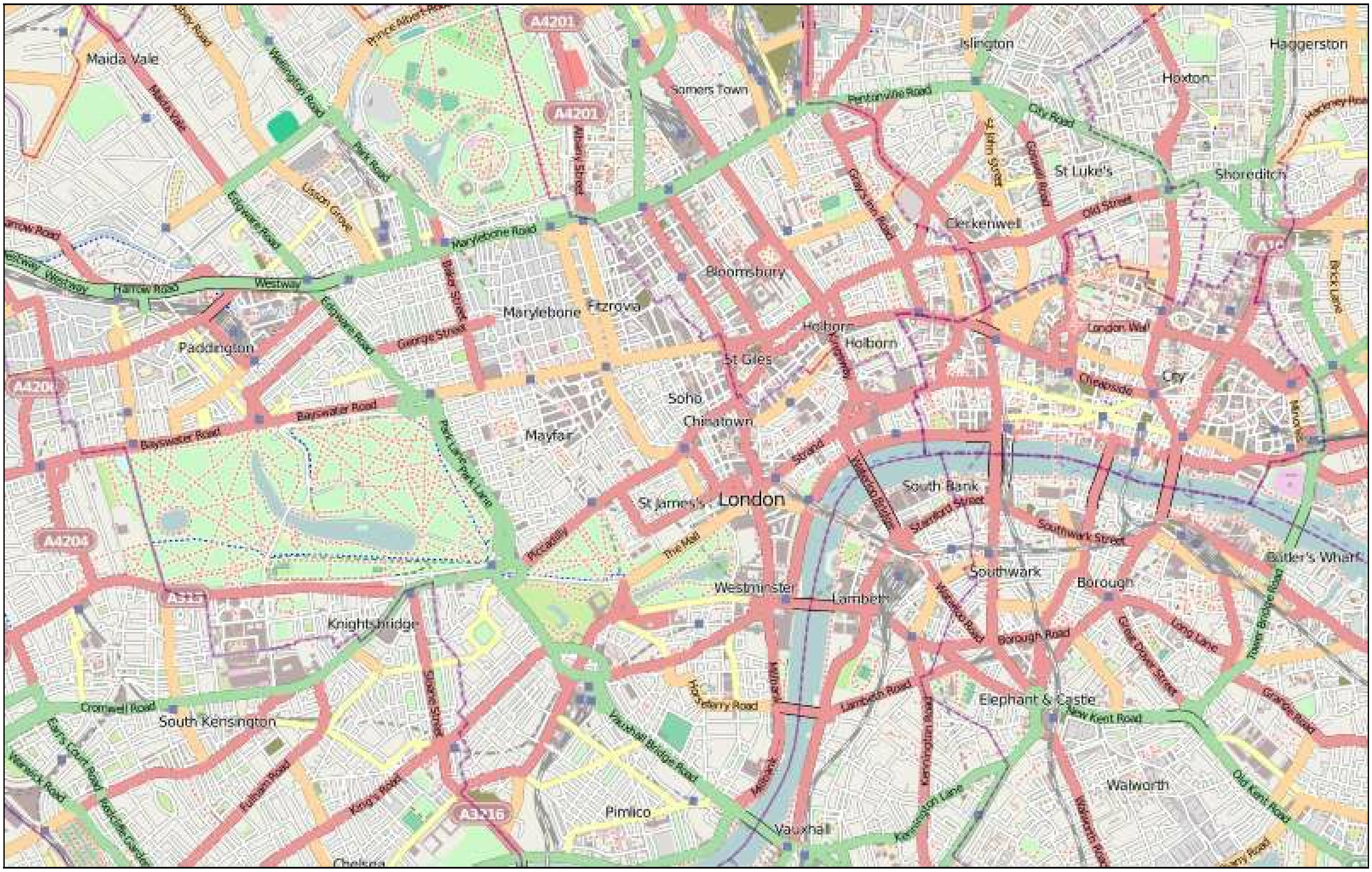
- **Management, Instrumentation, and Discovery (MID) Server**: The MID Server helps to establish communication and data movement between ServiceNow and the external corporate network and application
- **Credentials**: This is a platform that stores credentials including usernames, passwords, or certificates in an encrypted field on the credentials table that is leveraged by ServiceNow discovery
- **Service mapping**: Service mapping discovers and maps the relationships between IT components that comprise specific business services, even in dynamic, virtualized environments
- **Dependency views**: Dependency views graphically display an infrastructure view with relationships of configuration items and the underlying business services
- **Event management**: Event management provides a holistic view of all the events that are triggered from various event monitoring tools
- **Orchestration**: Orchestration helps in automating IT and business processes for operations management
- **Discovery**: Works with MID Server and explores the IT infrastructure environment to discover the configuration items and populating the **Configuration Management Database** (**CMDB**)
- **Cloud management**: Helps to easily manage third-party cloud providers, which include AWS, Microsoft Azure, and VMware clouds

Understanding ServiceNow IT Operations Management components

Now that we have covered what ITOM is about and focused on ServiceNow ITOM capabilities, let's deep dive and explore more about each capability.

Dependency views

In this section, we will near about the importance of dependency views.



Maps like the preceding one are becoming so important in everyday life; imagine a world without GPS devices or electronic maps.

There are also hard copies of the maps that were available everywhere for us to get from place to place. There are also special maps to the utilities and other public service agencies to be able to identify the impact of digging a tunnel or a water pipe or an underground electric cable. These maps help them to identify the impact of making a change to the ground.

Maps also helps us to understand the relationships between states, countries, cities, and streets with different set of information in real time that includes real-time traffic information showing accident information, any constructions, and so on.

Dependency views is similar to real life navigation maps; they provide a map of relationships between the IT Infrastructure components and the business services that are defined under the scope. Unlike the real-time traffic updates on the maps the dependency views show real-time active incidents, change, and problems reported on an individual configuration item or an infrastructure component.

Changes frequently happen in the environment. Some of the changes are handled with a legacy knowledge of how the individual components are connected to the business services through the service mapping plugin down to the individual component level. Making a change without understanding the relationships between each IT infrastructure component might adversely affect the service levels and impact the business service.

ServiceNow dependency views provide a snapshot of how the underlying business service is connected to individual **Configuration Item** (**CI**) elements. A configuration item is referred to as tangible or intangible infrastructure component or an element that might include Infrastructure components, process, procedures etc. Drilling down to the individual CI elements provides a view of associated service operations and service transition data that includes incidents logged against a given CI, any underlying problem reported against the given CI, and also changes associated with the given CI.

Dependency views provides a graphical view of configuration items and their relationships. The dependency views provide a view of the CI and their relationships; in order to get a perspective from a business stand point you will need to enable the service mapping plugin.

Having a detailed view of how the individual CI components are connected from the Business service to the CI components compliments change management, making it possible to perform effective impact analysis before any changes are made to the respective CI:

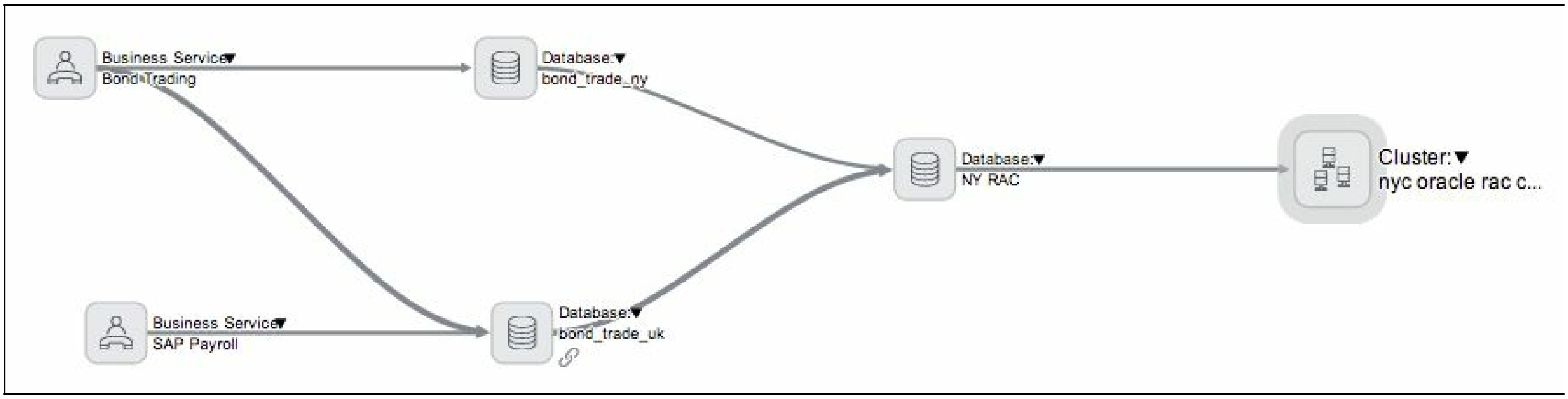


Image source: wiki.ServiceNow.com

A dependency map starts with a root node, which is usually termed as a root CI that is grayed out with a gray frame. Relationships start building up and they map from the upstream and downstream dependencies of the infrastructure components that are scoped to discover by the ServiceNow auto discovery. Administrators have control of the number of levels displayed the dependency maps.

It is also easy to manage maps that allow creating or modifying existing relationships right from the map that posts the respective changes to the CMDB automatically.

Each of the CI component of the dependency maps has an indicator that shows any active and pending issues against a CI; this includes any incidents, problems, changes, and any events associated with the respective configuration item.

Dependency maps can also be created manually by creating CI and creating relationships between them to create dependency maps.

Cloud management

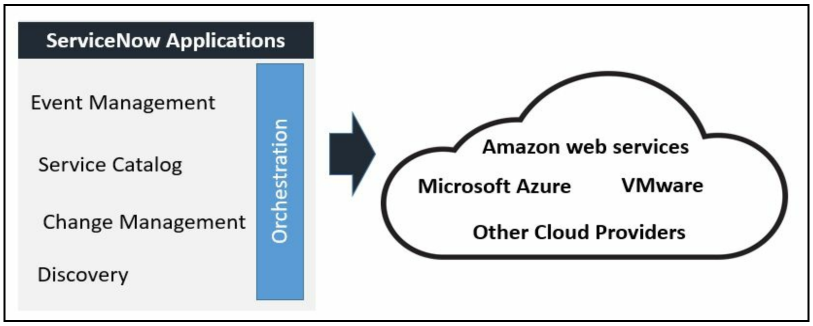
In the earlier versions prior to ServiceNow, there was no direct way to manage cloud instances, people had to create orchestration scripts to manage the cloud instances and also create custom roles.

Managing and provisioning has become easy with the ServiceNow cloud management application. The cloud management application seamlessly integrates with the ServiceNow service catalog. A Service Catalog provides a catalogs of services offered by an organization which has workflows built in with automation capability using orchestration workflows. The cloud management application fully integrates the life cycle management of virtual resources into standard ServiceNow data collection, management, analytics, and reporting capabilities.

The ServiceNow cloud management application provides easy and quick options to key private cloud providers, which include:

- **AWS Cloud**: Manages **Amazon Web Services** (**AWS**) using AWS Cloud
- **Microsoft Azure Cloud**: The Microsoft Azure Cloud application integrates with Azure through the service catalog and provides the ability to manage virtual resources easily
- **VMware Cloud**: The VMware Cloud application integrates with VMware vCenter to manage virtual resources by integrating with the service catalog

The following figure describes a high-level architecture of the cloud management application:



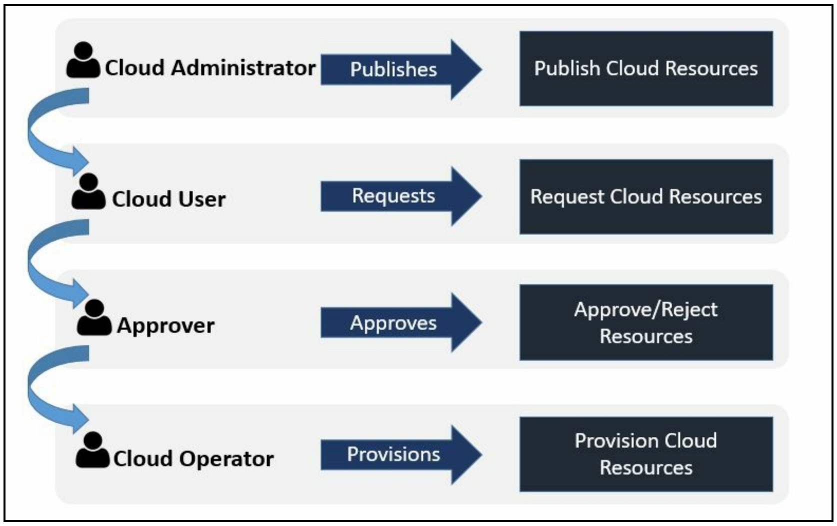
Key features with the cloud management applications include the following:

- A single pane of glass to manage the virtual services in public and private cloud environment including approvals, notifications, security, asset management, and so on
- The ability to repurpose configurations through resource templates that help to reuse the capability sets
- Seamless integration with the service catalog, with a defined workflow and approvals integration, can be done end to end right from the user request to the cloud provisioning
- The ability to control the leased resources through date controls and role-based security access
- The ability to use the ServiceNow discovery application to discover the infrastructure components or the standalone capability to discover virtual resources and their relationships in their environments

- The ability to control and manage virtual resources effectively with a controlled termination shutdown date
- The ability to perform a price calculation and integration of managed virtual machines with asset management
- The ability to automatically or manually provision the required cloud environment with zero click options

There are different roles within the cloud management applications, here are some of them:

- **Virtual provisioning cloud administrator**: The administrator owns the cloud admin portal and end-to-end management including configuration of the cloud providers. They have access to be able to configure the service catalog items that will be used by the requesters and the approvals required to provision the cloud environment.
- **Virtual provisioning cloud approver**: Who either approves or rejects requests for virtual resources.
- **Virtual provisioning cloud operator**: The operator fulfills the requests to manage the virtual resources and the respective cloud management providers. Cloud operators are mostly involved when a manual human intervention is required to manage or provision the virtual resources.
- **Virtual provisioning cloud user**: Users have access to the my virtual assets portal that helps them to manage the virtual resources they own, have requested, or are responsible for.



How clouds are provisioned

- The cloud administrator creates a service catalog item for users to be able to request for cloud resources
- The cloud user requests for a virtual machine through the service catalog
- The request goes to the approver who either approves or rejects it
- The cloud operator provisions the requests manually or virtual resources are auto provisioned

Discovery

Imagine how an atlas is mapped and how places have been discovered using exploration devices including manually, by satellite, by survey maps, or by street maps collector devices.

These devices crawl through all the streets to collect different data points that include information about the streets, houses, and much more.

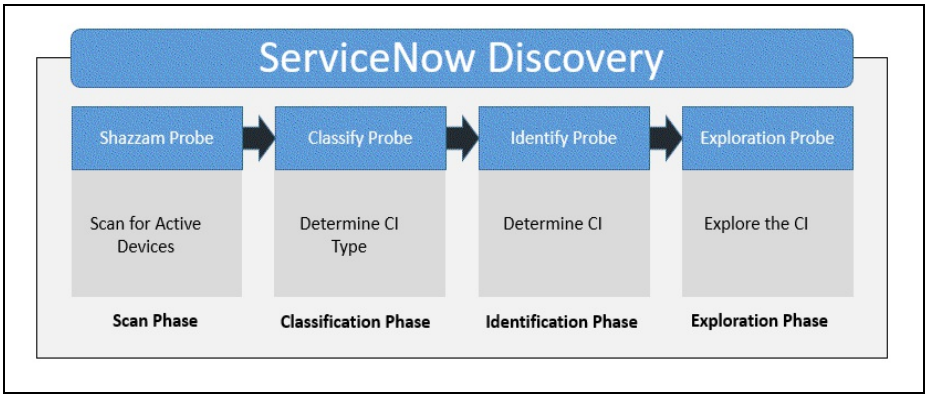
This information is used by consumers for various purposes, including GPS devices, finding and exploring different areas, finding the address of a location, checking for any incidents, constructions, or road closures on the way, and so on.

ServiceNow discovery works in the same way, ServiceNow discovery explores the enterprise network, identifying the devices in scope. ServiceNow discovery probes and sensors perform the collection of infrastructure devices connected to a given enterprise network. Discovery uses probes to determine which TCP ports are opened and to see if it responds to the SNMP queries and sensors to explore any given computer or device, starting first with basic probes and then using more specific probes as it learns more.

Discovery explores to check on the type of device, for each type of device, discovery uses different kinds of probes to extract more information about the computer or device, and the software that is running on it.

CMDB is populated through ServiceNow discovery. ServiceNow discovery searches for devices on the network, when ServiceNow discovery finds a device match within the CMDB; either CMDB gets updated with an existing CI or a new CI is created within the CMDB. Discovery can be scheduled to perform the scan at certain intervals; configuration management keeps the up-to-date status of the CI through discovery.

During discovery, the MID Server looks back on the probes to run from the ServiceNow instance and executes probes to retrieves the results to the CMDB with in the ServiceNow instance. No data is retained on the MID Server. The data collected by these probes is processed by sensors.



Discovery architecture

ServiceNow is hosted in ServiceNow data centers spanned across the globe. ServiceNow as an application does not have the ability to communicate with any given enterprise network. Traditionally, there are two different types of discovery tool on the market:

- **Agent based**: An agent is a piece of software installed on the servers or individual systems that sends all information about the system to the CMDB.
- **Agentless**: Agentless discovery doesn't require any individual installations on the systems or components. They utilize a single system or piece of software to probe and sense the network by scanning and federating the CMDB.

ServiceNow is an agentless discovery that does not require any individual software to be installed, but it does require MID Server to be installed on the network where discovery has to be run. Discovery is available as a separate subscription from the rest of the ServiceNow platform and requires the discovery plugin.

MID Server is Java software that runs on any windows or UNIX or Linux system that resides within the enterprise network that needs to be discovered. MID Server is the bridge and communicator between the ServiceNow instance that is sitting somewhere on the cloud and the enterprise network that is secured and controlled.

MID Server uses several techniques to probe devices without using agents. Depending on the type of infrastructure components, MID Server uses the appropriate protocol to gather information from the infrastructure component. For example, to gather information from network devices MID Server will use **Simple Network Management Protocol** (**SNMP**), to connect to the Unix systems MID Server will use SSH.

The following table shows different ServiceNow discovery probe types:

Device	Probe type
Windows computers and servers	Remote WMI queries, shell commands
UNIX and Linux servers	Shell command (via SSH protocol)
Storage	CIM/WBEM queries
Printers	SNMP queries
Network gear (switches, routers, and so on)	SNMP queries
Web servers	HTTP header examination
Uninterruptible Power Supplies (**UPS**)	SNMP queries

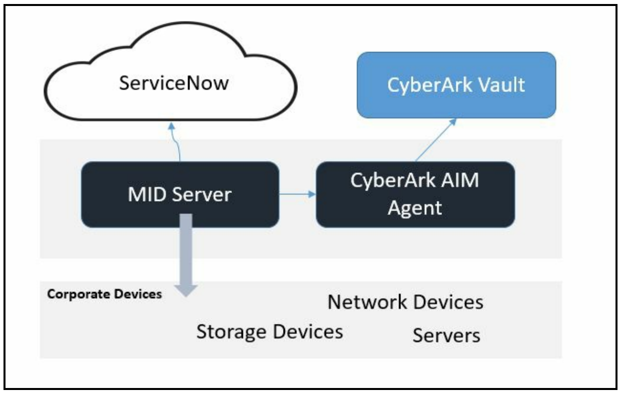
Credentials

ServiceNow discovery and orchestration features require credentials to be able to access the enterprise network; these credentials vary depending on network and device. Credentials such as usernames, passwords, and certificates need a secure place to store these credentials.

ServiceNow credentials applications store credentials in an encrypted format on a specific table within the credentials table.

Credential tagging allows workflow creators to assign individual credentials to any activity in an orchestration workflow or assign different credentials to each occurrence of the same activity type in an orchestration workflow. Credential tagging also works with credential affinities. Credentials can be assigned an order value that forces the discovery and orchestration to try all the credentials when orchestration attempts to run a command or discovery tries to query.

Credentials tables contain many credentials, based on pattern of usage the credential applications knows which credential to use for a faster logon to the device next time.



Credentials are encrypted automatically with a fixed instance key when they are submitted or updated in the credentials (`discovery_credentials`) table. When credentials are requested by the MID Server, the platform decrypts the credentials using the following process:

1. The credentials are decrypted on the instance with the fixed key.
2. The credentials are re-encrypted on the instance with the MID Server's public key.
3. The credentials are encrypted on the load balancer with SSL.
4. The credentials are decrypted on the MID Server with SSL.
5. The credentials are decrypted on the MID Server with the MID Server's private key.

A ServiceNow instance can store credentials used by discovery, orchestration, and service mapping in an external credential repository rather than directly in a ServiceNow credentials record.

Currently, the ServiceNow platform supports the use of the CyberArk vault for external credential storage

The ServiceNow credential application integrates with the **CyberArk** credential storage. The MID Server integration with CyberArk vault enables orchestration and discovery to run without storing any credentials on the ServiceNow instance.

The instance maintains a unique identifier for each credential, the credential type (such as SSH, SNMP, or Windows), and any credential affinities. The MID Server obtains the credential identifier and IP address from the instance, and then uses the CyberArk vault to resolve these elements into a usable credential.

The CyberArk integration requires the external credential storage plugin, which is available by request.

The CyberArk integration supports these ServiceNow credential types:

- CIM
- JMS
- SNMP community
- SSH
- SSH private key (with key only)
- VMware
- Windows

Orchestration activities that use these network protocols support the use of credentials stored on a CyberArk vault:

- SSH
- PowerShell
- JMS
- SFTP

MID Server

The Internet has become a prime utility for our day-to-day survival. The availability of Wi-Fi or hard cable network is provided by Internet service providers, these cables run through several miles across different cities, states, and countries. To subscribe to Internet services, our provider places a modem in our home. This modem allows the service provider to enable the Internet capabilities in your home and to link to their network and control them.

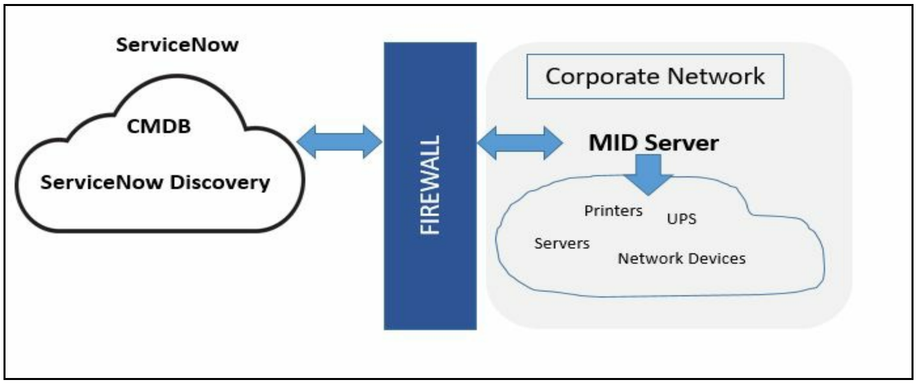
Similarly, ServiceNow is a cloud-based application and there are many customers who subscribe and use ServiceNow. ServiceNow is like the Internet service provider, instead of a modem there is something called *MID Server* that needs to be configured for ServiceNow to be able to communicate with the enterprise network. A piece of software needs to run on the enterprise network and be configured for ServiceNow to be able to communicate with the MID Server and be able to talk to the infrastructure components.

The MID Server facilitates communication and movement of data between the ServiceNow platform and external applications, data sources, and services. MID Server is a simple Java application that can run on Windows, Linux, or Unix environments; it facilitates the data exchange between the enterprise network and ServiceNow instance. As MID Server communications are initiated inside the enterprise firewall, they do not require any special firewall rules.

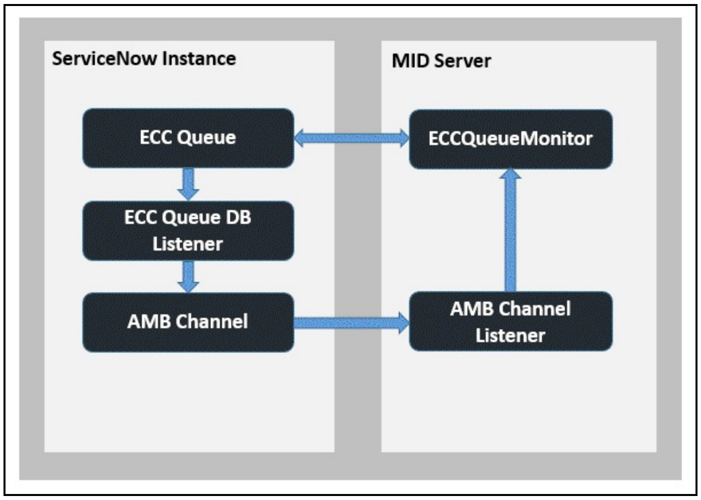
MID Server is not only used by discovery, but it is used by various other components within ServiceNow, which include:

- Discovery
- Orchestration
- Import sets
- Altiris
- Microsoft SMS/SCCM
- Avocent LANDesk
- HP OpenView Operations
- Microsoft **System Center Operations Manager** (**SCOM**)
- Borland Starteam Integration
- Microsoft MIIS
- Service assurance

The following figure shows the high level architecture of the MID Server and interaction points:



The ECC queue is a connection point between an instance and other systems.



The MID Server subscribes to messages published by the **Asynchronous Message Bus** (**AMB**), which notifies the MID Server about waiting jobs assigned to it. The MID Server opens a persistent connection to the instance through the AMB and listens on the `/mid/server/<mid_sys_id>` AMB channel. When an output record is inserted into the queue (`ecc_queue`) table, an AMB message is sent to the MID Server's channel.

The MID Server receives this message and immediately polls the `ecc_queue` table for work:

- If a job exists in the ECC queue for that MID Server , the MID Server sets the status to *I'm working on it*
- It then does the work that is requested
- Then it reports the findings of the job back to the ECC queue

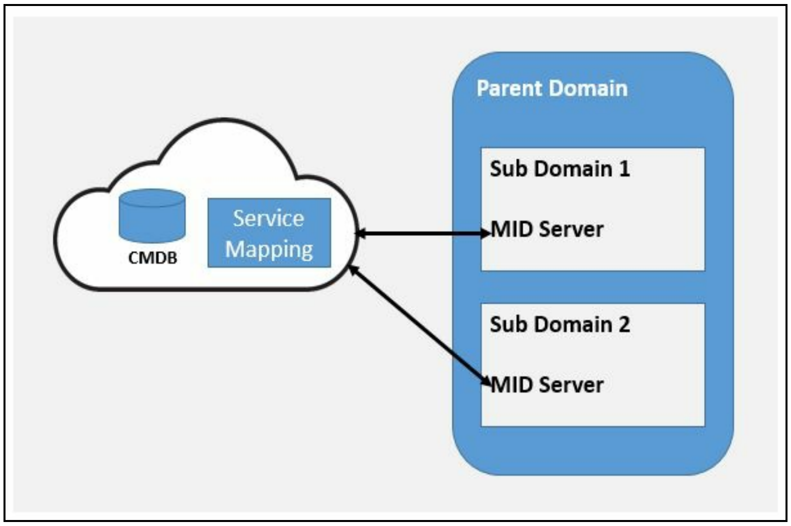
Depending on infrastructure factors that include the size of infrastructure there might be a need to place multiple MID Servers in the enterprise network. Placing multiple MID Servers will reduce the load and distribute the functionality between the MID Servers and what they are intended for. For example, there might be five MID Servers that are being used for only SSO integration and there might be an MID Server used for orchestration.

MID Server can be installed on a single machine or multiple MID Servers on a single machine.

There are several factors that need to be considered to determine if multiple MID Servers are required:

- **Network**: In a WAN deployment, deploying and having one MID Server to probe the WAN network might be a huge load and might impact the performance of the MID Server, the best way is to deploy MID Server into a different LAN network
- **Security**: Security policy controlled network devices with Access **Control List** (**ACL**) might require additional MID Servers on a machine in the network that is already on the ACL
- **Capacity and response time**: When the volume of configuration items to be discovered are high, multiple MID Servers need to be installed for it to be able to return responses quickly
- **Probes**: Depending on the type of probe there might be a need for separate MID Servers for each type of probe

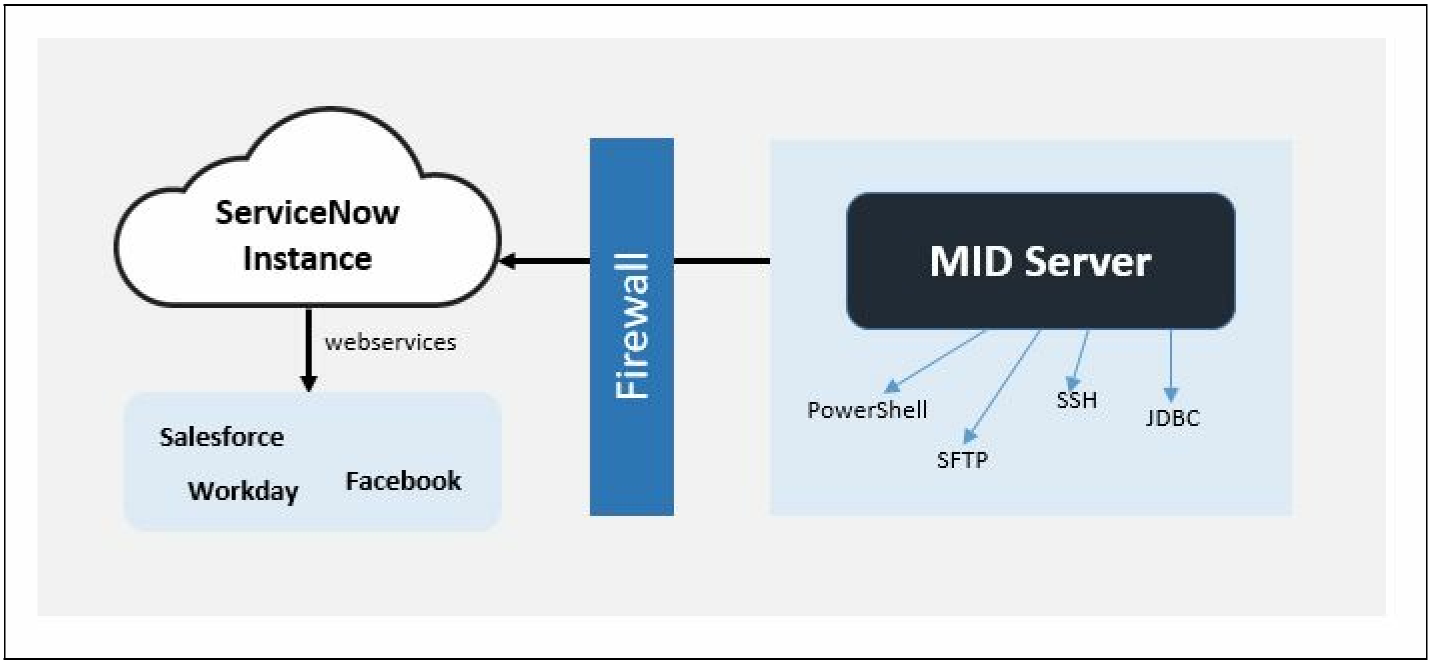
MID Servers are placed at the lowest domain level in a domain separated environment.



Orchestration

Imagine a world where a data center is situated several miles away from a corporate office, even rebooting the server requires a big commute to the data center. Imagine desktop technicians going through each desktop and installing software on each system. Imagine several manual steps in provisioning an AD or a virtual resource. Things have changed and people expect a speedy service and a more automated way of removing manual steps.

Orchestration is the automated arrangement, coordination, and management of complex computer systems, middleware, and services. Thanks to the automation tools available, it makes things much simpler. ServiceNow orchestration capabilities, unlike any other tools, provide orchestration or automation capabilities. Orchestration automates simple or complex multi-system tasks on remote services, servers, applications, and hardware. Orchestration is available as a separate subscription from the rest of the ServiceNow platform.

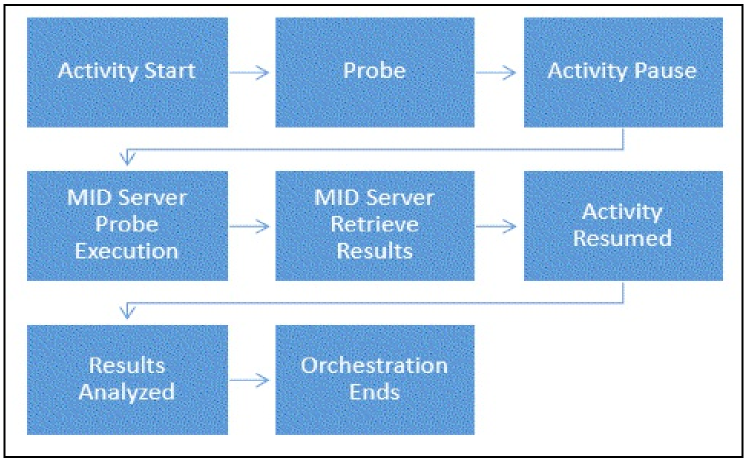


Orchestration provides the ability to make calls outside of a ServiceNow instance, directly to SOAP and REST web services, or to systems within an enterprise's corporate firewall through the MID Server. ServiceNow has workflow editor to create and define workflows across the different applications. The Orchestration extends the workflow editor by providing these features:

Activity packs containing ready-to-use activities:

- An activity designer that allows developers to create custom activities without having to rely on scripting
- The ability to create activity packs using scoped applications
- A databus for reusable data

When an orchestration activity starts within a workflow, orchestration launches a probe and writes a probe record to the ECC queue. The workflow pauses as the MID Server picks up the request and executes the probe. When the probe reports back, the workflow resumes as the results are analyzed. The workflow can exit or continue at this point.



Orchestration extends the ServiceNow workflow to interact with systems outside the ServiceNow instance. Orchestration provides custom activity packs you can use to automate tasks such as employee onboarding, user access rights, server management, and managed file transfers.

MID Server plays an important role in providing orchestration capability. MID Servers are associated with IP address ranges, enabling orchestration to select the correct MID Server to use for an orchestration activity based on the IP address of the target machine.

This functionality ensures that an MID Server with proper privileges is available wherever orchestration probes need to operate in a network. Auto finder also enables administrators to define specific capabilities for each MID Server within an IP address range.

Some of the automation that ServiceNow orchestration can perform includes the following VMware (through vCenter):

- Amazon EC2 instances
- Any system presenting web services
- Windows **Active Directory** (**AD**)
- Microsoft Exchange mail servers
- Puppet labs Puppet (with configuration automation)
- Chef (with configuration automation)
- Any system accessible from the command line

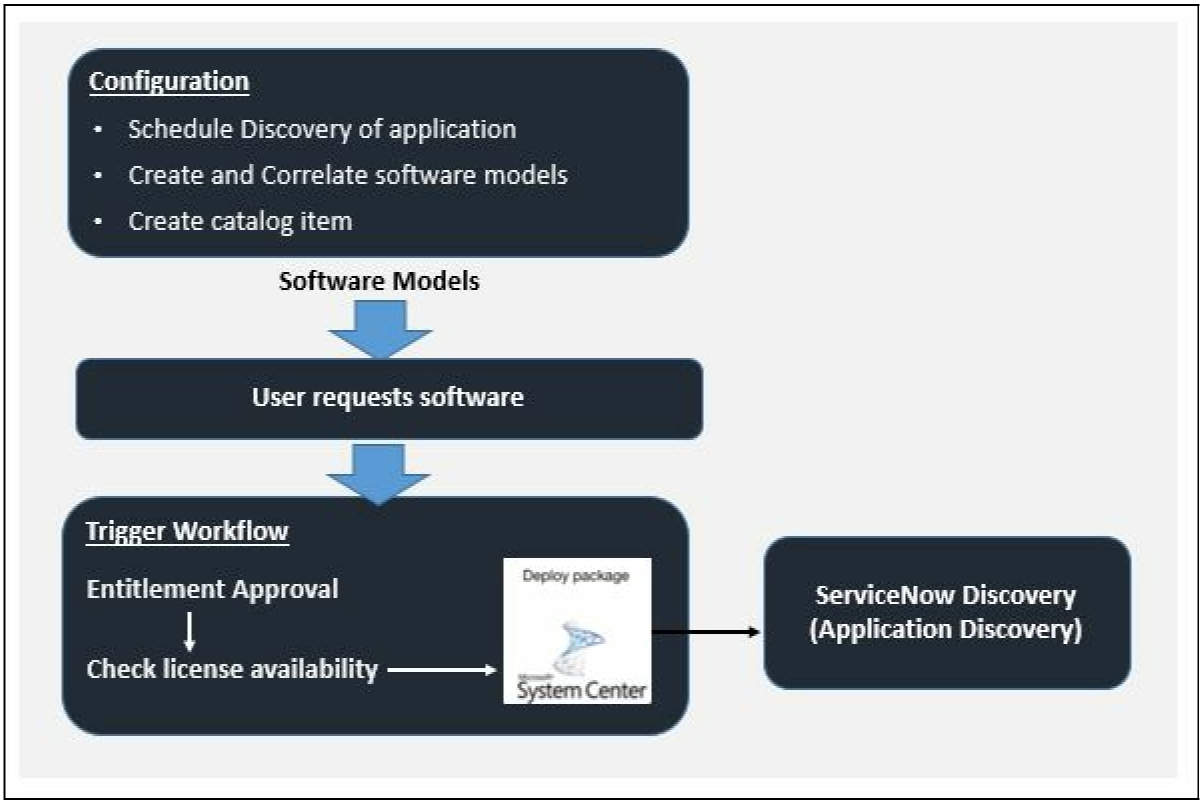
The AD activity pack enables an administrator to create, delete, and manage objects in Windows AD, such as users, groups, and computers, using a ServiceNow orchestration workflow.

For example, you can reset a password automatically from a user request. You can manage any user account in AD with these activities, whether or not it was created by an orchestration workflow. Orchestration workflow can perform the following in relation to the Activity directory:

- Add a user to group AD activity
- Change an AD user password
- Create an AD object
- Disable an AD user account
- Enable an AD user account
- Check if an AD account is locked
- Query AD
- Remove an AD object
- Remove a user from group AD activity
- Reset an AD user password
- Unlock an AD account
- Update an AD object

Orchestration provides several applications with your subscription:

- **Orchestration ROI**: The orchestration ROI application computes savings resulting from automated tasks in your instance, based on the hourly rate selected for performing tasks manually and the time period of the evaluation. Orchestration ROI estimates your savings by multiplying the cost of performing repetitive tasks manually by the estimated number of times the system performs those tasks automatically during a specific date/time range. The system also calculates the actual savings of your automations. Orchestration ROI is included with the base orchestration subscription. Orchestration ROI reports offer a number of views of the comparative data and allow you to access the associated records directly from the reports.
- **Client software distribution**: The **Client Software Distribution** (**CSD**) application allows administrators to distribute software from the service catalog using third-party management systems. CSD allows an administrator to create all the records necessary to deploy software from service catalog requests, including software models and catalog items. CSD also integrates with software asset management to track license counts for deployed software. Deployment is accomplished using orchestration activities and workflows.



- **Configuration automation**: Configuration automation allows you to use ServiceNow orchestration, Puppet, and Chef to provision and configure individual servers or groups of servers in your network. Chef is a server management application that can use ServiceNow CI data to bring Linux or Windows computers into a desired state by managing files, services, or packages installed on physical or virtual machines. Puppet is a server management application that can use CMDB data to bring computers into a desired state by managing files, services, or packages installed on physical or virtual machines. The ServiceNow application can interact with Puppet systems that run on Linux.
- **Password reset and password change**: The password reset application allows end users to use a self-service process to reset their own passwords on the local ServiceNow instance. Alternatively, your organization can implement a process that requires service-desk personnel to reset passwords for end users. The password change application extends the password reset application by letting admins define how users change their passwords.
- **Self-service process**: Users reset their password over the Internet using a browser on all supported interfaces, including mobile devices.
- **Service-desk password reset process**: Users reset their passwords with the assistance of a service-desk employee, over the phone or in person.

Service mapping

The organization provides services to its customers. IT plays a critical role in providing services to the business community who actually deliver the services to the end users or sell the products. Each line of a separate product line or type of service provided is called a **business service**. Some examples of business services include:

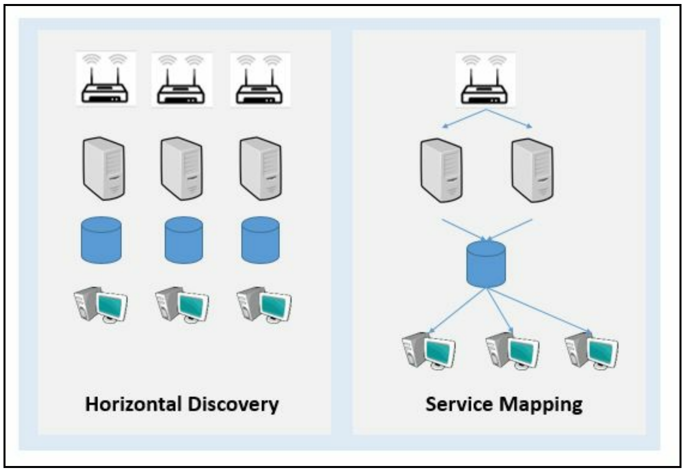
- Financial institutions such as a bank might have business services such as loans, credit cards, banking accounts, and so on
- In a health care pharmacy business, services might include research, development, and manufacturing
- In an oil and gas business, services might be downstream, upstream, manufacturing, research and development, and shipping

Each organization has exclusive types of business services to offer, some of the business services might overlap, which are pertinent to the same type of domain. A business service view to IT is most important to understand how IT is impacting the business or supporting a business service. Service mapping helps to bridge the gap to understand how IT is connected to the business. Service mapping helps to build a detailed map of all the configuration items, including all the hardware and software related configuration items used in a business service.

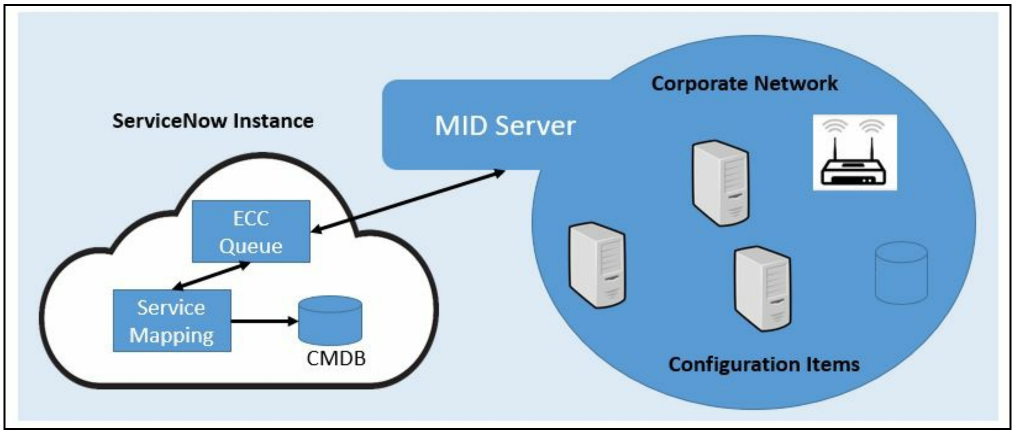
In some of the organizations people usually take an inventory of the list of configuration items that are isolated individually. These do not have any view of how configuration items are connected to a given business service, these types of mapping are called horizontal mapping, which just has relation to how CI's are connected to individual configuration item components, but no relation to each component of the configuration item. In a service mapping there is a holistic view of how different CI's components are mapped to other individual components of a business service.

Service mapping collects data about devices and applications used in business services in the organization. It then creates a map of business services and writes the collected data into the CMDB. Service mapping uses patterns to discover and map CIs. A typical service mapping pattern consists of two types of algorithms--one for CI identification and one for finding CI connections.

Business service maps show the snapshot of the interconnection between the infrastructure and the business service, service mapping helps to regenerate the maps with up-to-date information.

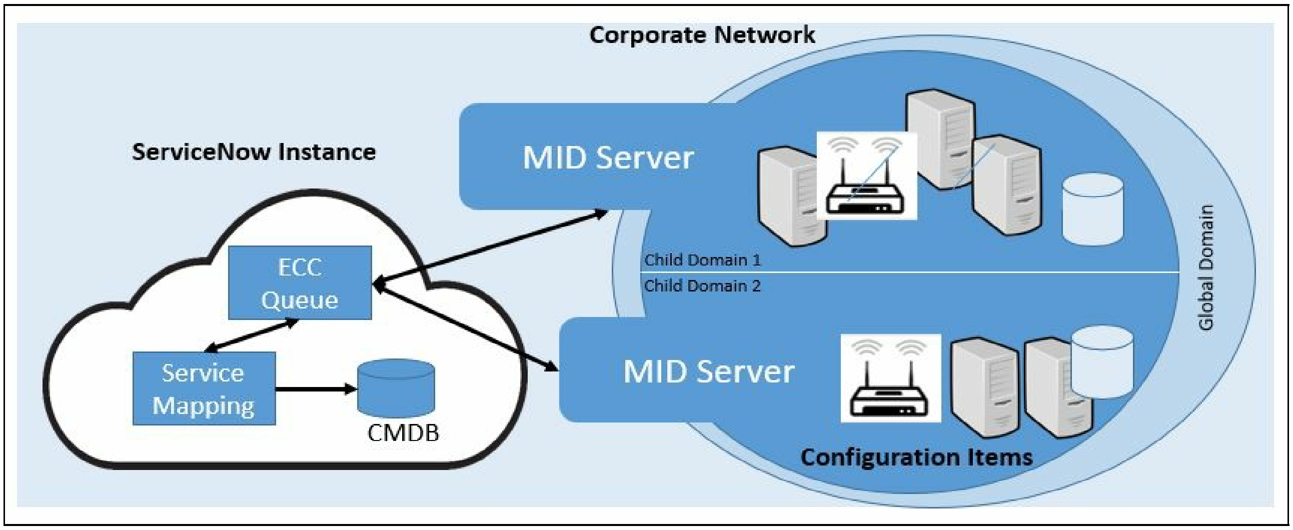


Service mapping creates maps of the business services by working together with other ServiceNow components. Service mapping uses the ECC queue and MID Servers for discovery and it writes discovered information into CMDB.



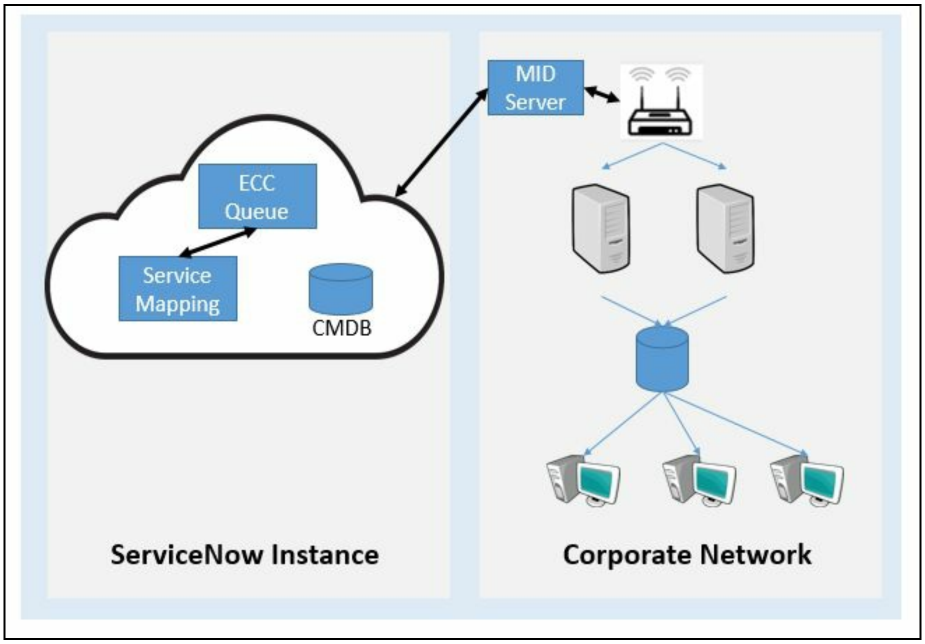
Mapping of devices is dependent on how the MID Server is set up and how discovery is configured. There might be a need of multiple MID Servers based on several factors, including configuration items sitting on a dematerialized zone and also secured network, multiple MID Servers are placed to discover data from multiple sources, and doing the service mapping.

The following figure describes how MID Server is set up in a domain separation environment:



How service mapping works

In this section, lets explore and see how Service Mapping works.



1. For every discovery request, service mapping selects MID Server, by default service mapping selects the MID Server whose IP ranges matches the IP in the discovery request. If there is not a match service mapping selects the default MID Server.
2. Service mapping creates a discovery request for the IP address of the entry point. It then writes the request in the (**ECC**External Communication Channel (ECC) queue and assigns an MID Server to the request.
3. The MID Server passes information on the discovered CI, its attributes, and connections to the ECC queue.
4. The MID Server checks the ECC queue and retrieves the discovery request assigned to it.
5. The MID Server starts running identification sections of the pattern to find the match for the entry point. When the identification section matches the entry point, the pattern discovers a CI.

6. The MID Server starts running connectivity sections of the pattern to find outgoing connections of the newly discovered CI.
7. Service mapping checks the ECC queue and receives information on the newly discovered CI.
8. Service mapping writes the information into the CMDB and adds this CI to the business service map.

Event management

Incidents occur in the IT Infrastructure that impacts a business service. These incidents originate from various sources, such as events and alerts. The IT infrastructure is monitored by various different sets of monitoring tools at different organizations. These monitoring tools collect data from the individual infrastructure components about their activity and signs of abnormality, these might be log messages, warnings, errors, failure messages, security messages, and so on. These messages are called events. ServiceNow event management helps to identify issues across the infrastructure in a single pane of glass or management console by providing event and alert analysis to ensure service availability with the ability to:

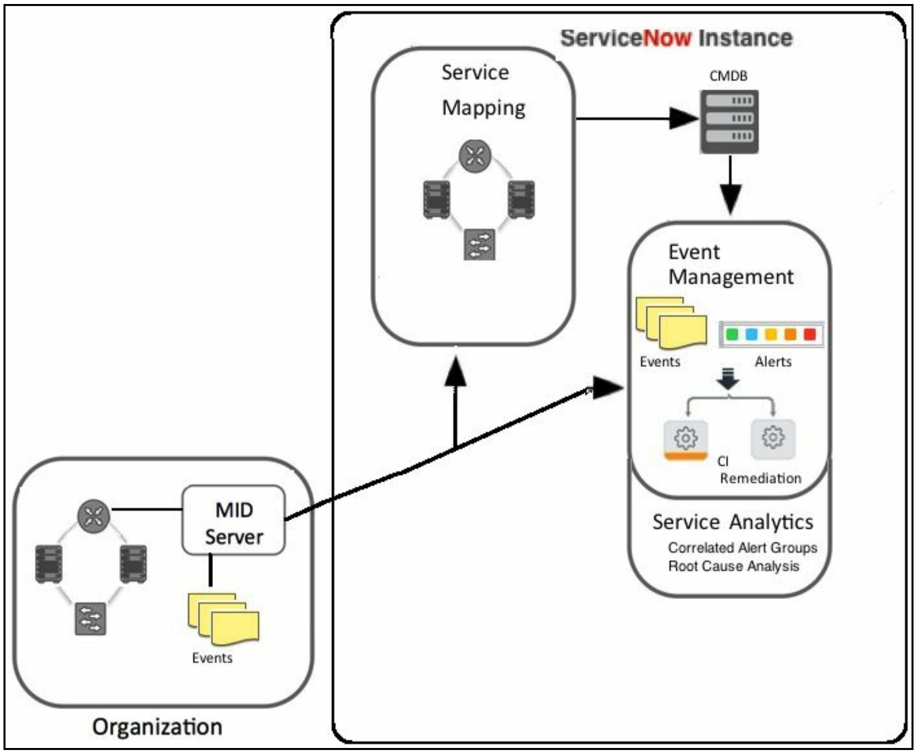
- Configure rules for triggering incidents and remediation actions
- Configure alert binding to CIs, services, and hosts for root cause analysis
- Track events from various systems on a single console
- Monitor the alerts console for real-time event processing
- Review the color-coded service maps to see high priority alerts and events
- Use dashboards for monitoring, analysis, and remediation of alerts
- Get a history of previous alerts and events
- Review impact relationships between parent and child CIs
- Review impact and severity calculations based on alerts to prioritize work
- Remediate alerts by integrating with orchestration

An alert is a notification generated by event management for selected events that are considered to be important and require attention. As part of the alert life cycle, you can manage alerts in the following ways:

- Acknowledge alerts
- Create a task such as an incident, problem, or change
- If automatic remediation tasks apply to the alert, begin automatic remediation to start a workflow
- Complete all tasks or remediation activities
- Close alerts for resolved issues
- Add additional information, such as a knowledge article for future reference

The generation of alerts is based on event rules. Event management processes events, generates alerts, and manages alert and incident resolution. Event management either pulls events from supported external event sources using an MID Server.

Event management leverages service mapping data and also data from service analytics to resolve an alert that is raised from the IT infrastructure component. Events are related to the configuration items in the CMDB; when an event is generated, event management locates the associated CI for generating an alert.



Source: wiki.servicenow.com

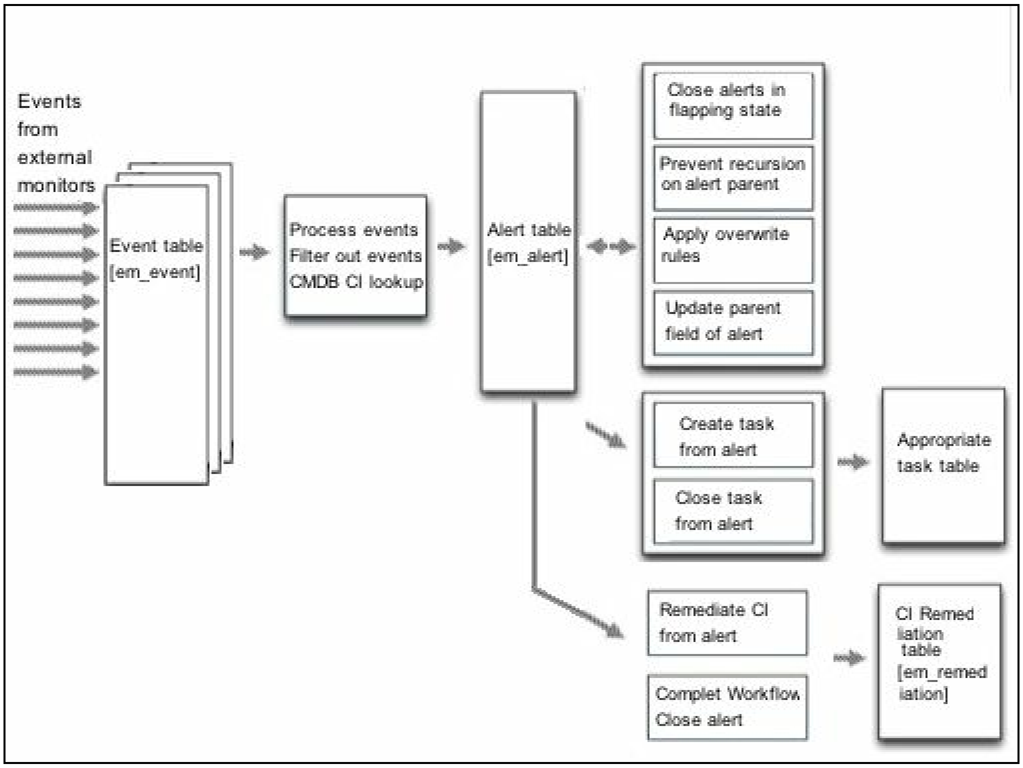
Event rules can be configured in ServiceNow with the ability to perform and take certain actions as required. Detailed event information associated with individual events or a group of eventent information associated with individual events or a group of events with individual rules set can be viewed within ServiceNow.

If an event rule or event field mapping used the event or group of events to generate an alert, the event information appears in the Activity section of the alert. Event management within ServiceNow has the ability to manage external events and also configure alerts for discovered business services.

Event management workflow

High-level workflow of event management in ServiceNow is described in the following list:

- Events from other monitoring tools that are integrated and fed into ServiceNow are stored in the event table, which is the `em_event` table first.
- Events are then processed for appropriate escalation by referring to the CMDB. For example, some of the events raised by critical business service and associated infrastructure might be resolved as a critical event and they follow the appropriate escalation rules that are configured.
- Unintended events are filtered out at the next state.
- Alert tables are referenced next for taking appropriate actions against the raised and processed events.
- During events processing the correlation is done this point by either overwriting or preventing recursion alerts.
- Appropriate remediation tasks are created at the next state. At places where automated self-healing solutions are in place, orchestration tasks kick in according to the configured parameters.
- Tasks and remediation related activities utilize the task and the remediation table.


Events from external monitors
Event table [em_event]
Process events Filter out events CMDB CI lookup
Alert table [em_alert]
Close alerts in flapping state
Prevent recursion on alert parent
Apply overwrite rules
Update parent field of alert
Create task from alert
Close task from alert
Appropriate task table
Remediate CI from alert
Complet Workflow Close alert
CI Remed iation table [em_remed iation]

Source : wiki.servicenow.com

Summary

In this chapter, we covered an overview of ITOM, explored different ServiceNow ITOM components including high-level architecture, functional aspects of ServiceNow ITOM components that include service mapping, discovery, event management, MID Server, credentials, service mapping, dependency views, orchestration, discovery, and cloud management.

In the next chapter, we will start detailing each of the individual ITOM components, especially the MID Server. We will describe prerequisites, any license requirements, and also how to set up and configure the individual ITOM component.

MID Server Essentials

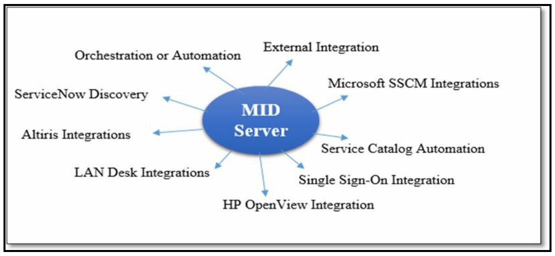
MID Server is one of the important components in ServiceNow. MID Server is a piece of software installed on a computer at a given network. In this chapter, we will learn about how the MID Server works, MID Server installation, and MID Server configuration steps.

MID Server architecture

In Chapter 1, *Introduction to IT Operations Management in ServiceNow*, we covered the architecture of an MID Server. In this chapter, we will explore how to set up an MID Server in technical detail and the prerequisites needed.

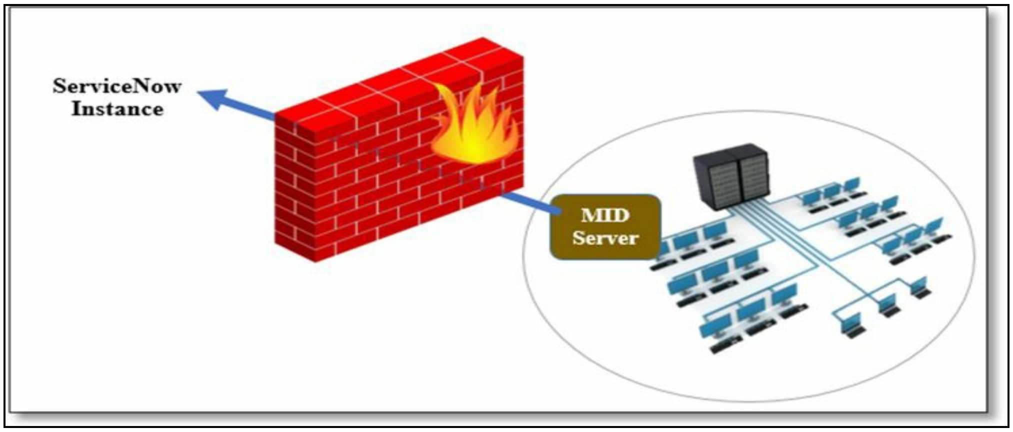
Summarizing what we learnt about MID Server, ServiceNow is a SaaS-based application that requires some form of communication mechanism to be able to talk to corporate networks. MID Server plays an important role within ServiceNow as it helps various applications within the ServiceNow suite to facilitate data exchange and establish communications between ServiceNow instances and corporate networks.

MID Server is an important plugin within ServiceNow that is utilized by various applications within ServiceNow, not limited to the following various integrations:



Applications that leverage MID Server

MID Server is Java software that is installed on a compatible server within the corporate network, this makes the communication secure enough to talk to the corporate network by not exposing any security drawbacks. Depending on the type of infrastructure set up, multiple MID Servers are placed within the network. MID Server is installed behind the company firewall, allowing communication between ServiceNow and the rest of the company network.



MID Server setup

MID Server communications

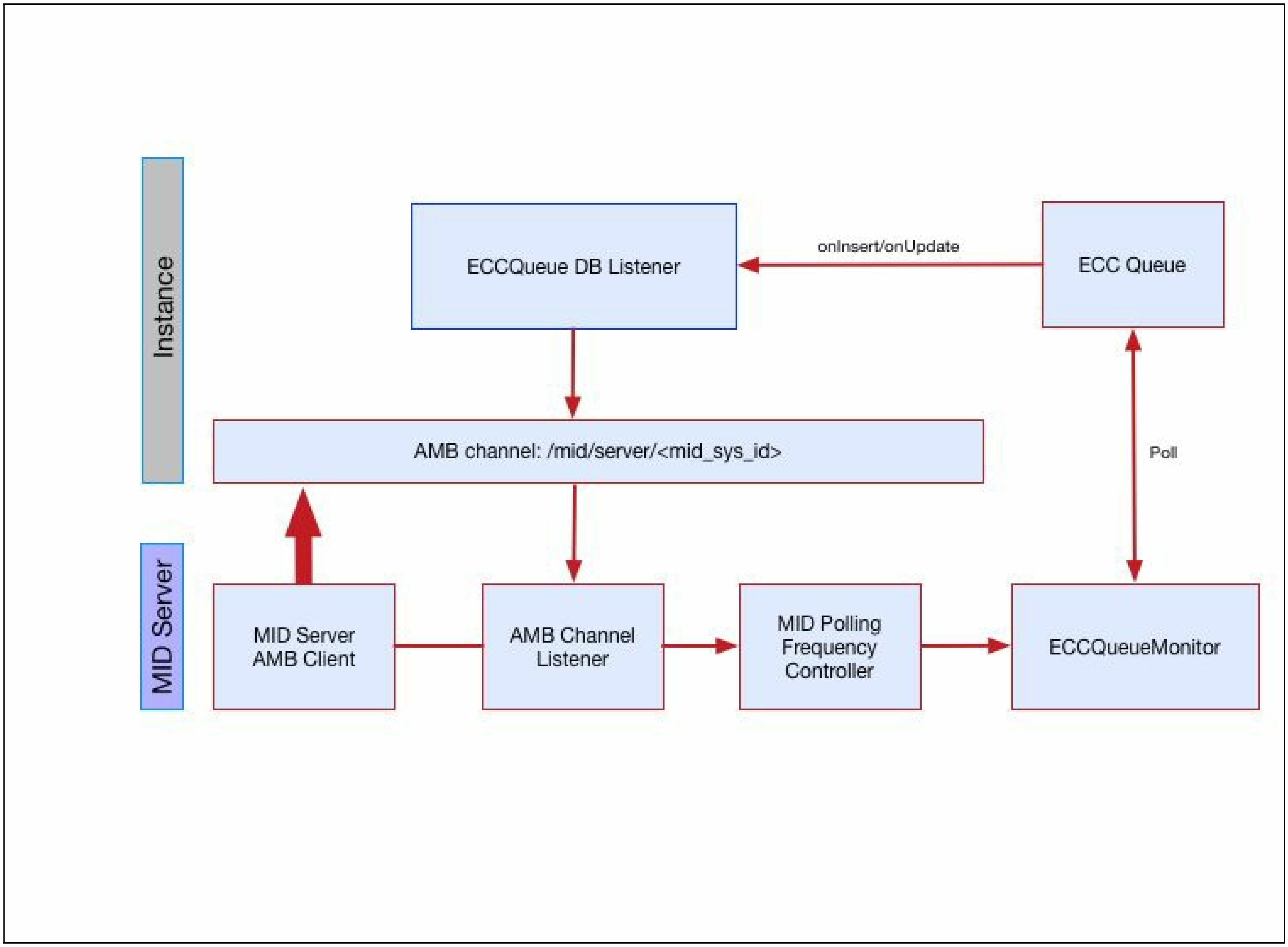
MID Server communications happen through an **External Communications Channel** (**ECC**) queue. One way to think about the ECC queue is like an airline check-in kiosk. MID Servers check each of these kiosks on a regular basis to see if there are any activities that need to be performed. If there is any activity then MID Server does the job and sends the information back to the ECC queue, which is utilized by the ServiceNow instance to use. ECC queue is an integration point between other systems and the ServiceNow instance. ECC queue is a table in the ServiceNow database that stores messages that are entered through other systems. Messages are classified as output and input messages:

- **Output messages**: Messages from the ServiceNow instance to some other system
- **Input messages**: Messages from other systems to the ServiceNow instance

The MID Server subscribes to messages published by the **Asynchronous Message Bus** (**AMB**), which notifies the MID Server that it has pending tasks in the ECC queue.

The MID Server opens a persistent connection to the instance through the AMB and listens on the `/mid/server/<mid_sys_id |` AMB channel. When an output record is inserted into the queue `[ecc_queue]` table, an AMB message is sent to the MID Server's channel. The MID Server receives this message and immediately polls the `ecc_queue` table for work.

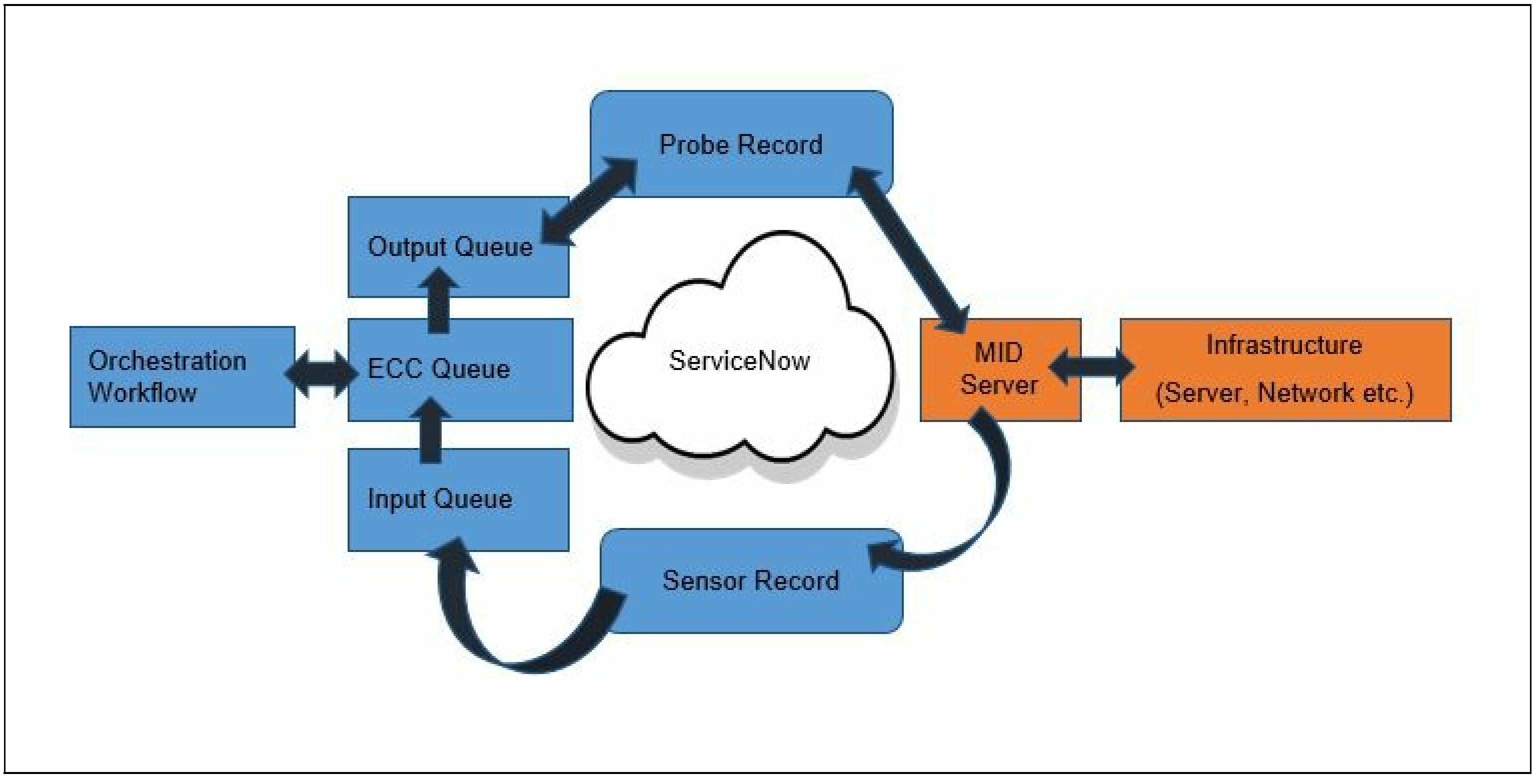
The MID Server polls the ECC queue on the regular intervals defined in the `mid.poll.time` configuration parameter, regardless of AMB message activity. The default polling interval is set to 40 seconds, but it can be reconfigured. This polling of the ECC queue at a regular interval is done in case the AMB connection is dropped.



Source: wiki.servicenow.com

MID Server use case in an orchestration workflow

In the following figure, we can see how an MID Server is utilized in an orchestration workflow:



In the preceding figure, MID Server is used to perform an orchestration workflow. The following steps show how the communication happens from the ECC queue to the MID Server and back to the orchestration workflow:

1. When an orchestration workflow is run, a probe record is created
2. MID Server checks the output queue every 15 seconds and receives the probe record from the output queue.
3. MID Server finds the probe record and it reads through and executes against the specified target system or infrastructure component.
4. MID Server now returns the response back of the payload from the probe into the input queue.
5. Orchestration workflow looks at the output queue on the response back from the MID Server and follows the rest of the defined orchestration steps or scripts that need to be executed.

MID Server, which is placed in the corporate networks, queries every 15 seconds to search for probe records. These parameters of 15 seconds frequencies can be adjusted to avoid unnecessary traffic in a multiple MID Server deployment scenario.

Once the probe records are executed, the results are posted back to the ServiceNow instance. Sensors are processors of the probe records, sensors decide how to precede on communicating with the particular infrastructure component. MID Server makes only outbound calls with no inbound calls made from ServiceNow to the MID Server. MID Server communications are securely initiated through SOAP on the HTTPS (port `443`) within the enterprise firewall.

Unlike how different people talk different languages to communicate, MID Server uses different probe technologies to communicate with different types of infrastructure components, some of them include PowerShell, SSH, and so on.

MID Server prerequisites

In this section, we will cover the detailed prerequisites required to set up MID Server including any license requirements.

- **Required ServiceNow plugins**:
    - MID Server
- **External dependency**: Ability to access networks without any restriction
- **System requirements**:
    - Operating system:

      Windows physical or virtual server with the operating system 2003, 2008, and 2012

      Linux physical or virtual server

- **System suggested configuration:**
    - 4 GB of available RAM with minimum 500 MB of disk space
- **Role requirements**
    - MID Server user role
    - System administration of the server to install the actual MID Server
- **License requirements**: None

Now that we have gone through prerequisites for MID Server, let's now explore in detail step-by-step procedures to begin checking the prerequisites.

MID Server configuration and setup

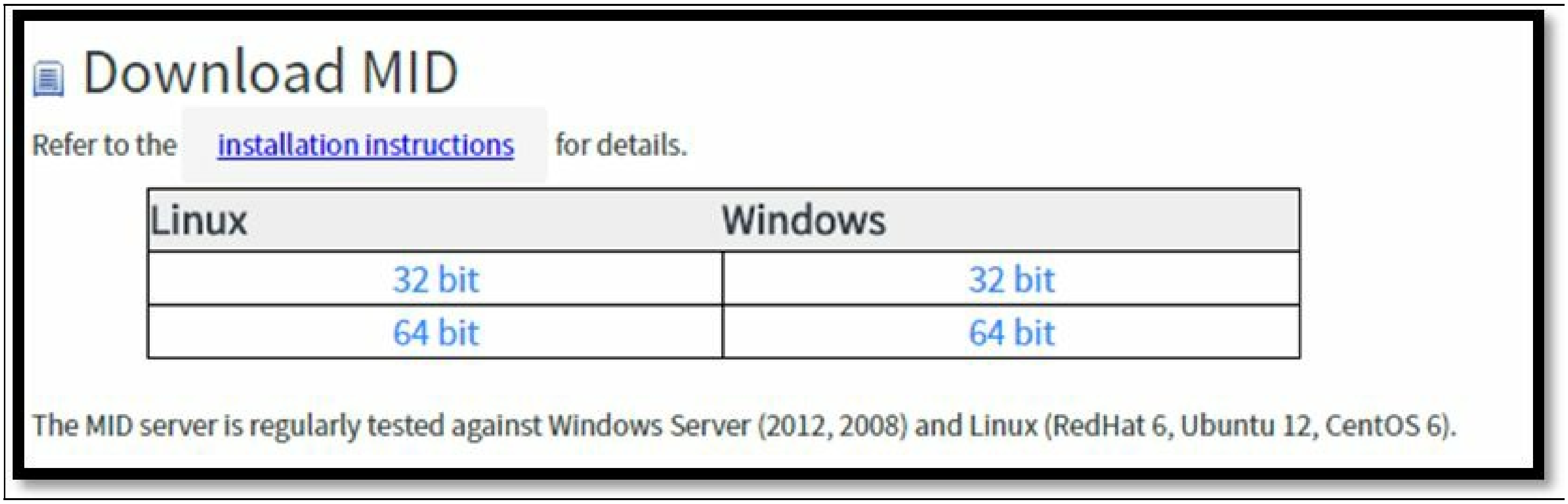
Let's explore the steps required to configure MID Server connection prerequisites:

First step is to set up users and roles for MID Server. MID Server uses users and roles to interact with the ServiceNow instance through the SOAP web service. Best practice is to create individual user accounts for each of the MID Servers in the network that need to have a `mid_server` role to be able to access the restricted tables within ServiceNow.

Creating a MID Server role

Download the MID Server installation:

1. Log on to your server where you intend to install the MID Server.
2. Open the supported browser and log on to the ServiceNow instance, which is usually the developer instance.
3. Log on to the ServiceNow instance with your credentials.
4. On the remote Windows server navigate to MID Server | Downloads:



Download MID

Refer to the installation instructions for details.

Linux	Windows
32 bit	32 bit
64 bit	64 bit

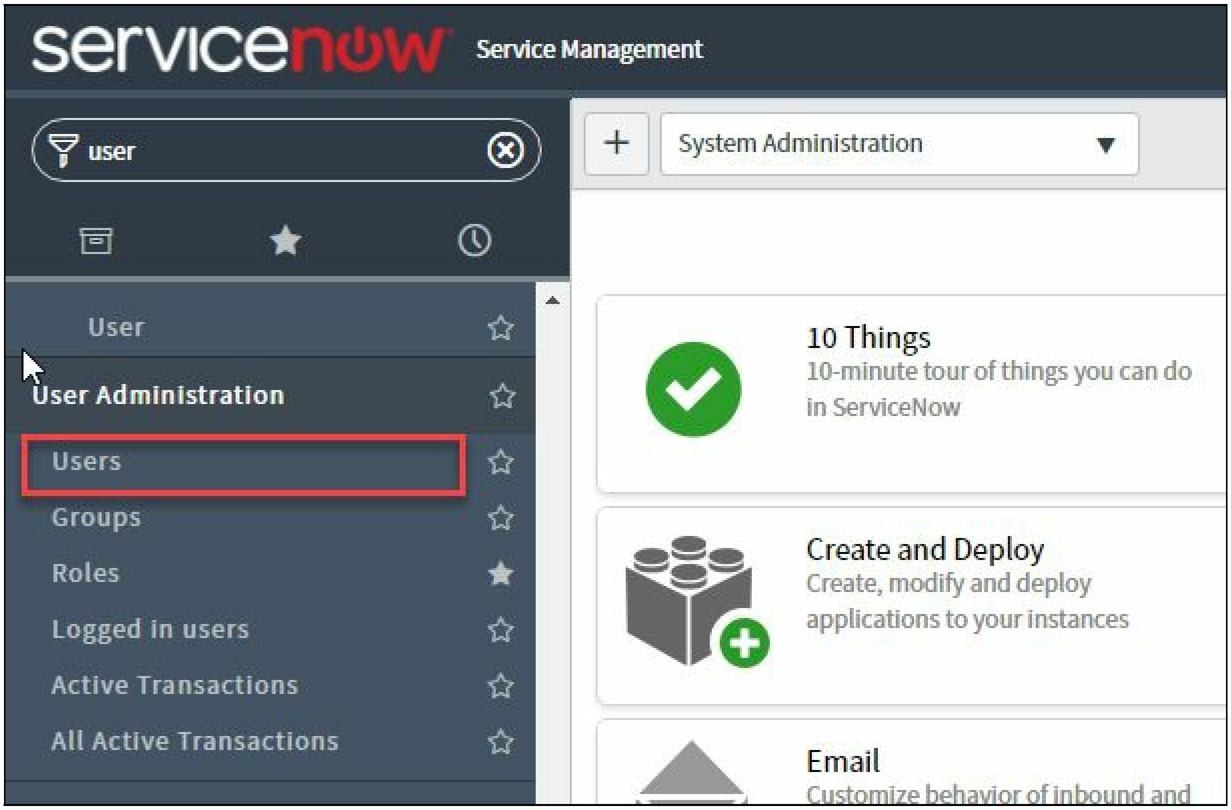
The MID server is regularly tested against Windows Server (2012, 2008) and Linux (RedHat 6, Ubuntu 12, CentOS 6).

In this example, we will go ahead and download the 32 bit version. Now right-click on Windows and right-click on 32 bit and then download to the server or the local machine where you are going to install the MID Server.

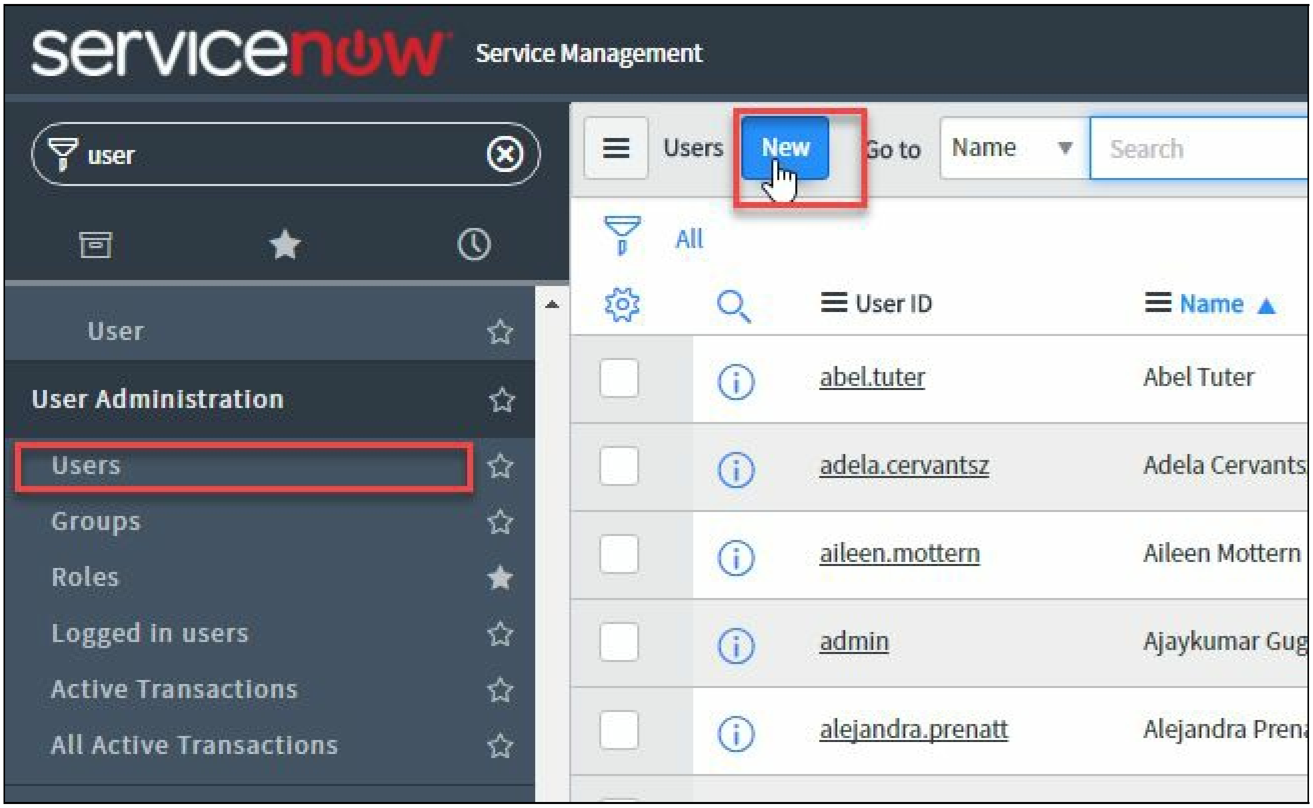
Creating an MID Server user

The next step is to create an user called `mid_server` to be able to work with the ServiceNow instance. The following are the steps to create a new user, `mid_server` , in the ServiceNow instance:

1. Log on to your ServiceNow instance.
2. From the left application navigator, navigate to Users:



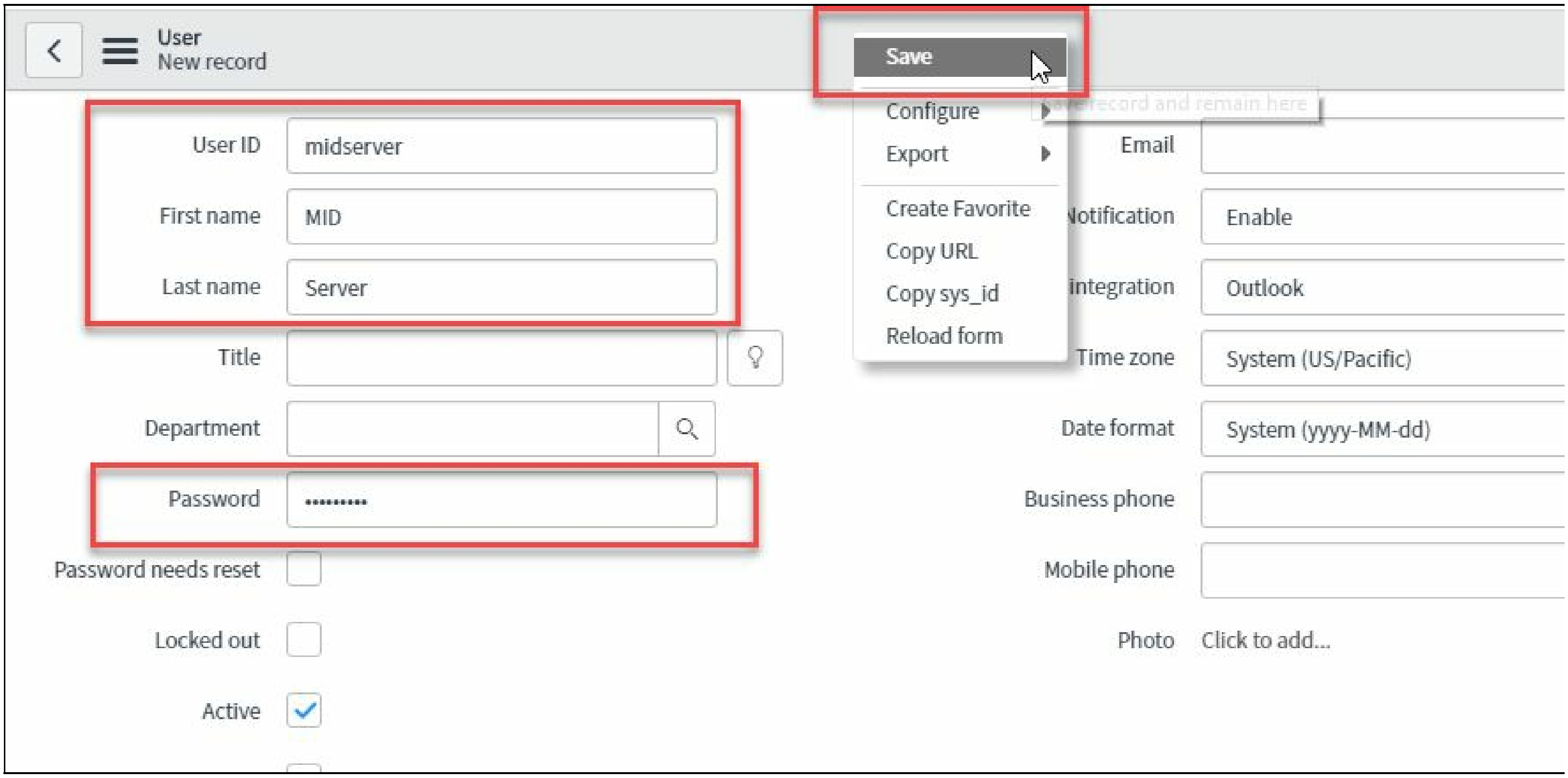
3. Now click on New to create a new user:



User ID	Name
abel.tuter	Abel Tuter
adela.cervantsz	Adela Cervants
aileen.mottern	Aileen Mottern
admin	Ajaykumar Gug
alejandra.prenatt	Alejandra Pren

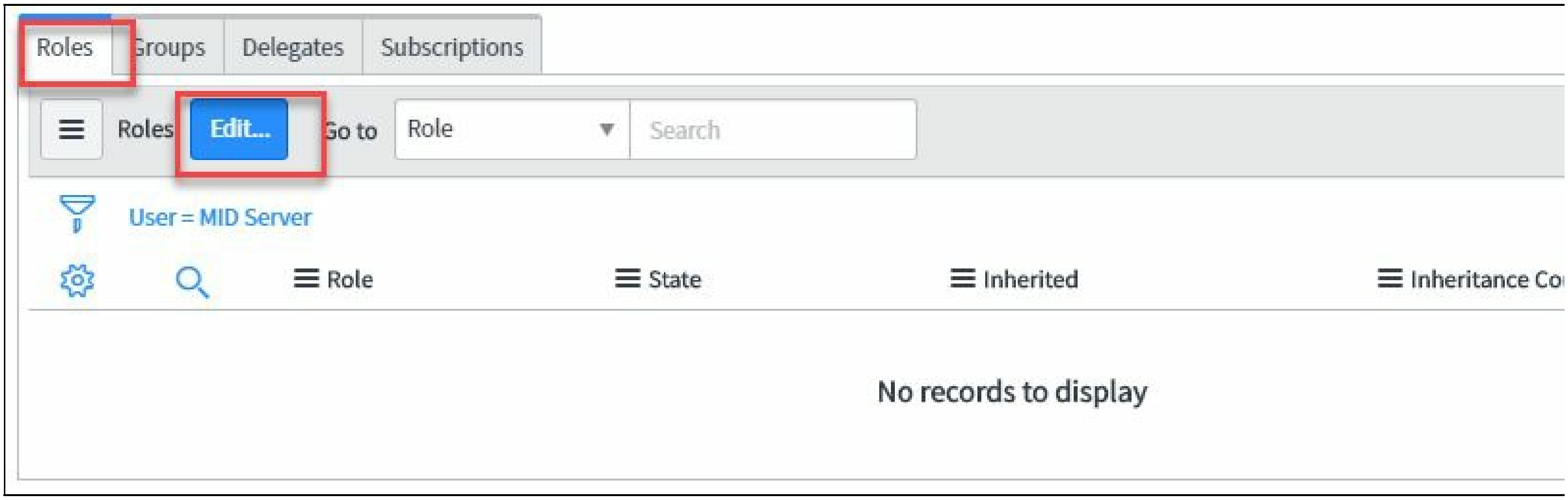
4. Fill in the required form files to create a new user:

- Provide the User ID as `midserver`
- Provide the First name as `MID`
- Provide the Last name as `Server`
- Provide the Password as `midserver`
- Please don't, you can provide any password that you wish to
- Right-click on the header bar and click on Save



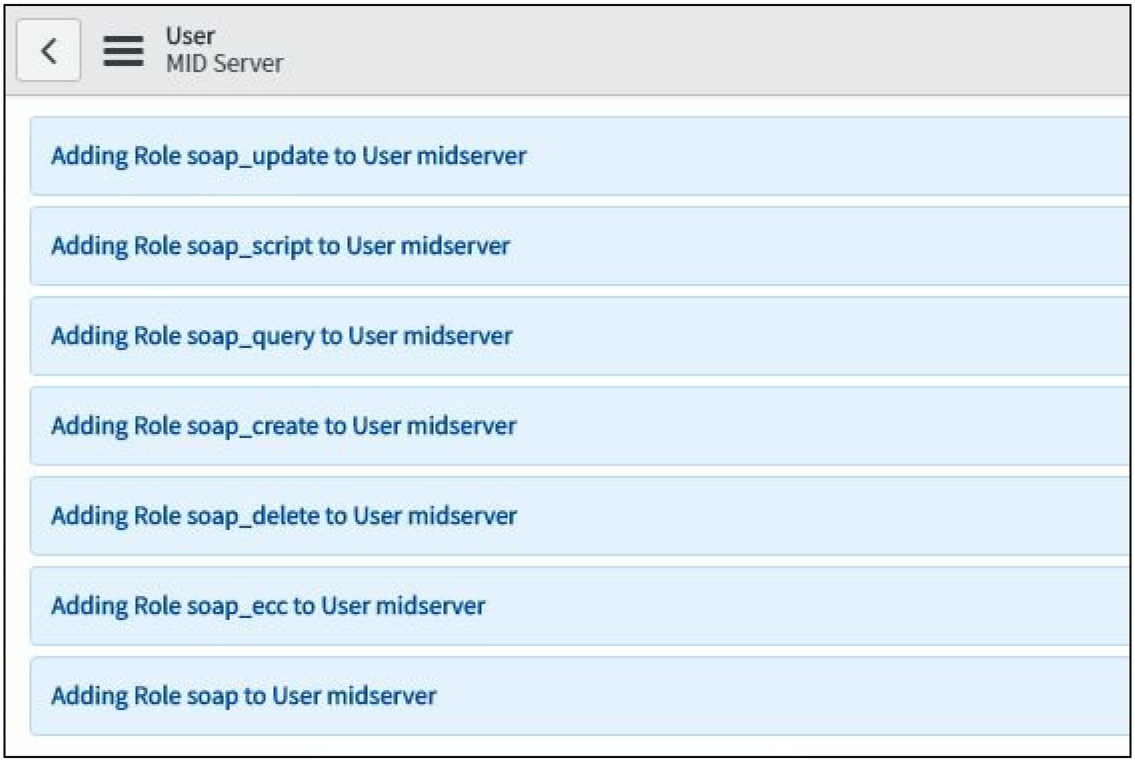
User ID	midserver
First name	MID
Last name	Server
Title	
Department	
Password	•••••••••
Password needs reset	□
Locked out	□
Active	☑
Email	
Notification	Enable
integration	Outlook
Time zone	System (US/Pacific)
Date format	System (yyyy-MM-dd)
Business phone	
Mobile phone	
Photo	Click to add...

5. Scroll down to the bottom to the Roles tab , you will not see the Roles tab until you click on Save:



No records to display

6. Now click on Edit.
7. Select the `mid_server` role for the left to the right selection box:



Adding Role soap_update to User midserver

Adding Role soap_script to User midserver

Adding Role soap_query to User midserver

Adding Role soap_create to User midserver

Adding Role soap_delete to User midserver

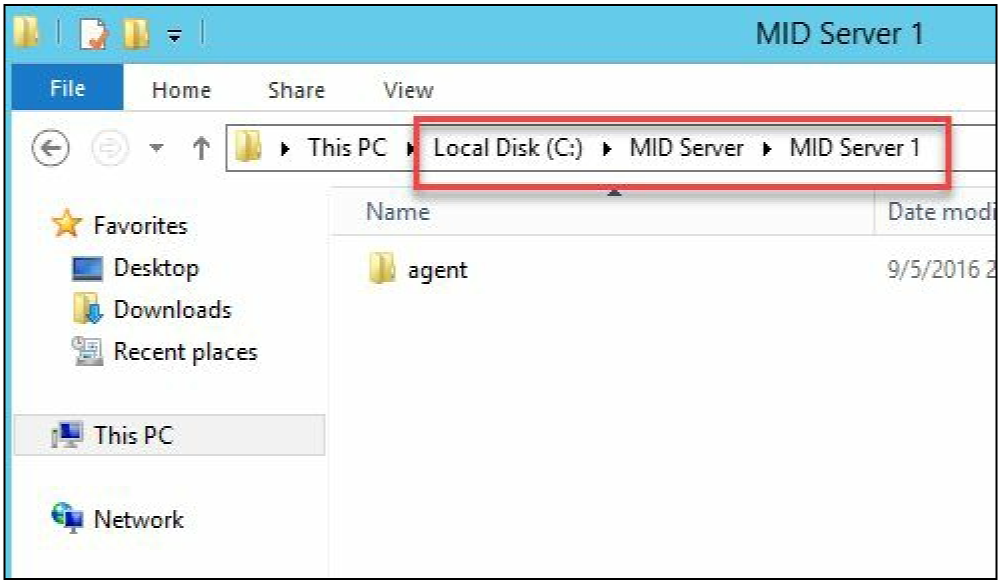
Adding Role soap_ecc to User midserver

Adding Role soap to User midserver

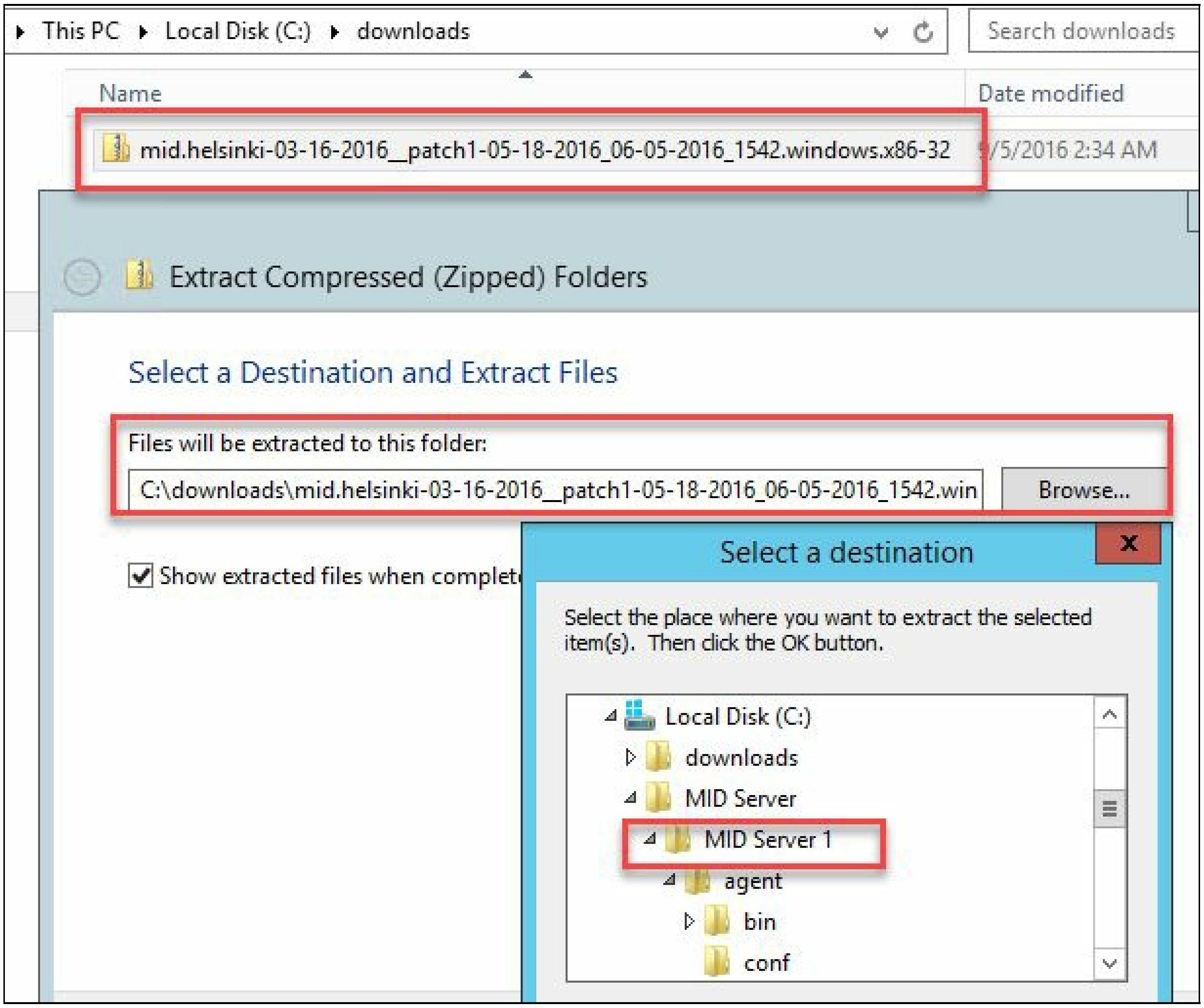
MID Server installation

Follow these steps to install the MID Server:

1. Create two folders in the root drive (example `C:` or `D:`)
2. Create a folder called `MID Server` in the root, the path to the folder will look like `C:MID Server`.
3. Now create one more folder called `MID Server 1` inside the newly created folder `MID Server`, the path to the newly created folder will look like `C:MID ServerMID Server1`:



4. Extract the downloaded installation to the folder: `C:MID ServerMID Server1`



This PC ▸ Local Disk (C:) ▸ downloads
Search downloads
Name
Date modified
mid.helsinki-03-16-2016__patch1-05-18-2016_06-05-2016_1542.windows.x86-32
9/5/2016 2:34 AM
Extract Compressed (Zipped) Folders
Select a Destination and Extract Files
Browse...
Select a destination
Local Disk (C:)
downloads
MID Server
MID Server 1
agent
bin
conf

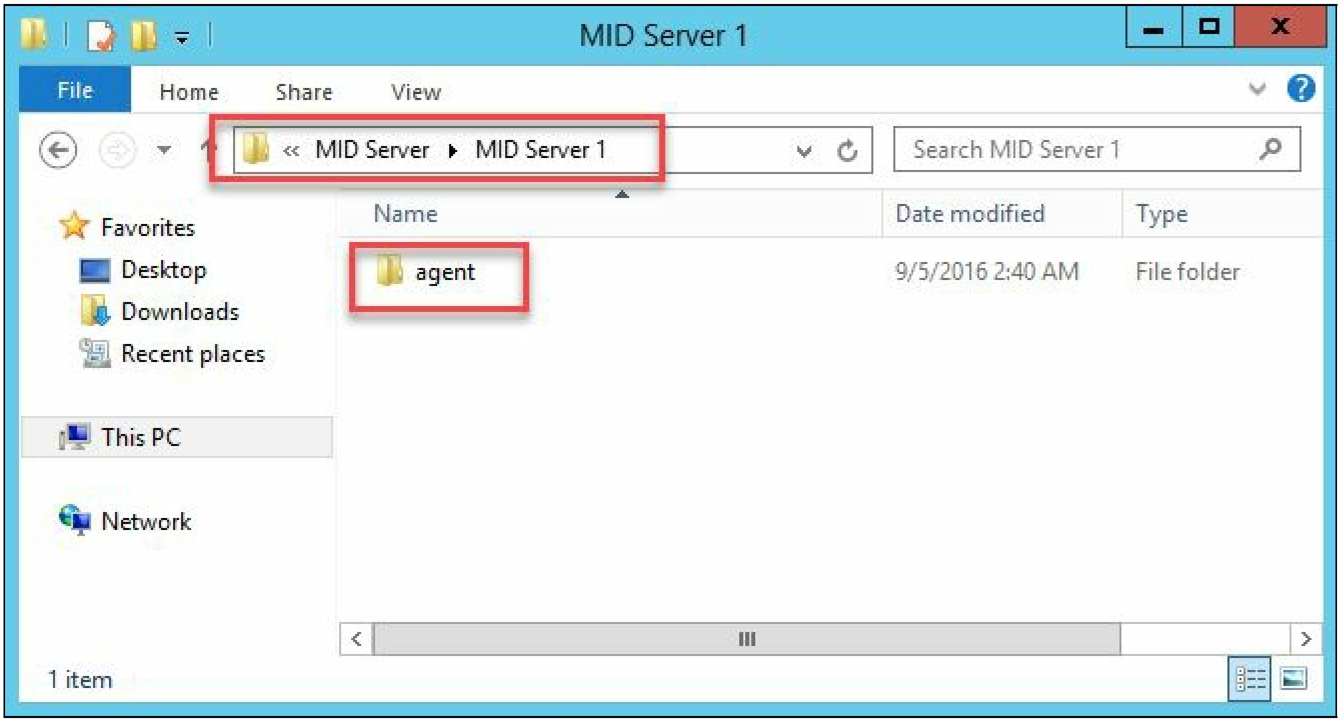
Files will be extracted to this folder:

C:\downloads\mid.helsinki-03-16-2016__patch1-05-18-2016_06-05-2016_1542.win

☑ Show extracted files when complete

Select the place where you want to extract the selected item(s). Then click the OK button.

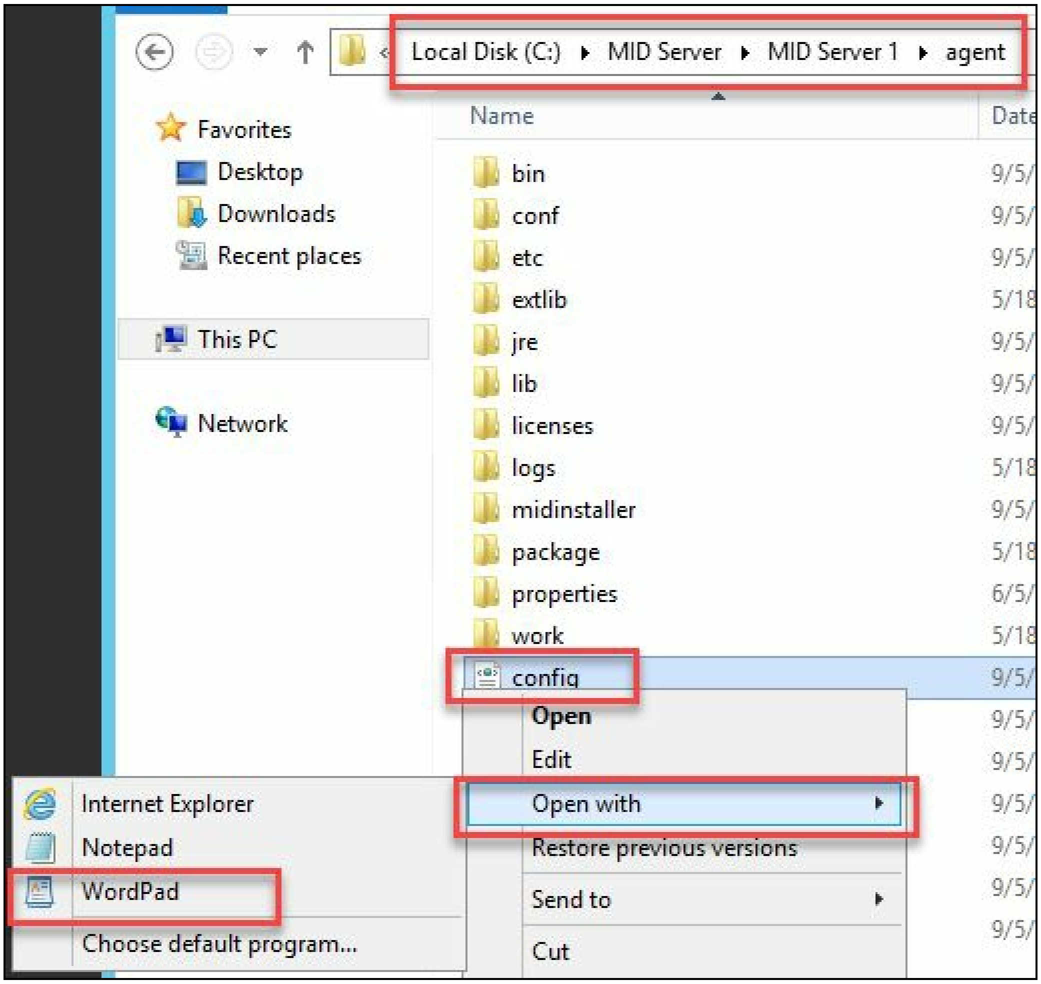
5. After extraction you will see a folder called `agent`:



The steps we have seen so far are common for a manual and automated installation. Now let's see the required steps for manual installation and we will later explain automated installation.

MID Server manual installation procedures

1. Open the folder called `agent` and you will see many folders and files inside the folder. Now right-click on the file called `config.xml` and click on Open with | WordPad or you can use any text editor:



2. In the `config.xml` file you will need to provide the instance URL, login credentials, and MID Server name. Follow these steps to configure the XML file:

    1. To configure the instance URL, in the `config.xml` file scroll down to the XML tag section `<parameters>` and set the `parameter name =url` value as your instance URL example:

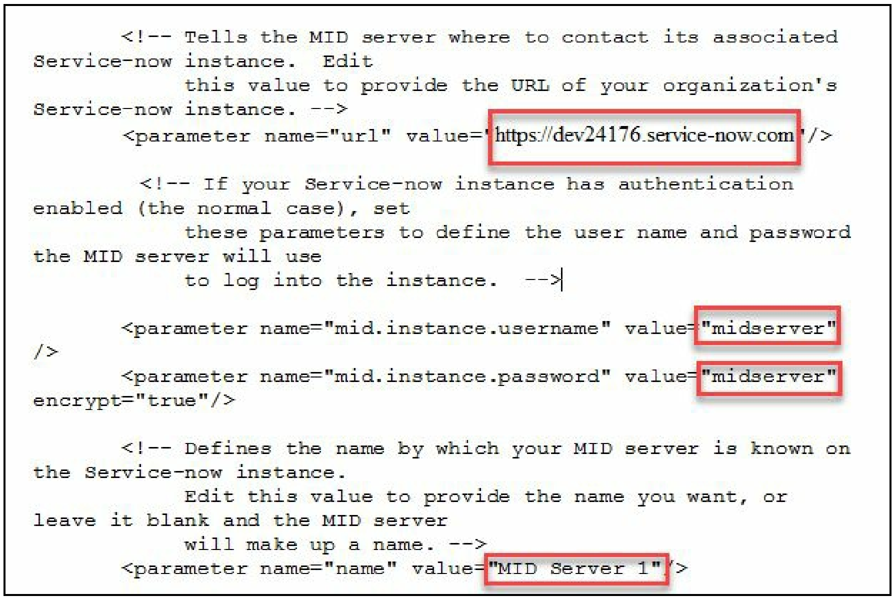
```
<parameter name =url value=https://dev24176.service-
now.com / |
```

    2. Now set the MID Server credentials as follows:

```
<parameter name=mid.instance.username value=midserver
/ |
  <parameter name=mid.instance.password value=midserver
  encrypt=true / |
```

    3. Now provide a name for the MID Server:

```
<parameter name =name value=MIDServer1 / |
```



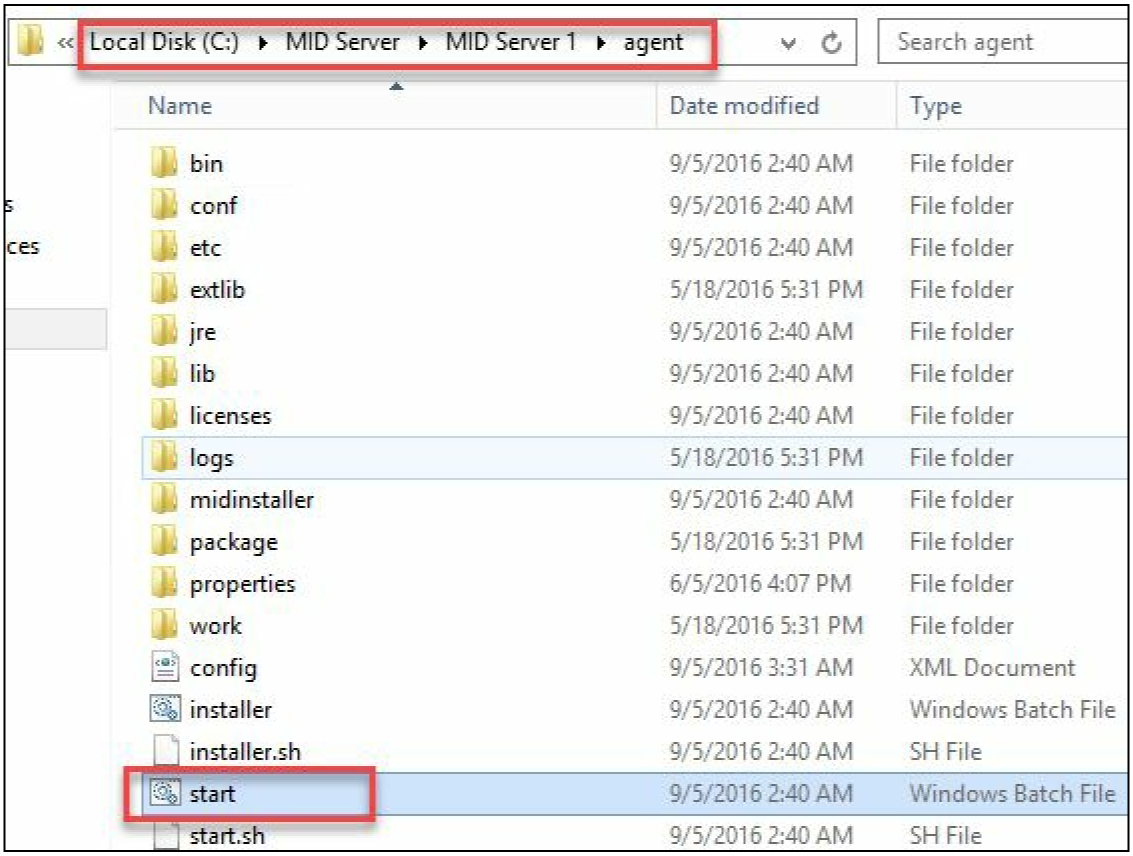
```
       <!-- Tells the MID server where to contact its associated
Service-now instance.  Edit
             this value to provide the URL of your organization's
Service-now instance. -->
       <parameter name="url" value="https://dev24176.service-now.com"/>

        <!-- If your Service-now instance has authentication
enabled (the normal case), set
             these parameters to define the user name and password
the MID server will use
             to log into the instance.  -->

       <parameter name="mid.instance.username" value="midserver"
/>
       <parameter name="mid.instance.password" value="midserver"
encrypt="true"/>

       <!-- Defines the name by which your MID server is known on
the Service-now instance.
             Edit this value to provide the name you want, or
leave it blank and the MID server
             will make up a name. -->
       <parameter name="name" value="MID Server 1"/>
```

3. Now save the `config.xml` and close it.

Configuring the MID Server services

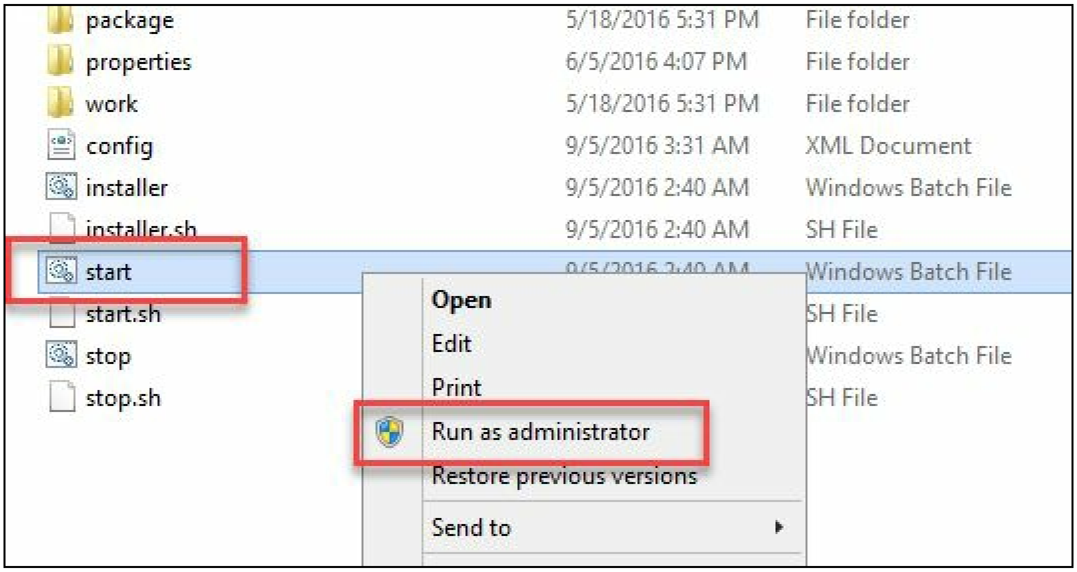
Follow the steps to configure the MID Server services:

1. Click on the `start.bat` file in the `agent` folder in `MID Server 1`, the path to the `agent` folder is `C:MID Server MID Server 1agent`.



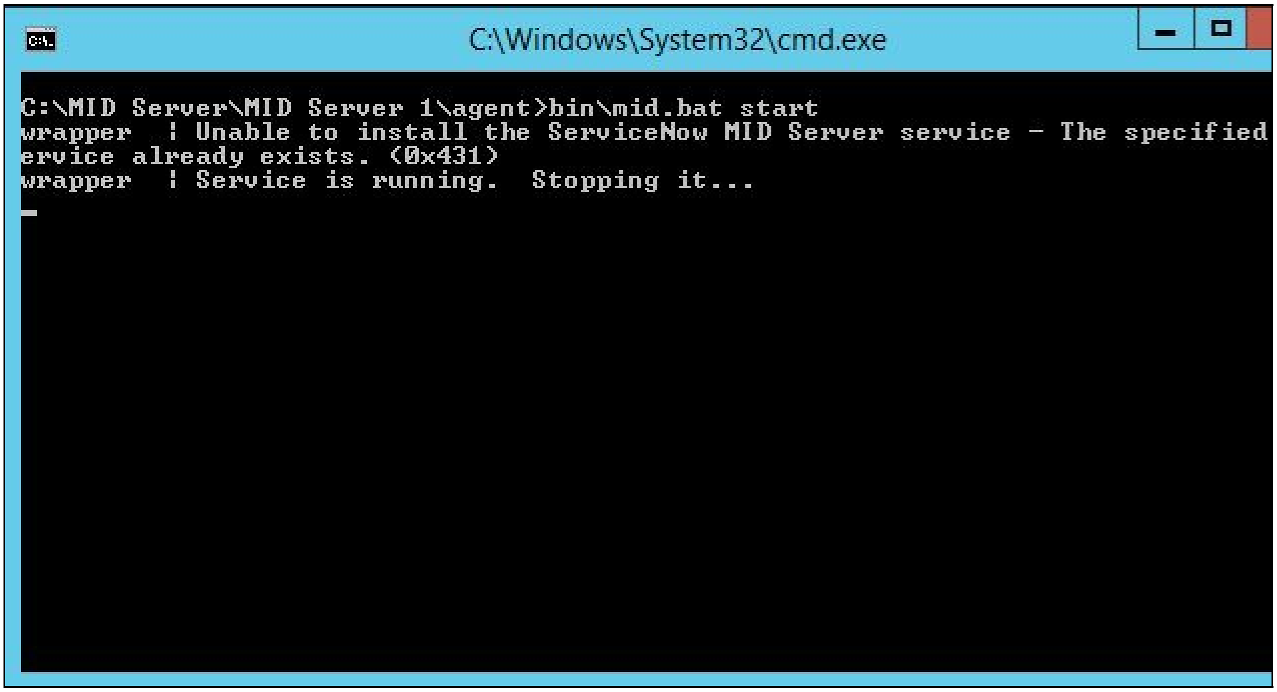
Name	Date modified	Type
bin	9/5/2016 2:40 AM	File folder
conf	9/5/2016 2:40 AM	File folder
etc	9/5/2016 2:40 AM	File folder
extlib	5/18/2016 5:31 PM	File folder
jre	9/5/2016 2:40 AM	File folder
lib	9/5/2016 2:40 AM	File folder
licenses	9/5/2016 2:40 AM	File folder
logs	5/18/2016 5:31 PM	File folder
midinstaller	9/5/2016 2:40 AM	File folder
package	5/18/2016 5:31 PM	File folder
properties	6/5/2016 4:07 PM	File folder
work	5/18/2016 5:31 PM	File folder
config	9/5/2016 3:31 AM	XML Document
installer	9/5/2016 2:40 AM	Windows Batch File
installer.sh	9/5/2016 2:40 AM	SH File
start	9/5/2016 2:40 AM	Windows Batch File
start.sh	9/5/2016 2:40 AM	SH File

2. Right-click on the `start.bat` file and click Run as administrator:



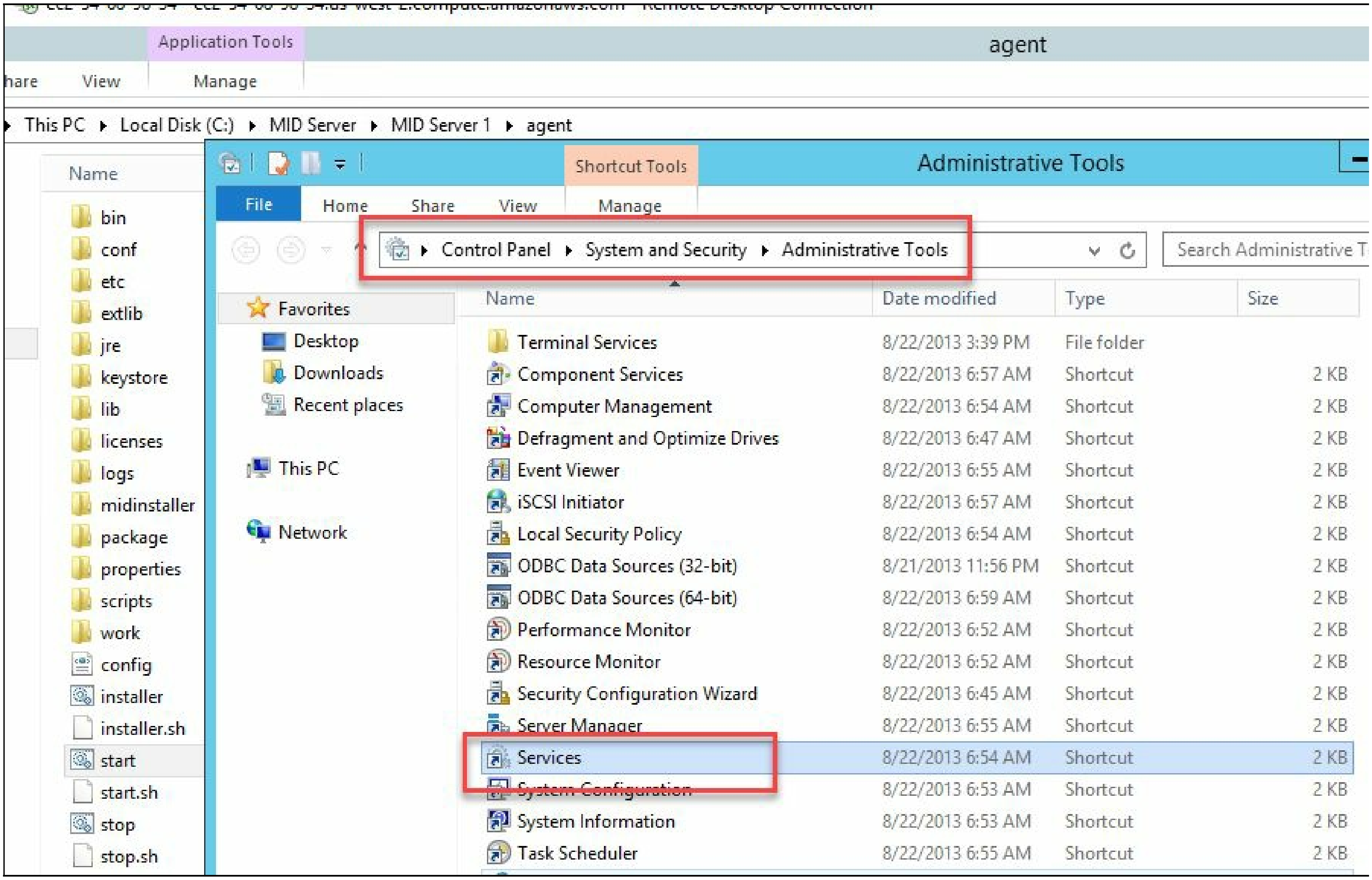
package	5/18/2016 5:31 PM	File folder
properties	6/5/2016 4:07 PM	File folder
work	5/18/2016 5:31 PM	File folder
config	9/5/2016 3:31 AM	XML Document
installer	9/5/2016 2:40 AM	Windows Batch File
installer.sh	9/5/2016 2:40 AM	SH File
start	9/5/2016 2:40 AM	Windows Batch File
start.sh		SH File
stop		Windows Batch File
stop.sh		SH File

3. A command window will open and run the script:



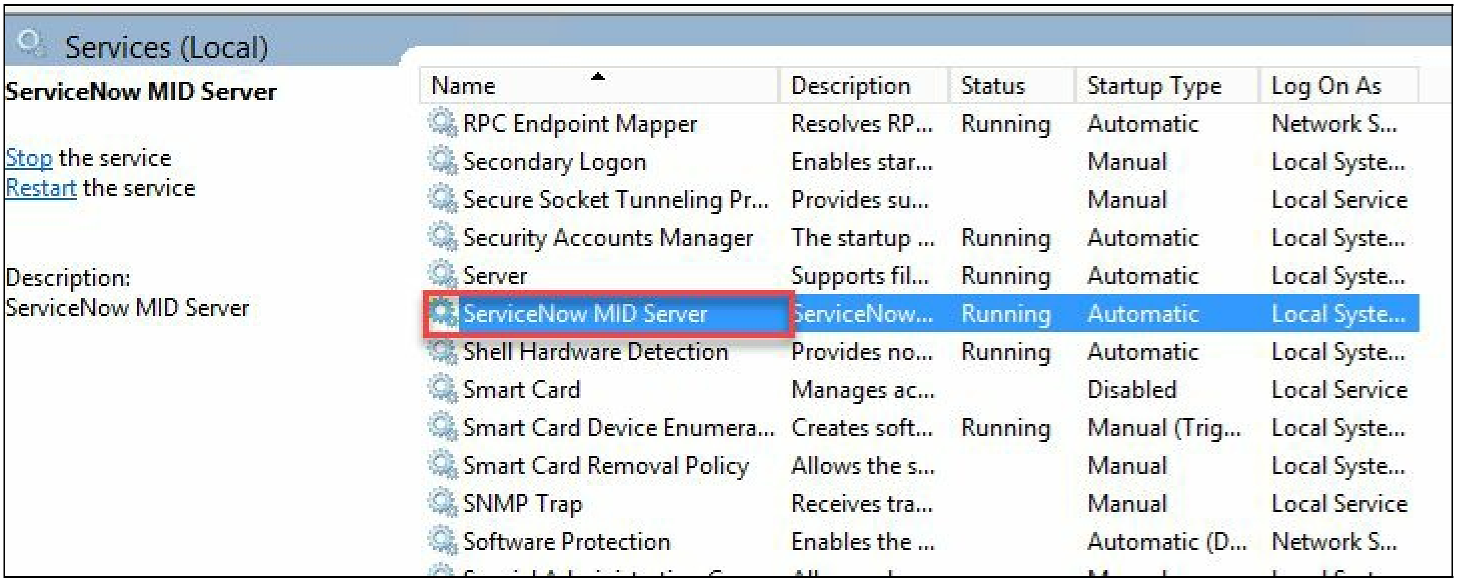
```
C:\MID Server\MID Server 1\agent>bin\mid.bat start
wrapper  | Unable to install the ServiceNow MID Server service - The specified
ervice already exists. (0x431)
wrapper  | Service is running.  Stopping it...
```

4. Navigate to Administrative Tools and locate and click on Services:



Name	Date modified	Type	Size
Terminal Services	8/22/2013 3:39 PM	File folder	
Component Services	8/22/2013 6:57 AM	Shortcut	2 KB
Computer Management	8/22/2013 6:54 AM	Shortcut	2 KB
Defragment and Optimize Drives	8/22/2013 6:47 AM	Shortcut	2 KB
Event Viewer	8/22/2013 6:55 AM	Shortcut	2 KB
iSCSI Initiator	8/22/2013 6:57 AM	Shortcut	2 KB
Local Security Policy	8/22/2013 6:54 AM	Shortcut	2 KB
ODBC Data Sources (32-bit)	8/21/2013 11:56 PM	Shortcut	2 KB
ODBC Data Sources (64-bit)	8/22/2013 6:59 AM	Shortcut	2 KB
Performance Monitor	8/22/2013 6:52 AM	Shortcut	2 KB
Resource Monitor	8/22/2013 6:52 AM	Shortcut	2 KB
Security Configuration Wizard	8/22/2013 6:45 AM	Shortcut	2 KB
Server Manager	8/22/2013 6:55 AM	Shortcut	2 KB
Services	8/22/2013 6:54 AM	Shortcut	2 KB
System Configuration	8/22/2013 6:53 AM	Shortcut	2 KB
System Information	8/22/2013 6:53 AM	Shortcut	2 KB
Task Scheduler	8/22/2013 6:55 AM	Shortcut	2 KB

5. Locate the ServiceNow MID Server services:



Services (Local)

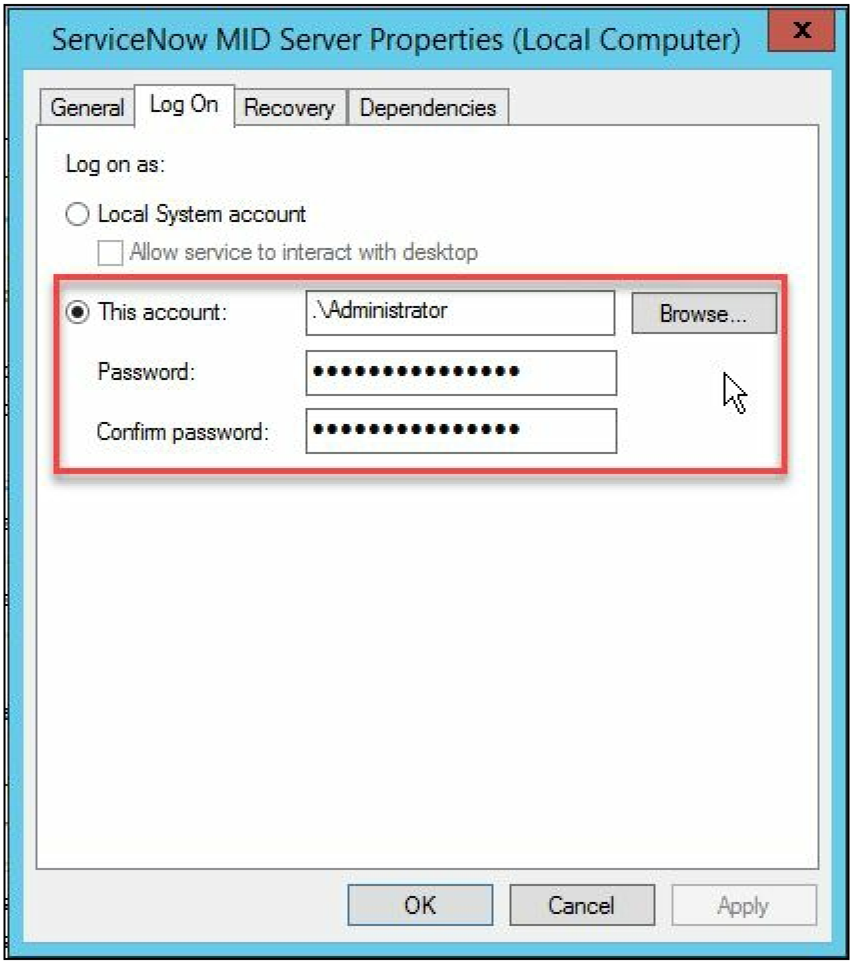
ServiceNow MID Server

Stop the service
Restart the service

Description:
ServiceNow MID Server

Name	Description	Status	Startup Type	Log On As
RPC Endpoint Mapper	Resolves RP...	Running	Automatic	Network S...
Secondary Logon	Enables star...		Manual	Local Syste...
Secure Socket Tunneling Pr...	Provides su...		Manual	Local Service
Security Accounts Manager	The startup ...	Running	Automatic	Local Syste...
Server	Supports fil...	Running	Automatic	Local Syste...
ServiceNow MID Server	ServiceNow...	Running	Automatic	Local Syste...
Shell Hardware Detection	Provides no...	Running	Automatic	Local Syste...
Smart Card	Manages ac...		Disabled	Local Service
Smart Card Device Enumera...	Creates soft...	Running	Manual (Trig...	Local Syste...
Smart Card Removal Policy	Allows the s...		Manual	Local Syste...
SNMP Trap	Receives tra...		Manual	Local Service
Software Protection	Enables the ...		Automatic (D...	Network S...

6. Right-click on ServiceNow MID Server and click on the Log On tab:



ServiceNow MID Server Properties (Local Computer)

Log on as:

○ Local System account

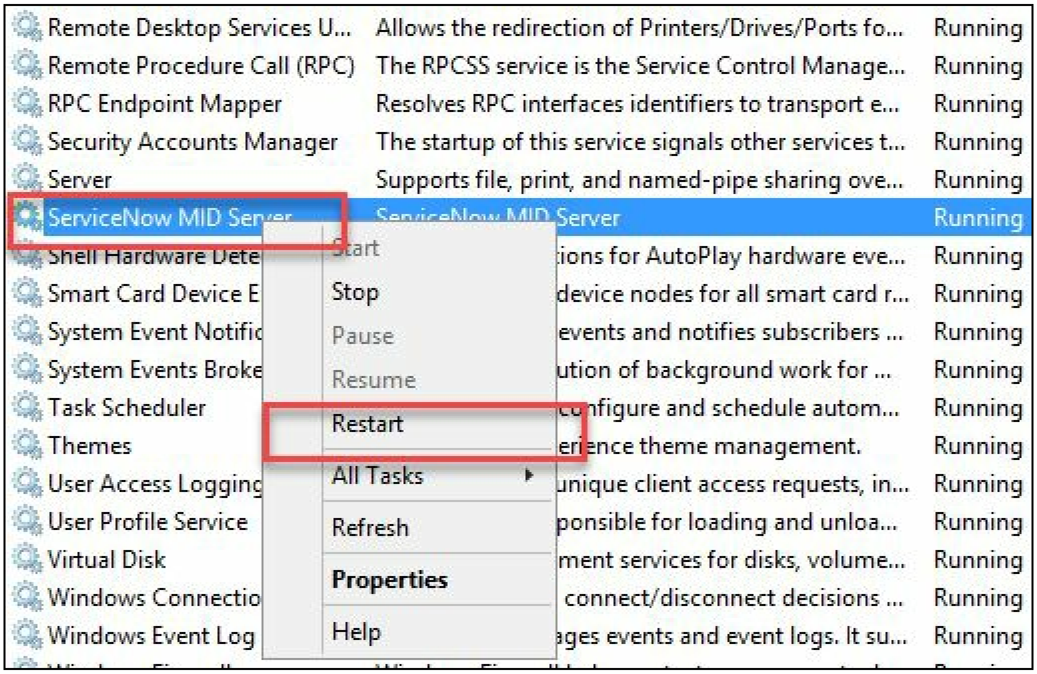
□ Allow service to interact with desktop

● This account: .\Administrator

Password: ••••••••••••••••

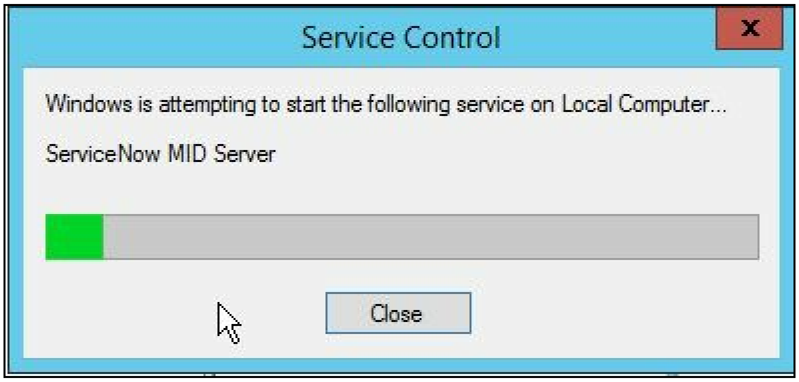
Confirm password: ••••••••••••••••

7. Now right-click on the ServiceNow MID Server services and click on Restart:



Remote Desktop Services U... Allows the redirection of Printers/Drives/Ports fo... Running
Remote Procedure Call (RPC) The RPCSS service is the Service Control Manage... Running
RPC Endpoint Mapper Resolves RPC interfaces identifiers to transport e... Running
Security Accounts Manager The startup of this service signals other services t... Running
Server Supports file, print, and named-pipe sharing ove... Running
ServiceNow MID Server ServiceNow MID Server Running
Shell Hardware Dete ...ions for AutoPlay hardware eve... Running
Smart Card Device E ...device nodes for all smart card r... Running
System Event Notific ...events and notifies subscribers ... Running
System Events Broke ...ution of background work for ... Running
Task Scheduler ...configure and schedule autom... Running
Themes ...erience theme management. Running
User Access Logging ...unique client access requests, in... Running
User Profile Service ...ponsible for loading and unloa... Running
Virtual Disk ...ment services for disks, volume... Running
Windows Connectio ...connect/disconnect decisions ... Running
Windows Event Log ...ages events and event logs. It su... Running

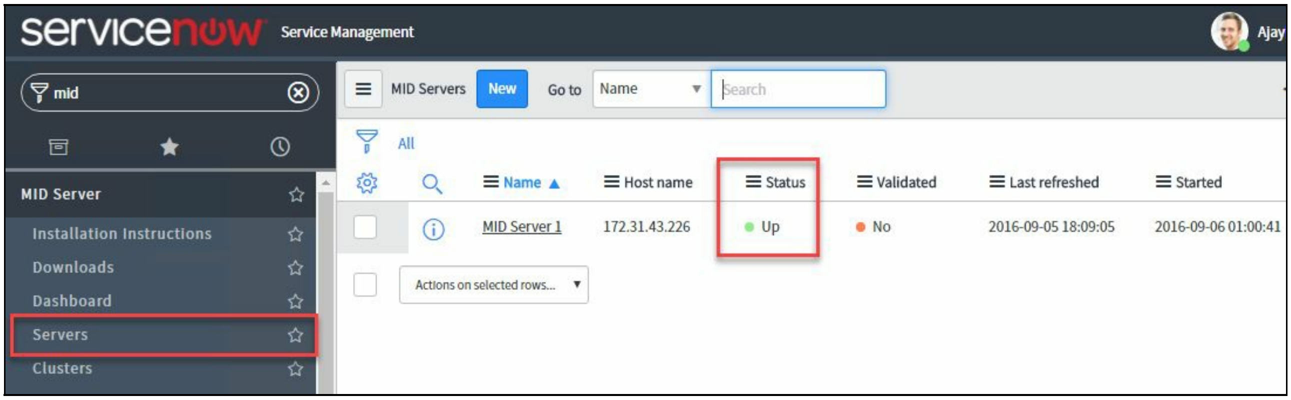
8. A progress bar appears when the ServiceNow MID Server gets restarted:



Windows is attempting to start the following service on Local Computer...

ServiceNow MID Server

9. Now log back on to your ServiceNow instance:



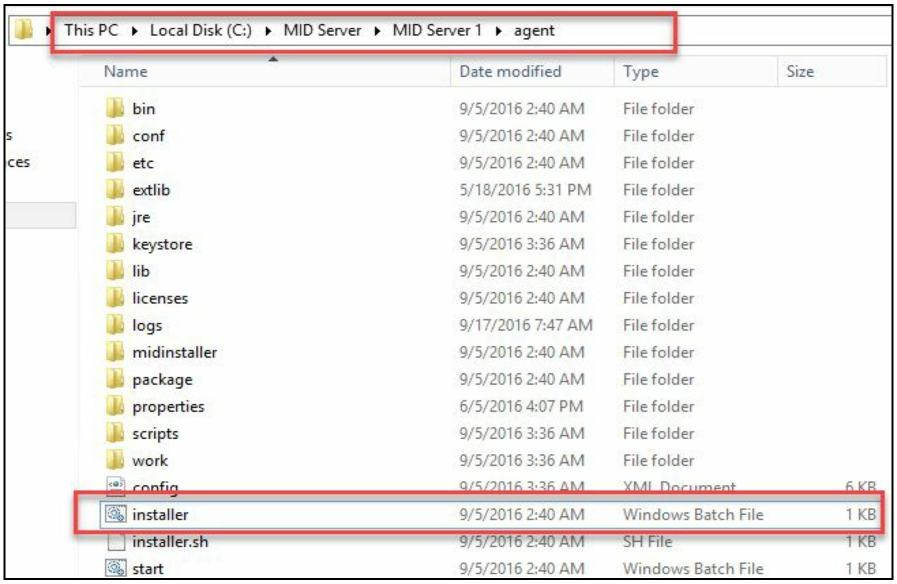
Name ▲	Host name	Status	Validated	Last refreshed	Started
MID Server 1	172.31.43.226	● Up	● No	2016-09-05 18:09:05	2016-09-06 01:00:41

MID Server is now configured completely using manual steps. Now let's quickly see how to configure MID Server using automated steps.

MID Server automated installation steps

As we have seen the steps to install MID Server automatically, let's now see the steps to install MID Server in an automated way. Steps 1 through step 5 mentioned in *MID Server installation* are common for both automated and manual installation:

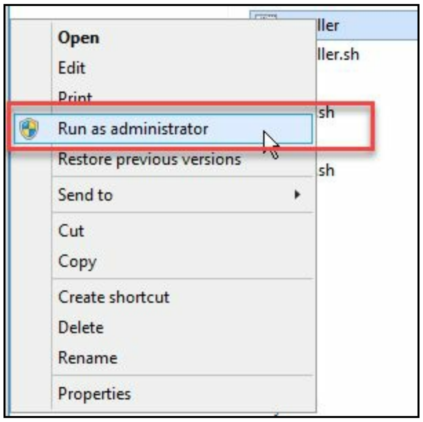
1. In the extracted folder, navigate to the `agent` folder and click on the `installer.bat` file:



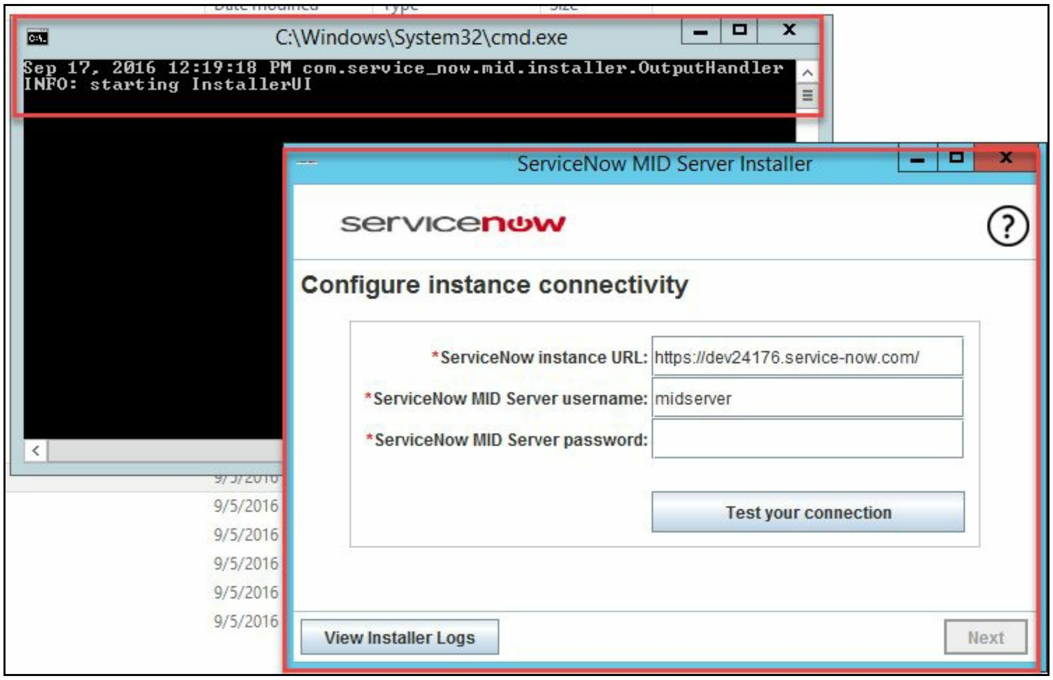
This PC ▸ Local Disk (C:) ▸ MID Server ▸ MID Server 1 ▸ agent

Name	Date modified	Type	Size
bin	9/5/2016 2:40 AM	File folder	
conf	9/5/2016 2:40 AM	File folder	
etc	9/5/2016 2:40 AM	File folder	
extlib	5/18/2016 5:31 PM	File folder	
jre	9/5/2016 2:40 AM	File folder	
keystore	9/5/2016 3:36 AM	File folder	
lib	9/5/2016 2:40 AM	File folder	
licenses	9/5/2016 2:40 AM	File folder	
logs	9/17/2016 7:47 AM	File folder	
midinstaller	9/5/2016 2:40 AM	File folder	
package	9/5/2016 2:40 AM	File folder	
properties	6/5/2016 4:07 PM	File folder	
scripts	9/5/2016 3:36 AM	File folder	
work	9/5/2016 3:36 AM	File folder	
config	9/5/2016 3:36 AM	XML Document	6 KB
installer	9/5/2016 2:40 AM	Windows Batch File	1 KB
installer.sh	9/5/2016 2:40 AM	SH File	1 KB
start	9/5/2016 2:40 AM	Windows Batch File	1 KB

2. Right-click on `installer.bat` and click Run as administrator:



3. A command window will open up and an installation configuration screen will also open up:



C:\Windows\System32\cmd.exe
ServiceNow MID Server Installer
servicenow
Configure instance connectivity
Test your connection
View Installer Logs
Next

```
Sep 17, 2016 12:19:18 PM com.service_now.mid.installer.OutputHandler
INFO: starting InstallerUI
```

*ServiceNow instance URL: https://dev24176.service-now.com/

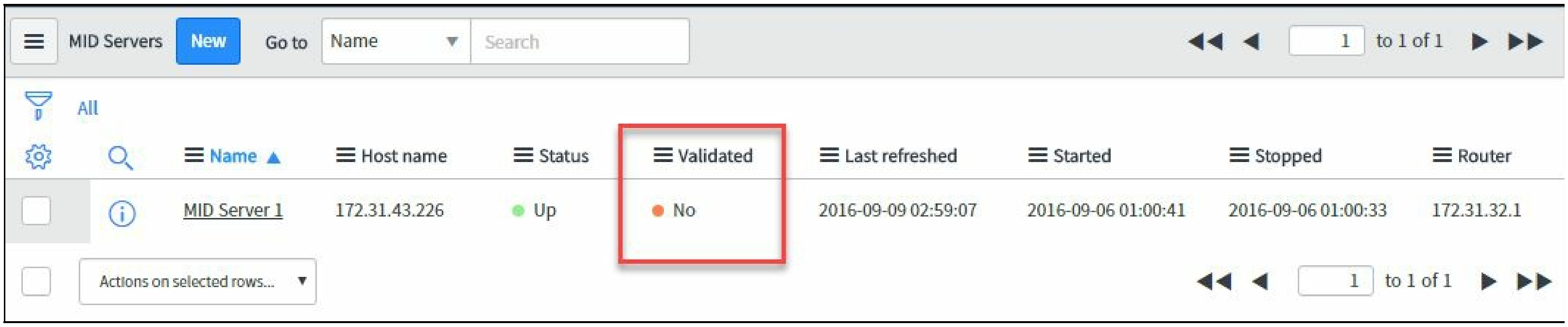
*ServiceNow MID Server username: midserver

*ServiceNow MID Server password:

4. Fill in the required parameters in the form field:
    1. ServiceNow instance URL: URL to your instance.
    2. ServiceNow MID Server username: Username to the MID Server that you set on the instance.
    3. ServiceNow MID Server password: Password that you set to log on to the MID Server.
5. Click on Start MID Server. MID Server will be configured successfully. You will get a Your MID Server has been configured successfully message.
6. Clicking on MID Server installer will open the list of MID Servers, select the required MID Server.
7. Auto installation steps are completed and you will need to follow the following steps to validate the MID Server.

MID Server validation

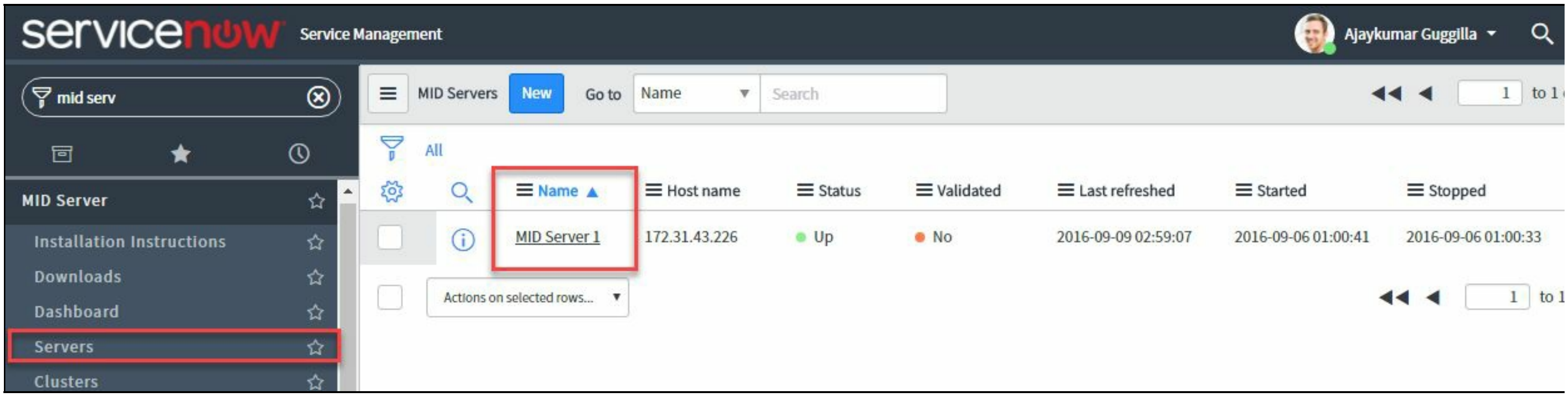
Now that we have seen the steps to configure the MID Server, the next step is to validate the MID Server. By default, MID Server cannot execute any automation or orchestration tasks, MID Servers need to be validated, which enables restricting automation credentials to trusted MID Servers.



Name ▲	Host name	Status	Validated	Last refreshed	Started	Stopped	Router
MID Server 1	172.31.43.226	● Up	● No	2016-09-09 02:59:07	2016-09-06 01:00:41	2016-09-06 01:00:33	172.31.32.1

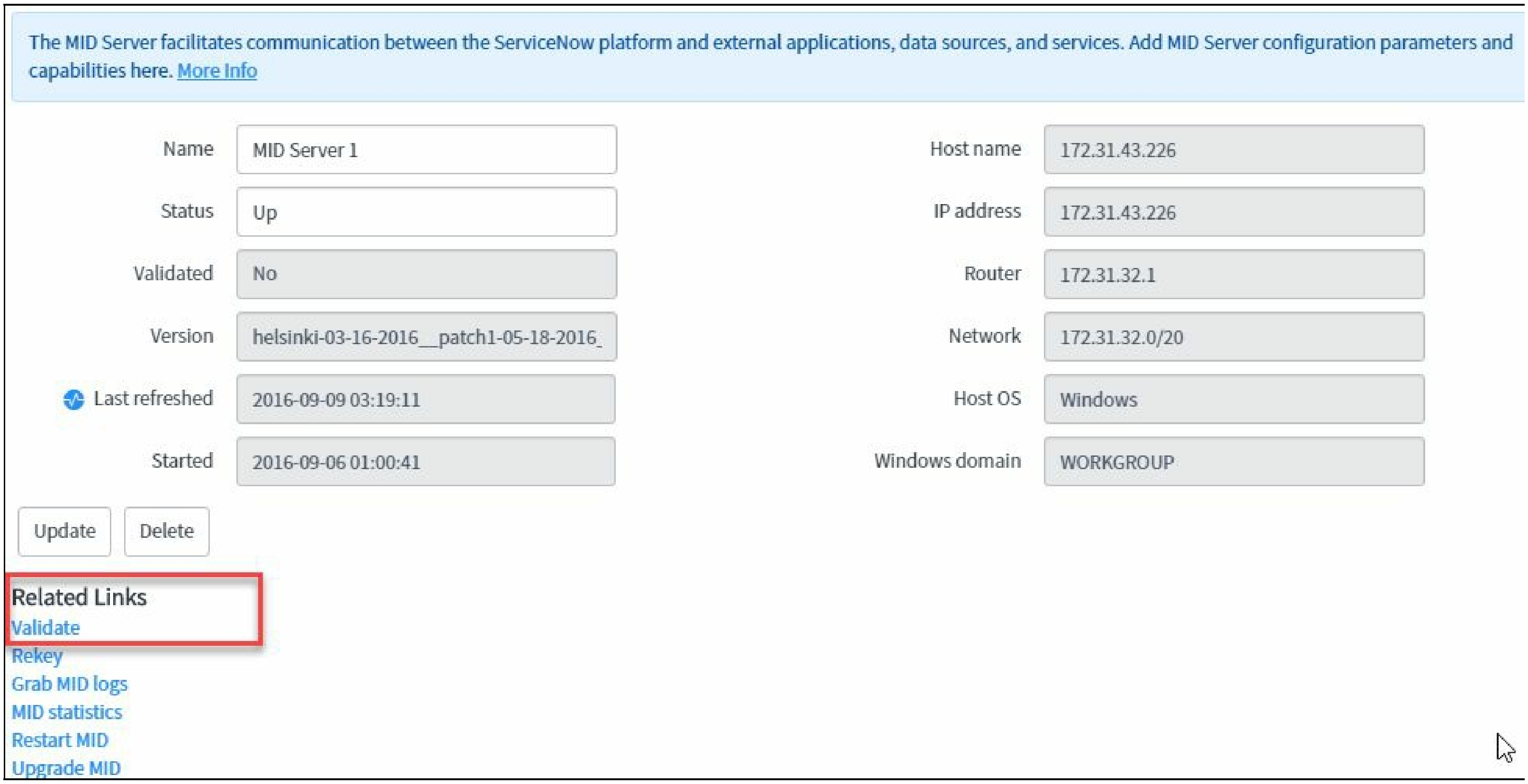
Once the MID Server is installed, you will notice that the Validated status is defaulted to No, in the following steps we will see how to change the MID Server to validated Yes state:

1. Open the installed MID server, for example, the MID Server 1 that we had installed during the installation step:



Name ▲	Host name	Status	Validated	Last refreshed	Started	Stopped
MID Server 1	172.31.43.226	● Up	● No	2016-09-09 02:59:07	2016-09-06 01:00:41	2016-09-06 01:00:33

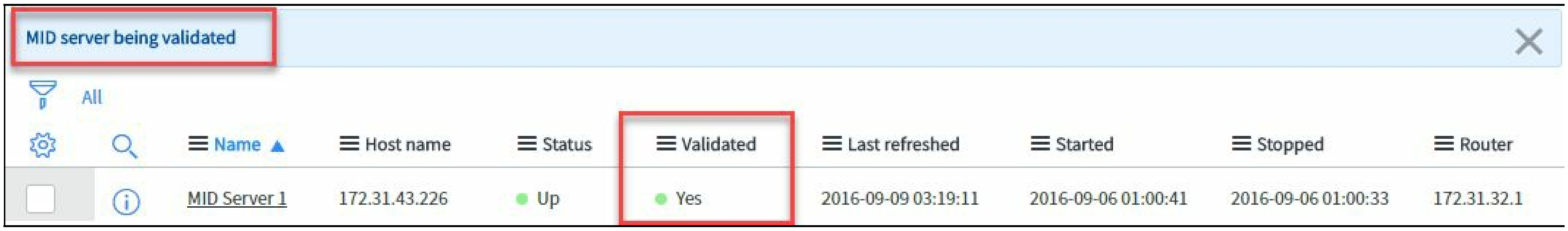
2. Scroll down to the Related Links section and click Validate:



The MID Server facilitates communication between the ServiceNow platform and external applications, data sources, and services. Add MID Server configuration parameters and capabilities here. More Info

Name	MID Server 1	Host name	172.31.43.226
Status	Up	IP address	172.31.43.226
Validated	No	Router	172.31.32.1
Version	helsinki-03-16-2016__patch1-05-18-2016_	Network	172.31.32.0/20
Last refreshed	2016-09-09 03:19:11	Host OS	Windows
Started	2016-09-06 01:00:41	Windows domain	WORKGROUP

3. If you click on Validation status you will notice a prompt that says validation is in progress and the validation status turning green means the validation is completed:



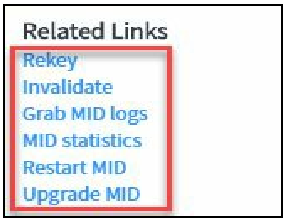
MID server being validated

Name ▲	Host name	Status	Validated	Last refreshed	Started	Stopped	Router
MID Server 1	172.31.43.226	● Up	● Yes	2016-09-09 03:19:11	2016-09-06 01:00:41	2016-09-06 01:00:33	172.31.32.1

MID Server is now validated.

Understanding related links

When you open the MID Server, you will notice various related links under the Related Links section, let's briefly see what these are:



Related Links
Rekey
Invalidate
Grab MID logs
MID statistics
Restart MID
Upgrade MID

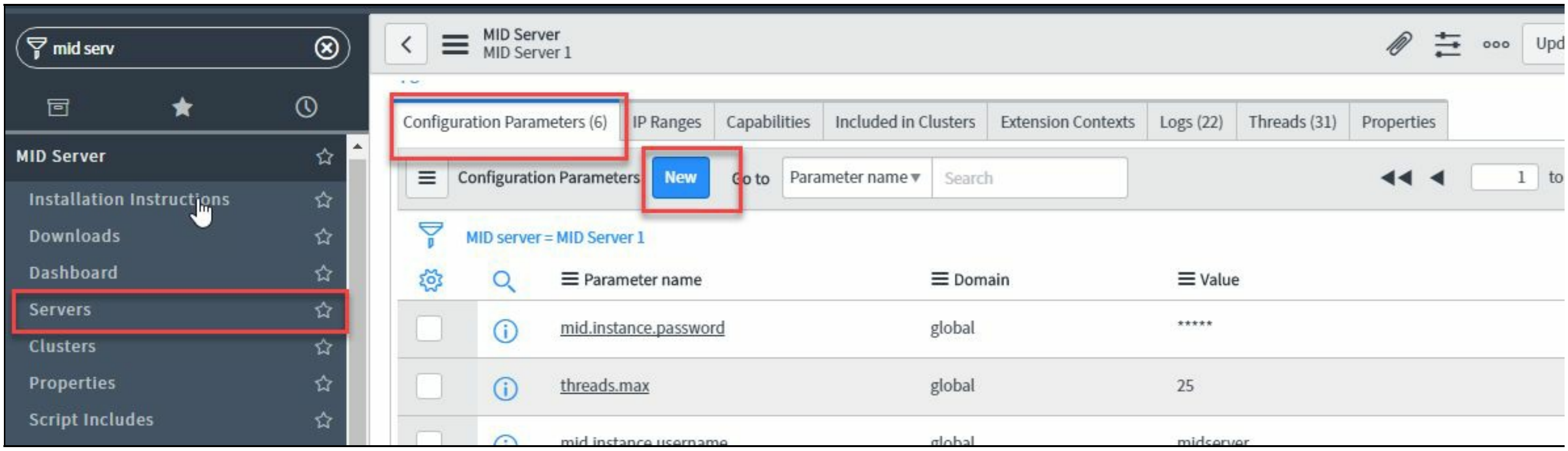
- Rekey: Forces the MID Server to generate a new asymmetric key pair
- Invalidate: Marks MID Server as invalid and forces asymmetric key generation
- Grab MID logs: Grabs the MID Server logs `wrapper.log` and `agent0.log.0`
- MID statistics: Opens all status of records in the ECC queue for this MID Server
- Restart MID: Restarts the selected MID Server
- Upgrade MID: Helps to upgrade the MID Server to the latest build stamp

Important MID Server connection parameters

MID Server settings can be adjusted to the way it should operate in the environment. There are different attributes that can be set for the MID Server. We will not be able to describe all the parameters in this book. When there is a specific need according to the environment you are setting the MID Server in, you might need to adjust the parameters accordingly.

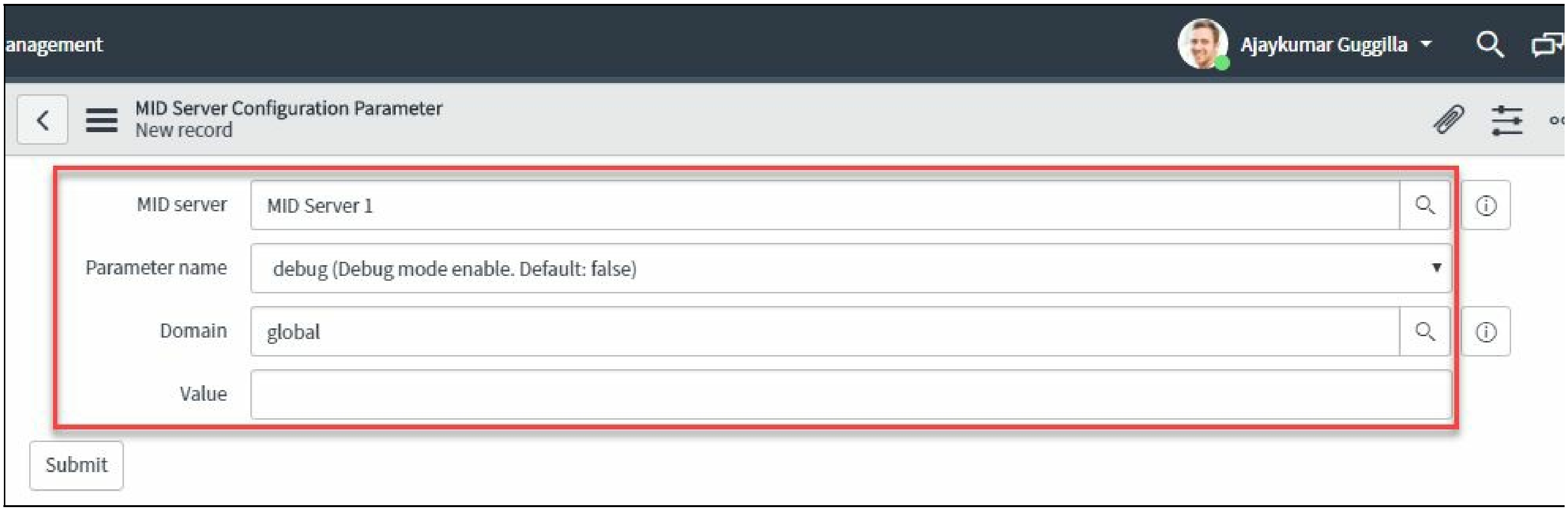
How to set MID Server parameters?

1. Click on the MID Server from the application navigator:



Parameter name	Domain	Value
mid.instance.password	global	*****
threads.max	global	25
mid.instance.username	global	midserver

2. By default, you will see the parameters that are already set for the MID Server. Be cautious in changing any parameters as that might impact the environment and the way MID Server works:
    1. In order to add a new parameter click New, which will open the attribute entry window.
    2. You can select the required MID Server you would like to set the attribute for in case of a multi MID Server environment. Clicking on the Parameter name will list all the available parameters that can be set for the MID Server; specific domains and values can be set for each of the parameters.



MID server	MID Server 1
Parameter name	debug (Debug mode enable. Default: false)
Domain	global
Value	

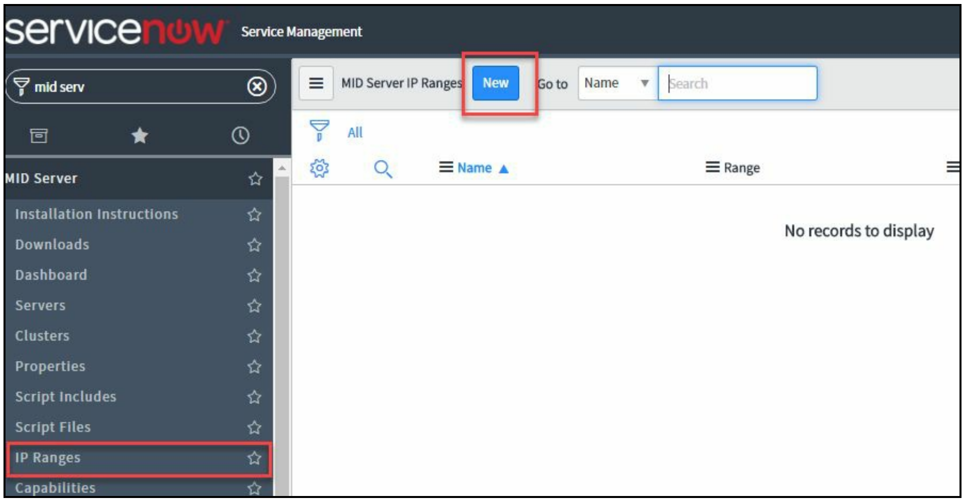
3. In the list of parameters, there are some that are restricted and cannot be changed, such as the following:

- mid.max.messages: Maximum number of messages to hold in memory
- instance.date.format: Format that an instance uses for date and time
- glide.mid.fast.responses: Reduces time between a probe completion and response receiving
- mid.jmx.enabled: Enables management information to JMX consoles
- glide.mid.max.sender.queue.size: Maximum transmission queue size
- threads.max: Maximum number of probe threads
- mid.poll.time: MID Server pooling time

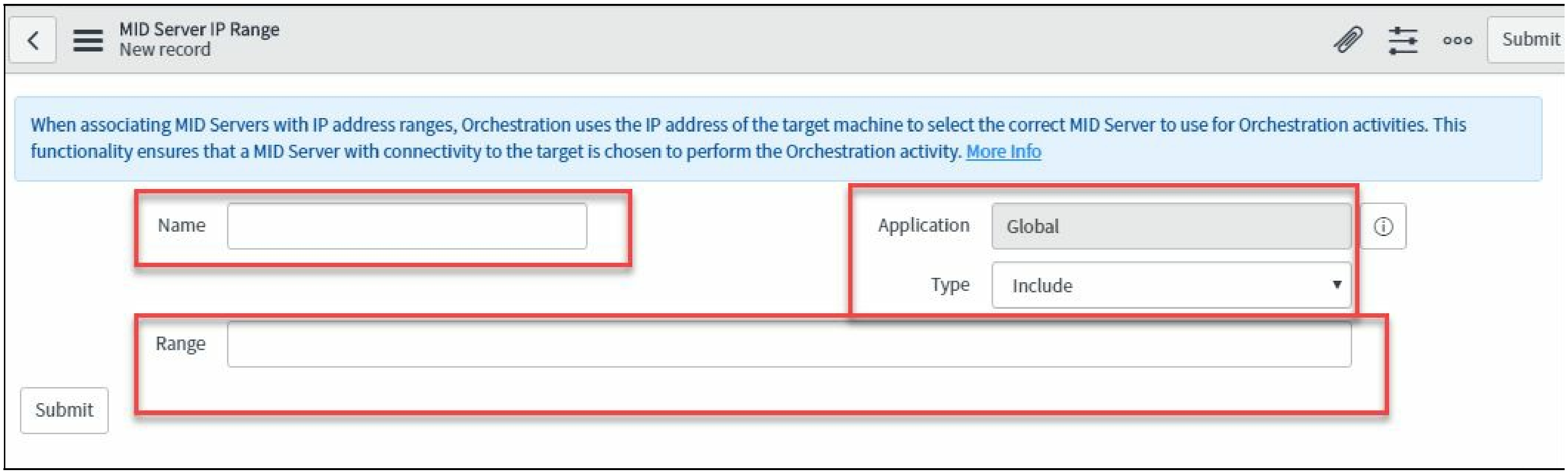
Setting IP ranges for MID Server

Imagine the IP range as your ZIP code and store selection. While searching for the closest store, we sometimes go to online maps or the store website to find the nearest store. We select the store we want to visit based on several factors including distance, product availability and so on. IP ranges for the MID Server work in a similar way; each MID Server will be given an IP range when there are multiple MID Servers in the environment. Different applications or plugins that leverage MID Server will leverage the right MID Server based on the given IP range, for example, there might be a MID Server for service mapping and there might be another MID Server for orchestration activities, specifying the IP ranges enables us to use the right MID Server in the environment:

1. To configure IP ranges, click on IP Ranges from the application navigator below the MID Server, and then click New:



2. Clicking on New brings up a new window to enter specific values related to the IP ranges. In the Type parameter choosing Exclude will exclude the specified IP address range:



When associating MID Servers with IP address ranges, Orchestration uses the IP address of the target machine to select the correct MID Server to use for Orchestration activities. This functionality ensures that a MID Server with connectivity to the target is chosen to perform the Orchestration activity. More Info

Name	
Application	Global
Type	Include
Range	

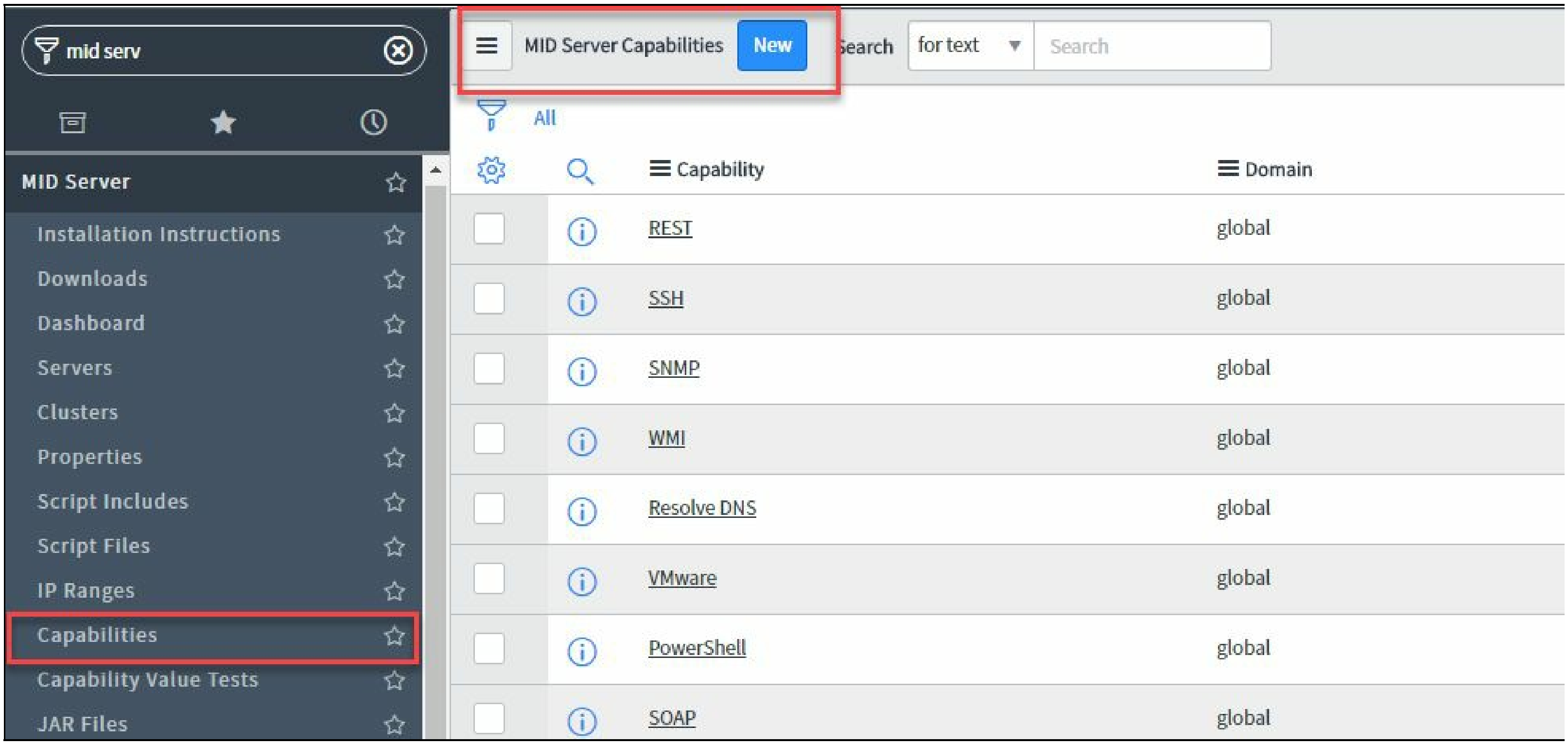
MID Server capabilities

There can be multiple MID Servers configured in a given range of IPs. Each of the MID Server can be leveraged for multiple purposes. For example, MID Server can be used for event management, MID Server can be used for orchestration, MID server can be used for discover and so on.

Imagine this as multiple vending machines in a store, some of them dispense movies, toys, drinks, keys, and so on. A vending machine is like an MID Server, each of the configured MID Servers can be used for a different purpose. Some ways to use a MID Server include MID Servers used for orchestration that can have capabilities not limited to SSH, SNMP, VMWare, PowerShell, and so on. Each MID Server should have at least one capability configured.

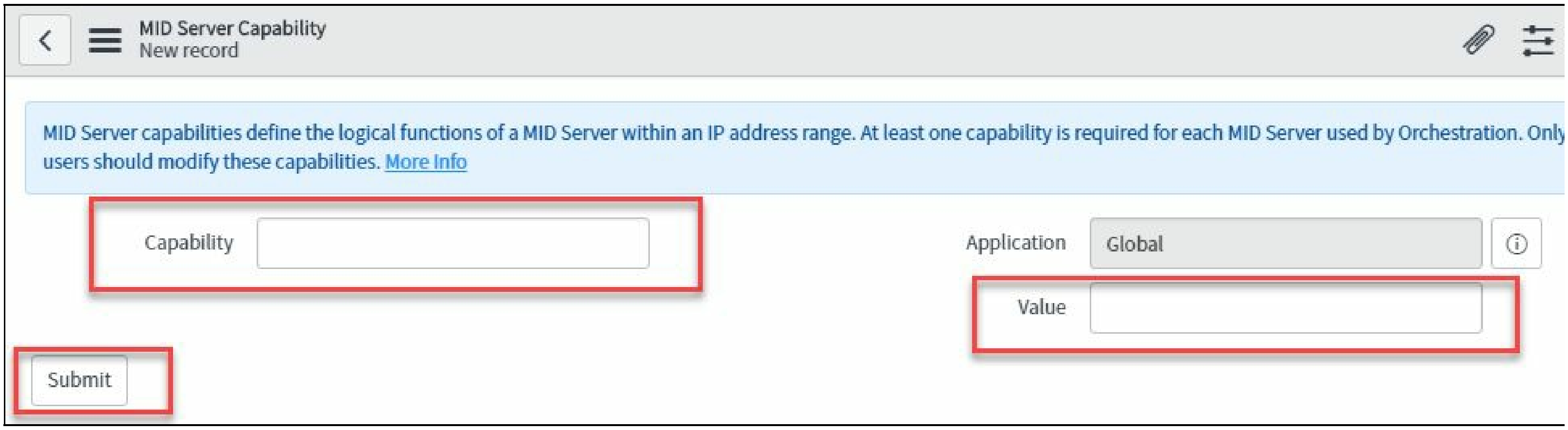
To configure the capability, follow these steps:

1. Open the MID Server from the application navigator and click New to add a new MID Server:



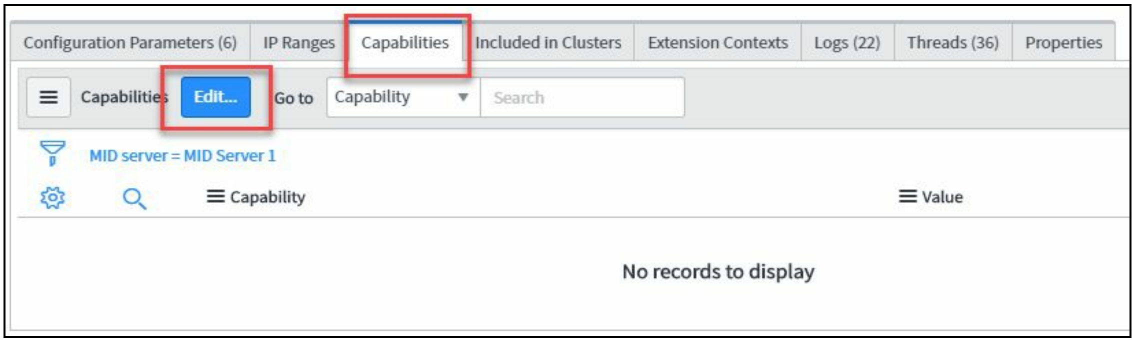
Capability	Domain
REST	global
SSH	global
SNMP	global
WMI	global
Resolve DNS	global
VMware	global
PowerShell	global
SOAP	global

2. By default you will see some of the capabilities already in place. Clicking on New you can add a new capability:



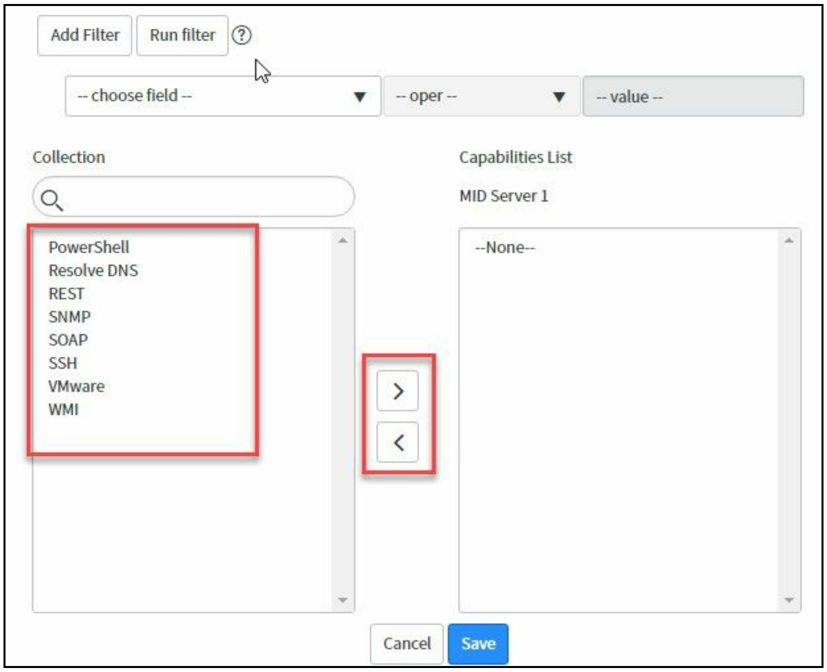
MID Server capabilities define the logical functions of a MID Server within an IP address range. At least one capability is required for each MID Server used by Orchestration. Only users should modify these capabilities. More Info

3. To add a capability to a MID Server, open the configured MID Server and scroll down to the section called Capabilities:



No records to display

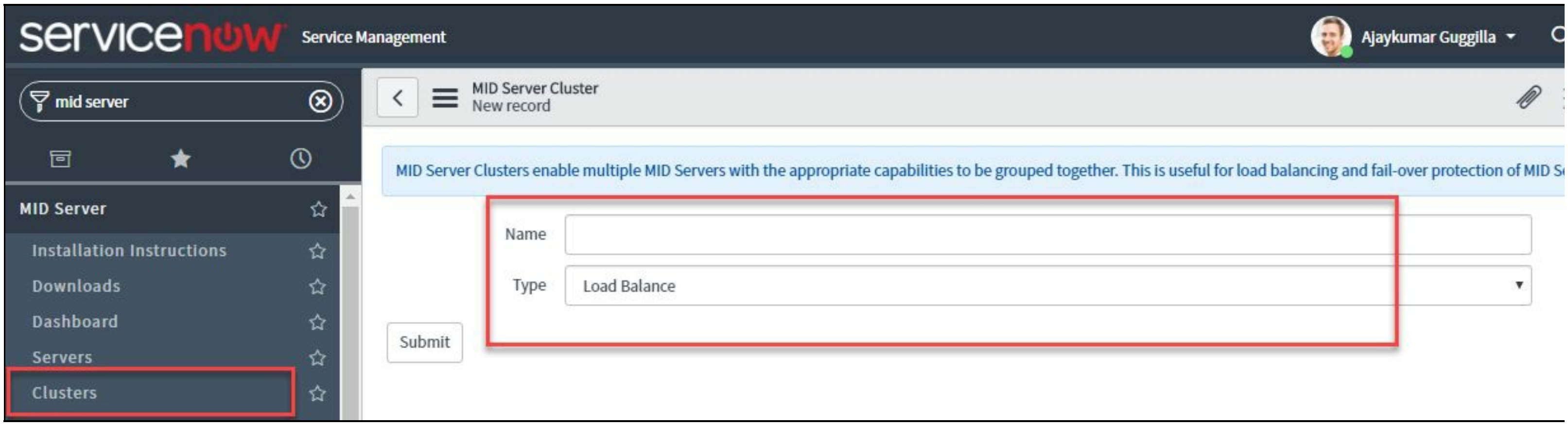
4. Clicking Edit brings up options for you to select the required capabilities for the MID Server:



MID Server clustering

Unlike the high availability servers which mostly have the fail over or are for load balancing, even MID Servers can be configured for load balancing and fail-over protection. With this, we are able to cluster multiple MID Servers with the appropriate capabilities to be grouped together. Let's see how to set the clustering of MID Servers:

1. From the application navigator, click Clusters under the MID Server:
2. You can provide the Name and select the Type if it is going to be fail over or load balance:

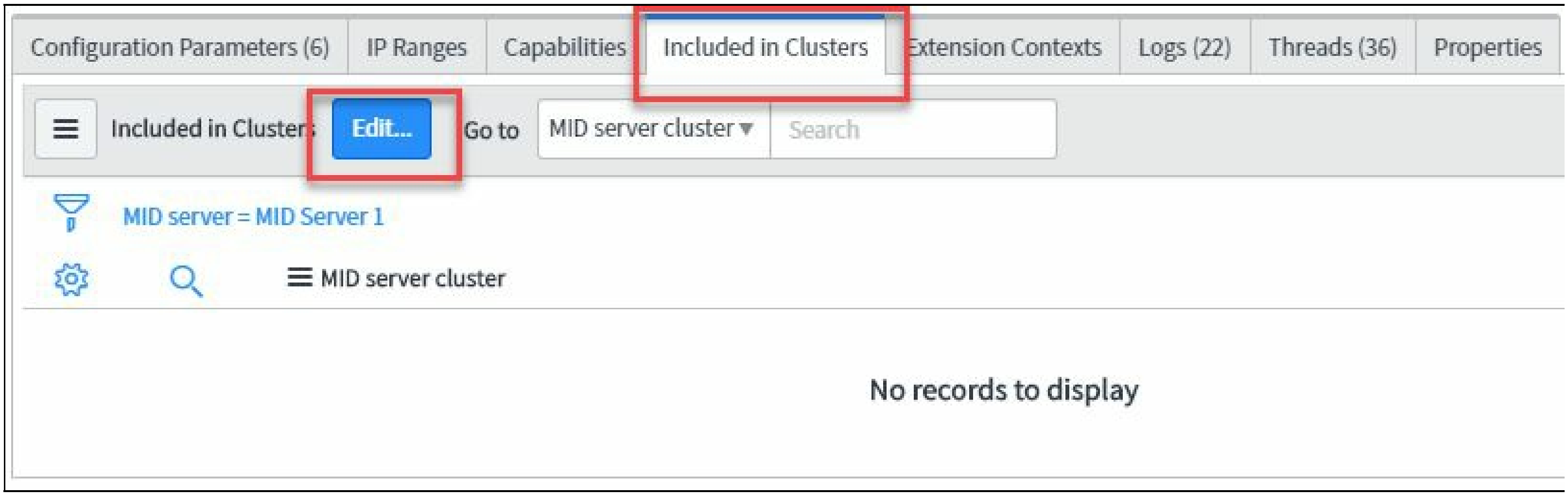


MID Server Clusters enable multiple MID Servers with the appropriate capabilities to be grouped together. This is useful for load balancing and fail-over protection of MID S

Name

Type: Load Balance

3. To add clustering options, scroll down to an existing MID Server, click on the MID Server, and navigate to the Clusters section and then click on Edit. Clicking Edit will bring up options to select a particular cluster:



MID server = MID Server 1

No records to display

With this we have completed configuring the MID Server and setting key attributes.

Summary

In this chapter, we have learnt about MID Server architecture, how to set up MID Server including a guided setup and the traditional way of manual configuration of MID Servers. Concluding, we also saw how to set some of the parameters for the MID server and MID Server capabilities.

Configuration Management Using ServiceNow Discovery

Configuration management is about managing the lifecycle of infrastructure components. **Configuration Management Database** (**CMDB**) has all the **Configuration Items** (**CI**) with its relationships. ServiceNow discovery plays an important role in populating the CMDB by discovering the configuration items for a given network. In this chapter, we will learn about ServiceNow discovery architecture, and how to configure and set up ServiceNow discovery.

What is ServiceNow discovery?

Discovery is a plugin within ServiceNow that helps in exploring a given network and identifies the interdependencies between the infrastructure components. Individual infrastructure component is refered to as configuration item or CI.

Discovery capabilities

Some of the discovery's capabilities include the following:

- It is able to discover and track assets and manage them
- It is able to find the application to infrastructure or application to application dependencies
- It is able to support the change management to do impact analysis by identifying the impact through the related configuration items
- It is able to identify new CI to populate the CMDB
- It supports the Service Mapping to map the business layer

The discovery application can find the following infrastructure elements in the network:

- AIX systems
- ESXi servers
- HPUX systems
- Linux systems
- Linux **Kernel-based Virtual Machines** (**KVM**)
- Apple MAC systems
- Netware
- Solaris systems
- Solaris zones
- Virtual machines
- Windows systems
- Apache web servers
- General software packages
- JBoss servers
- Microsoft IIS servers
- MySQL servers
- Oracle databases
- Tomcat servers
- Network printers
- VMware vCenter
- Websphere servers
- Network printers
- Network switches
- Network routers
- **Uninterruptible Power Supplies** (**UPS**)
- Load balancers
- F5 Big IP
- IP addresses
- IP networks

- Relationships
- Services and daemons
- Storage devices
- TCP connections

Discovery can classify and discover the following operating systems:

- AIX
- HPUX
- Linux
- Solaris
- Windows 2008 Server
- Windows 2008 Server R2
- Windows 2012 Server
- Windows 2012 Server R2
- Windows cluster VIP
- Windows 7
- Windows 8
- Windows 8.1
- Windows 10

Prerequisites

Following are some of the requirements for setting up the discovery application.

Required ServiceNow applications/plugins

Following are the two plugins required to set up the discovery application:

- **MID Server**: Create the MID Server user that has permission to connect to the ServiceNow instance
- **Credentials**: Create the credentials that the MID Server needs to communicate with devices in your network

Role requirements

An administrator with access to the discovery quick start application, access or be able to configure the MID Server, and also configure other key parameters including behaviors, probes, and sensors, and so on.

License requirement

Discovery is available as a separate subscription from the rest of the ServiceNow platform and it requires the discovery plugin.

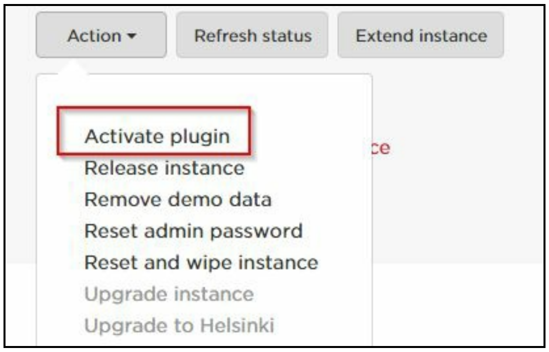
In this chapter, we will follow the steps on how to set up discovery easily. To set up discovery easily, ServiceNow provides the discovery quick start feature to configure the required components within ServiceNow easily through wizards.

Configuring discovery the easy way

An easy way to start using discovery is to use *discovery quick start*, which is under the discovery application. It allows us to set up discovery easily to configure the MID Server, create credentials, and schedule discovery.

Activating the plugin

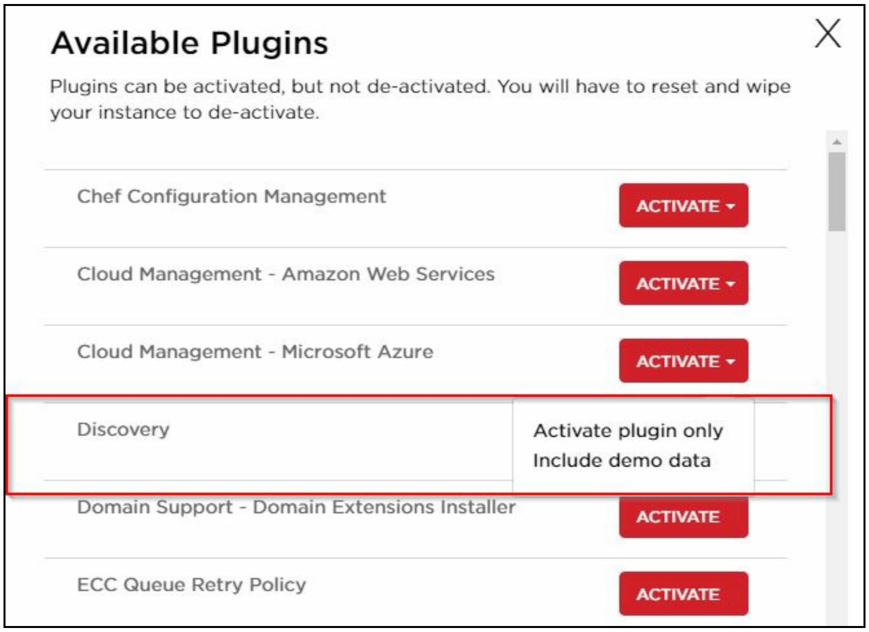
Follow the steps to activate the discovery plugin. The following steps describe how to activate a plugin on the personal instance. Separate steps need to be followed to activate the plugin for the commercial version of ServiceNow. Plugins are activated from the HI portal.



To activate the discovery plugin, the administrator has to do this from the instance management console:

These screenshots might vary from the actual instance for activating the plugin.

1. Click on ACTIVATE, which is next to Discovery:



Available Plugins

Plugins can be activated, but not de-activated. You will have to reset and wipe your instance to de-activate.

Chef Configuration Management

Cloud Management - Amazon Web Services

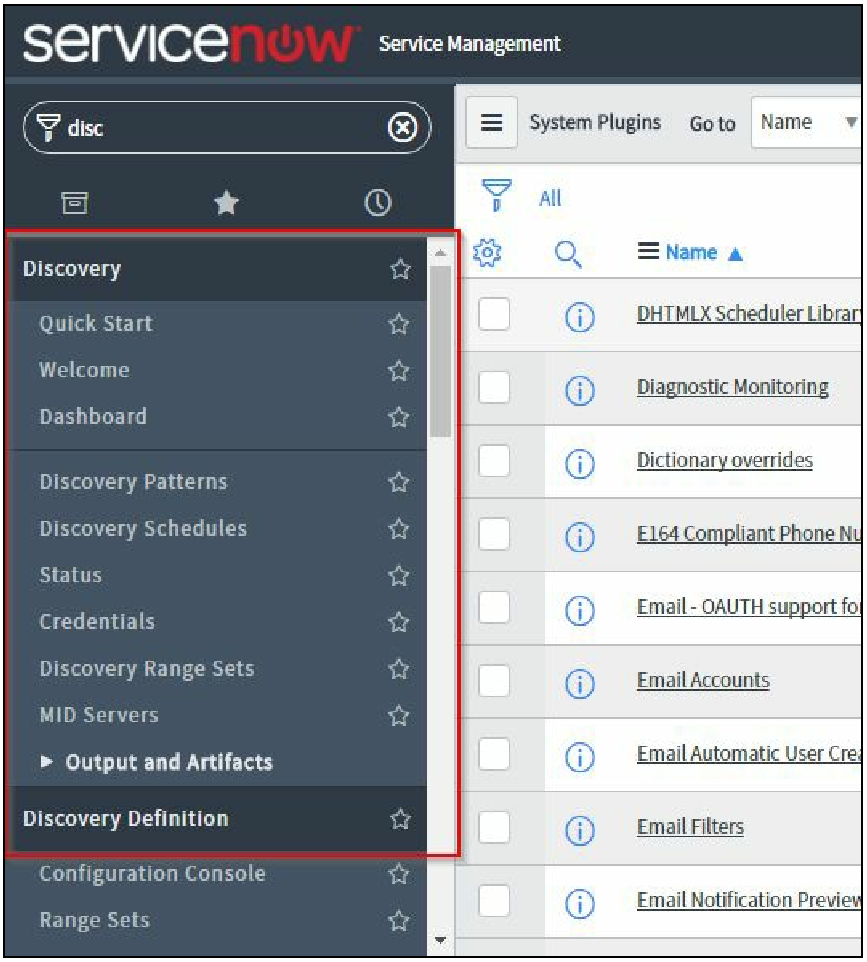
Cloud Management - Microsoft Azure

Discovery

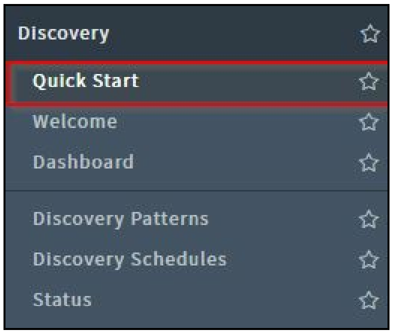
Domain Support - Domain Extensions Installer

ECC Queue Retry Policy

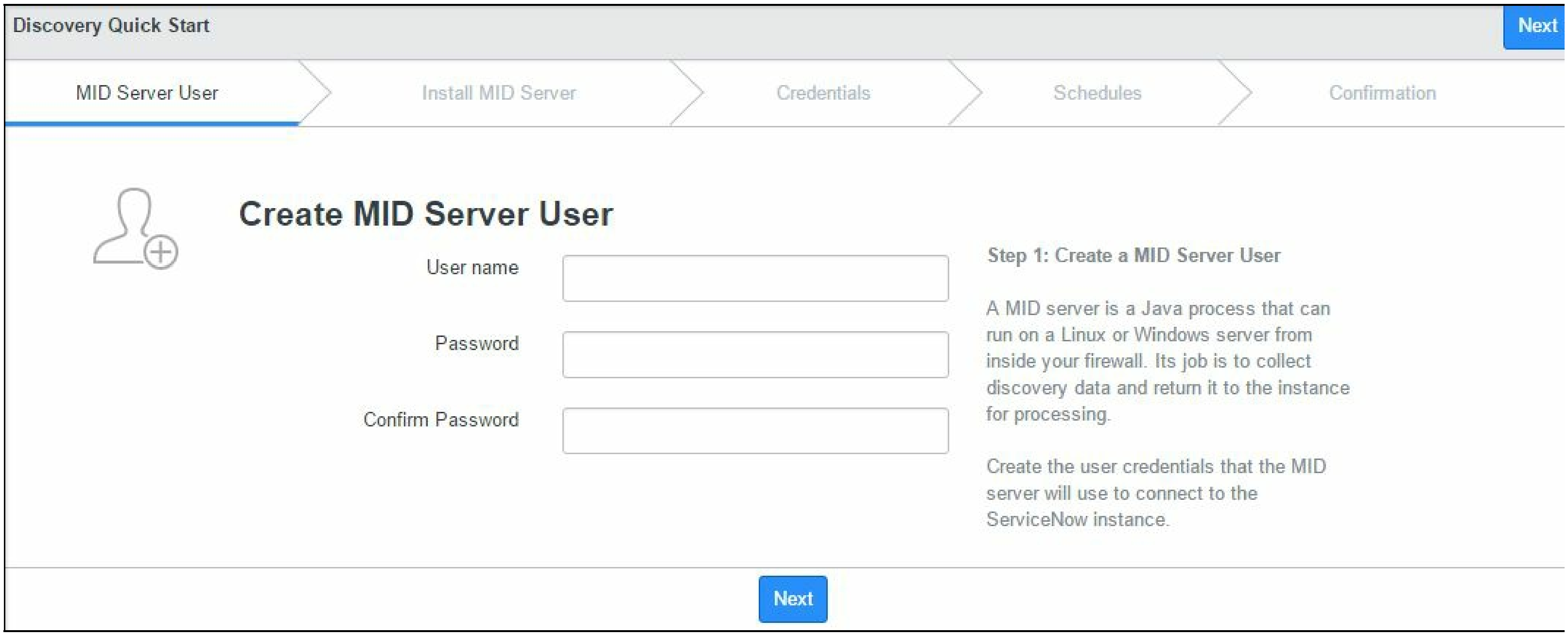
2. Once you activate the Discovery plugin, now you can navigate to the application navigator and type in Discovery. This will bring up Discovery applications and the options, as shown in the following screenshot:



3. Under the Discovery application, click onQuick Start:



4. After you click Quick Start, the MID Server configuration console opens up:



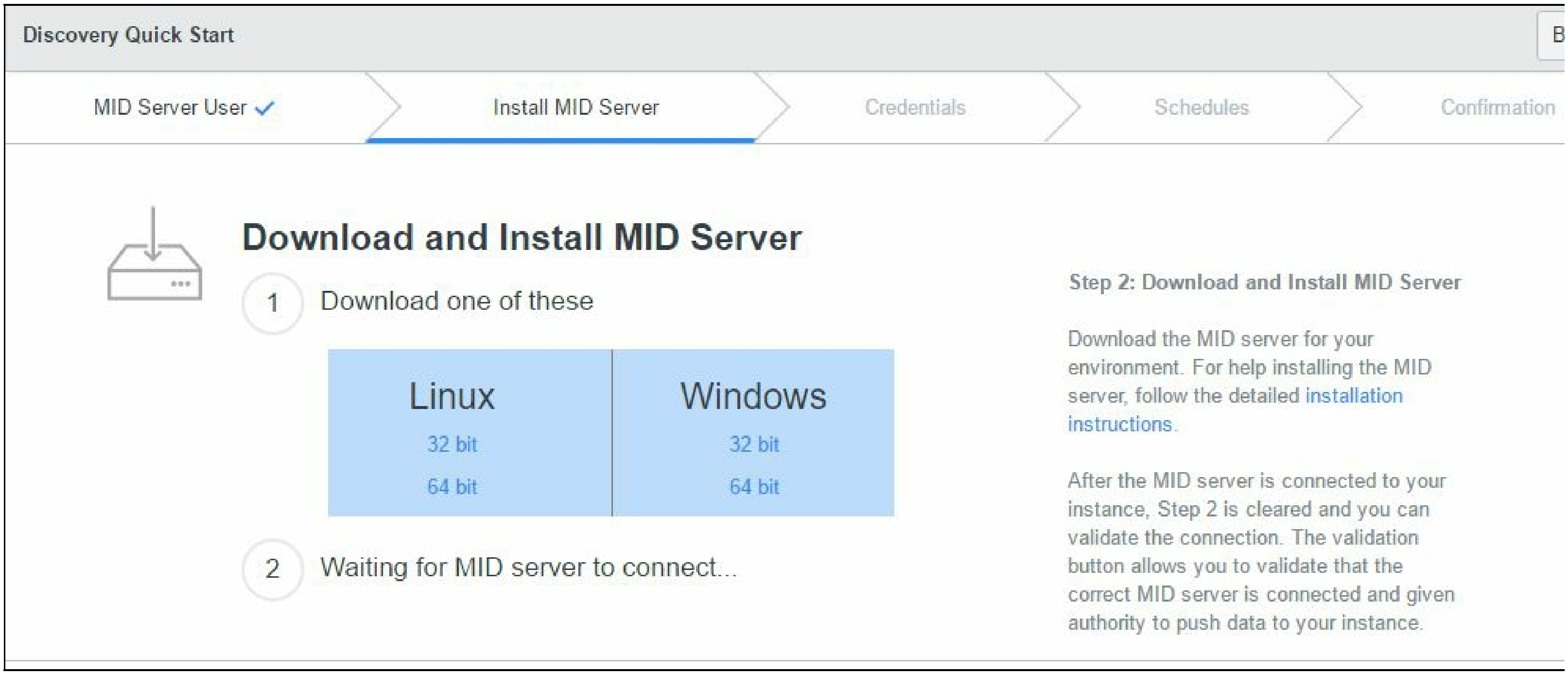
Step 1: Create a MID Server User

A MID server is a Java process that can run on a Linux or Windows server from inside your firewall. Its job is to collect discovery data and return it to the instance for processing.

Create the user credentials that the MID server will use to connect to the ServiceNow instance.

5. In Chapter 1, *Introduction to IT Operations Management in ServiceNow*, you learnt and set up the MID Server, you can provide the same credentials to set up the MID Server if you are planning to leverage the same MID Server. If not, you can follow the instructions in Chapter 1, *Introduction to IT Operations Management in ServiceNow*, to set up a new MID Server.

> *If you have already installed the MID Server in Chapter 1, Introduction to IT Operations Management in ServiceNow, and chose not to install the MID Server and want to leverage the credentials in the MID Server User step once you have entered the credentials, you will need to wait for 2, which is Waiting for MID Server to connect....*

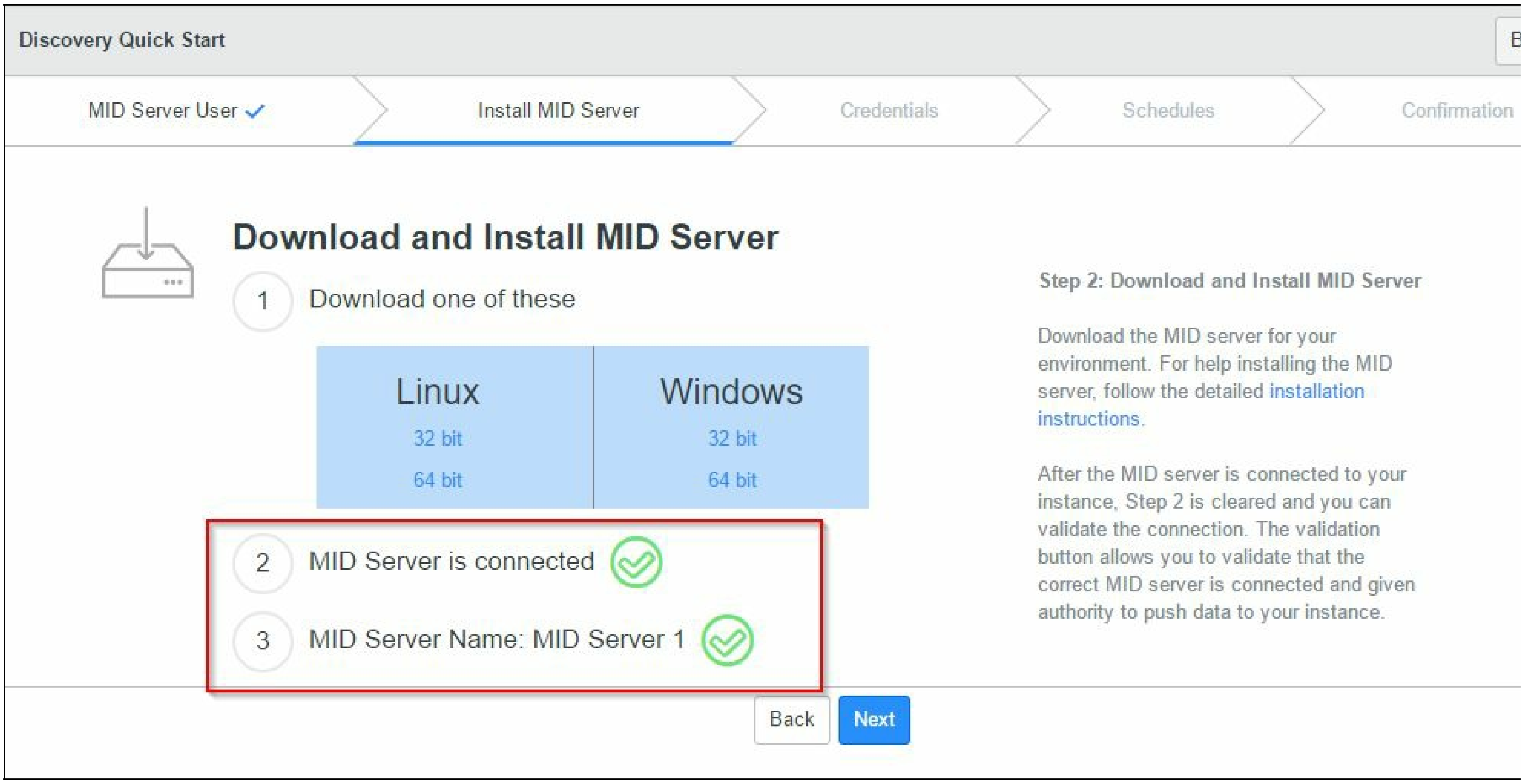


Step 2: Download and Install MID Server

Download the MID server for your environment. For help installing the MID server, follow the detailed installation instructions.

After the MID server is connected to your instance, Step 2 is cleared and you can validate the connection. The validation button allows you to validate that the correct MID server is connected and given authority to push data to your instance.

6. Once the MID Server is authenticated, you will receive a confirmation that MID Server is authenticated and connected to the MID Server for which the user credentials are provided:



Download and Install MID Server

1 Download one of these

2 MID Server is connected ✓

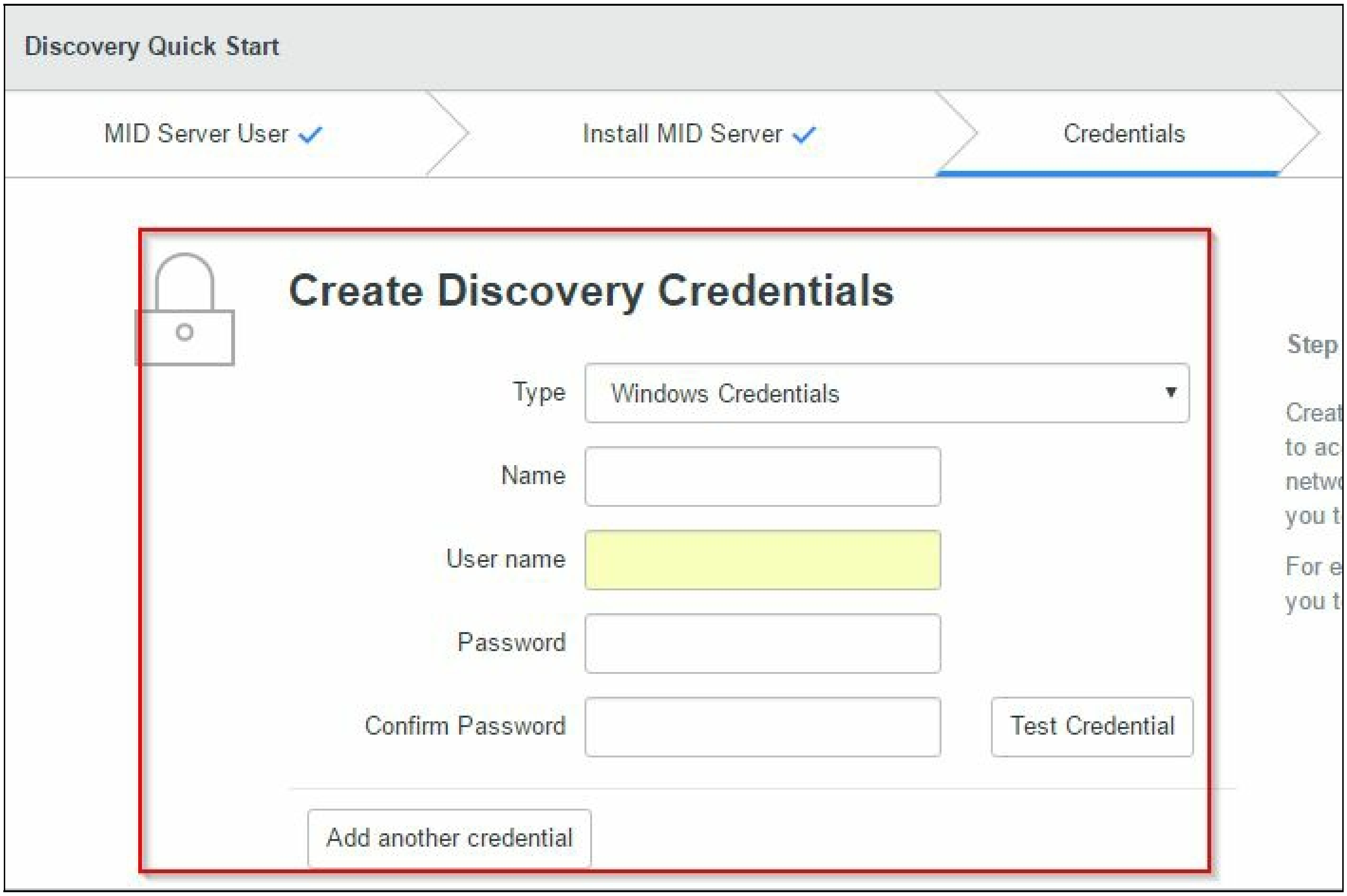
3 MID Server Name: MID Server 1 ✓

Step 2: Download and Install MID Server

Download the MID server for your environment. For help installing the MID server, follow the detailed installation instructions.

After the MID server is connected to your instance, Step 2 is cleared and you can validate the connection. The validation button allows you to validate that the correct MID server is connected and given authority to push data to your instance.

7. The next step is to provide credential information that discovery will use to explore and scan the infrastructure components. Choosing the type will have different credential information:

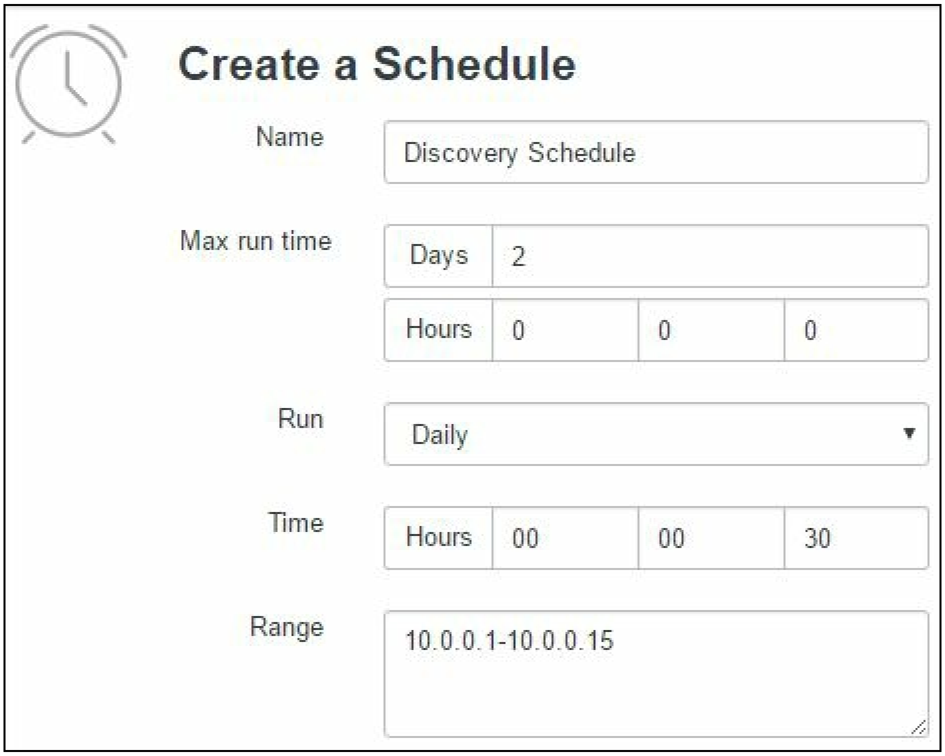


Create Discovery Credentials

Type	Windows Credentials ▾
Name	
User name	
Password	
Confirm Password	

8. The next step is creating a Discovery Schedule; you will provide the information, such as when you want discovery to run and which IP ranges you would like to target discovery to run. In case

of multiple MID Servers, you specify different IP ranges to discover the configuration items:



Create a Schedule

Name: Discovery Schedule

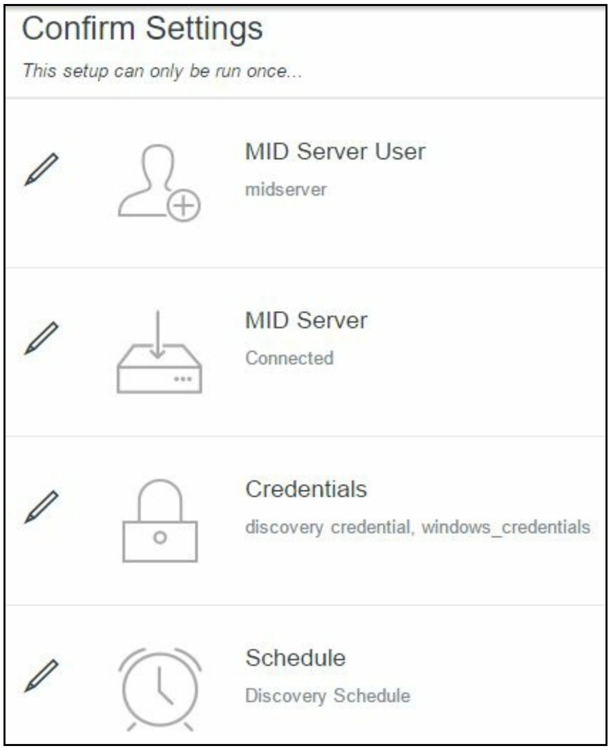
Max run time: Days 2; Hours 0 0 0

Run: Daily

Time: Hours 00 00 30

Range: 10.0.0.1-10.0.0.15

9. Once discovery is set up, you will receive a confirmation summary about the settings:



Confirm Settings

This setup can only be run once...

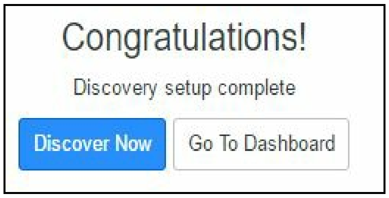
MID Server User
midserver

MID Server
Connected

Credentials
discovery credential, windows_credentials

Schedule
Discovery Schedule

10. Once the discovery quick start setting has been completed, you will receive confirmation about completion and discovery is now ready to be scheduled:



Congratulations!

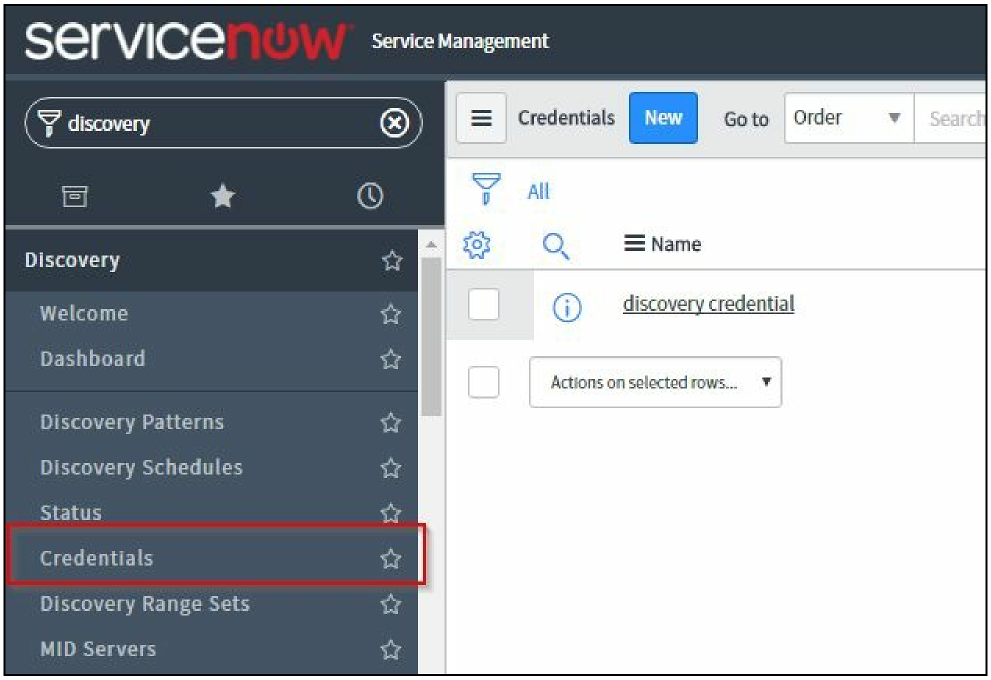
Discovery setup complete

Discovery credentials setup

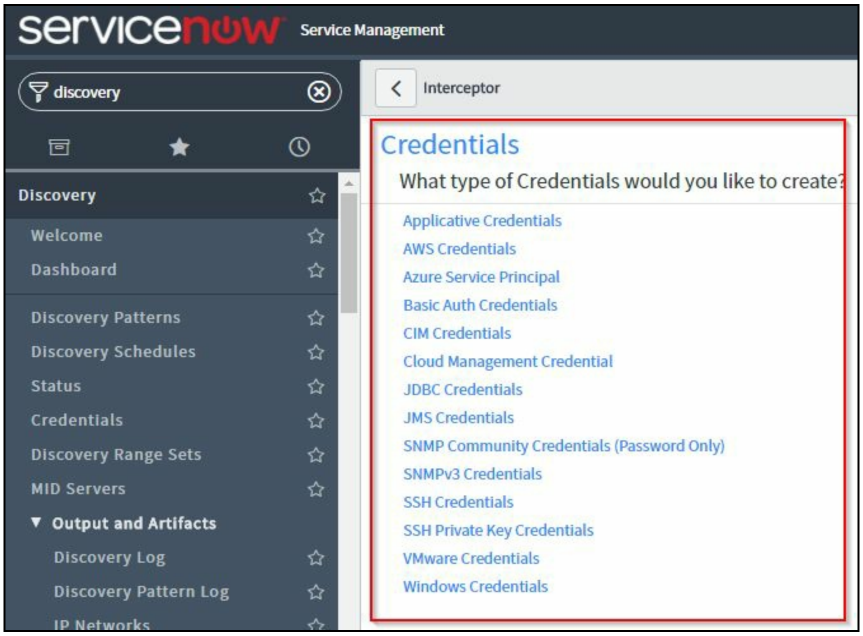
Credentials are used by discovery, orchestration, and service mapping to access the external devices that they explore or manage. MID Server, which is installed on the Windows operating system, uses the login credentials of the MID Server service on the host machine to discover Windows devices. For Linux and Unix machines and network devices, the MID Server leverages the SSH and SNMP credentials.

Follow these steps to set up credentials:

1. Search for discovery in the application navigator, which will bring up all the existing credentials, or click New if you need to create a new credential:



2. Next, you will have options to select what type of credentials we are trying to create:

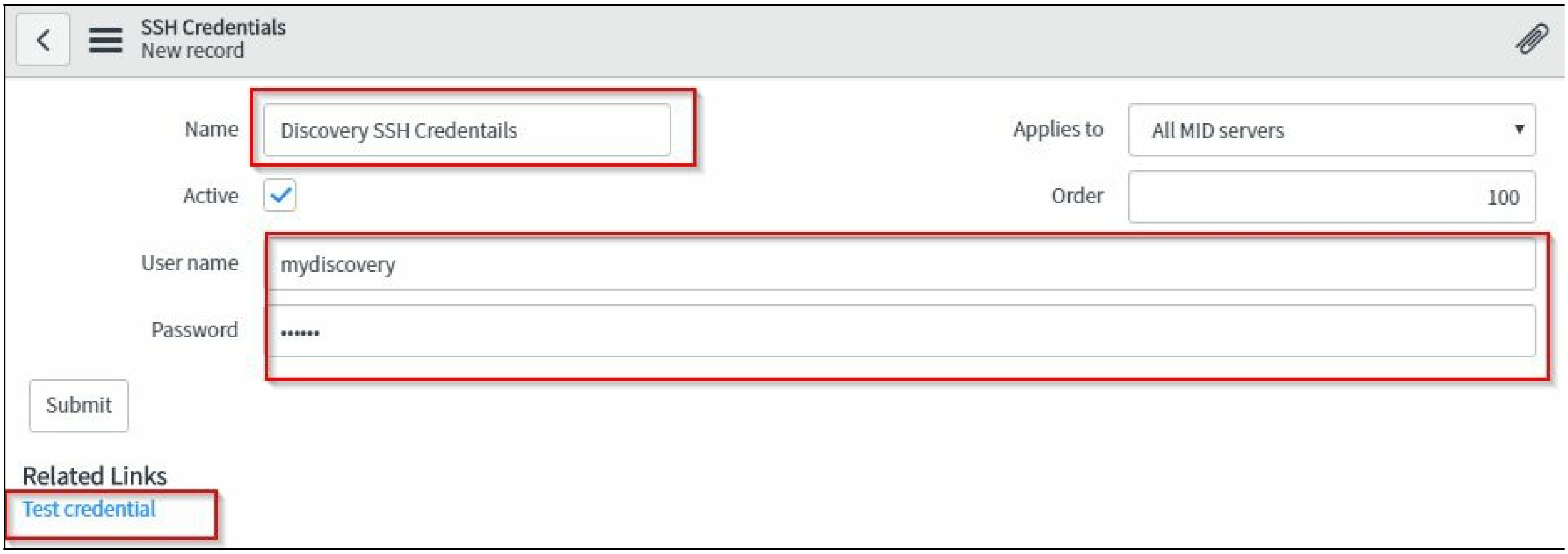


Credentials

What type of Credentials would you like to create?

- Applicative Credentials
- AWS Credentials
- Azure Service Principal
- Basic Auth Credentials
- CIM Credentials
- Cloud Management Credential
- JDBC Credentials
- JMS Credentials
- SNMP Community Credentials (Password Only)
- SNMPv3 Credentials
- SSH Credentials
- SSH Private Key Credentials
- VMware Credentials
- Windows Credentials

3. Click on New, which will open a new form to enter the values. Entering the required information and clicking on Test credential lets you test the credential:



SSH Credentials
New record

Name: Discovery SSH Credentails

Active: ☑

User name: mydiscovery

Password: ••••••

Applies to: All MID servers

Order: 100

Related Links

Test credential

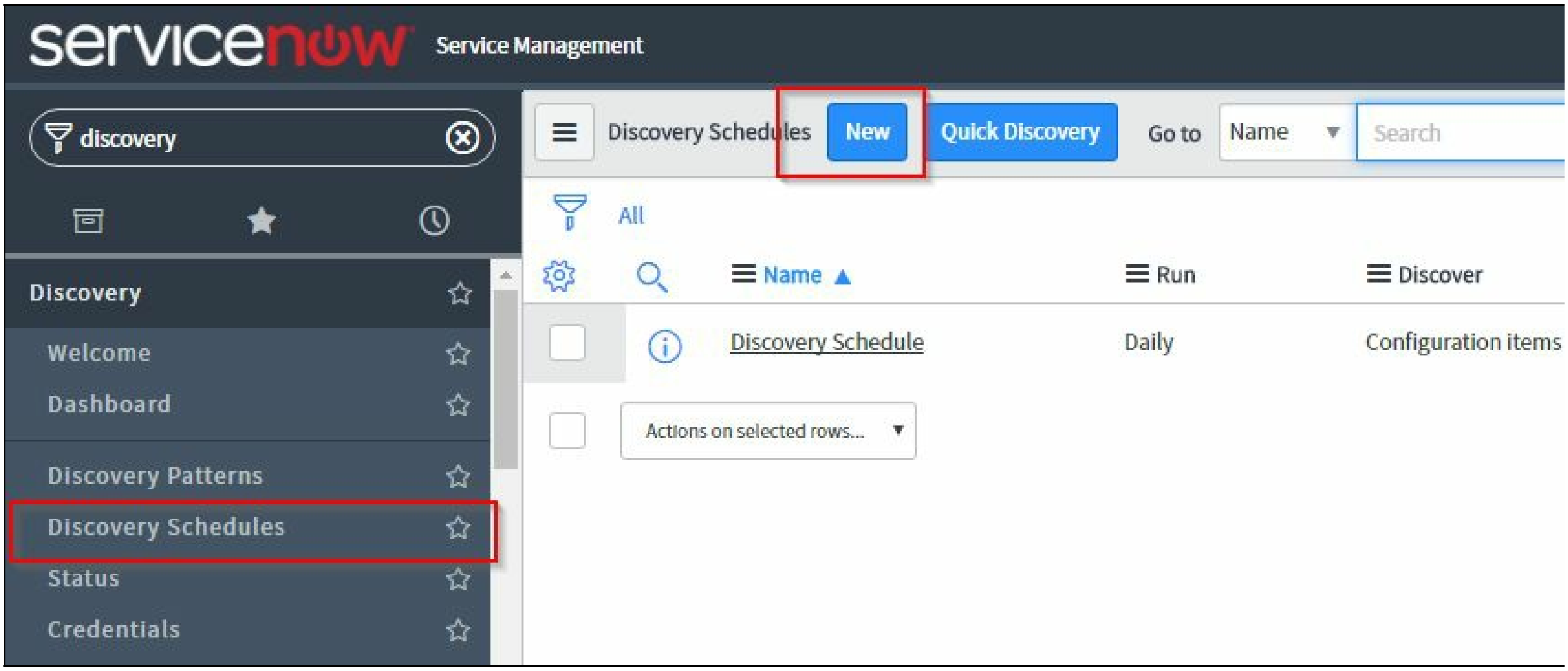
Discovery schedule

Discovery schedule will determine what the discovery run will search. Discovery schedule helps us with the following:

- IP address-based device identification
- Specifying if device probes will use credentials
- Configuring use of multiple MID Servers
- Manual discovery run
- Specifying an MID Server for a type of discovery

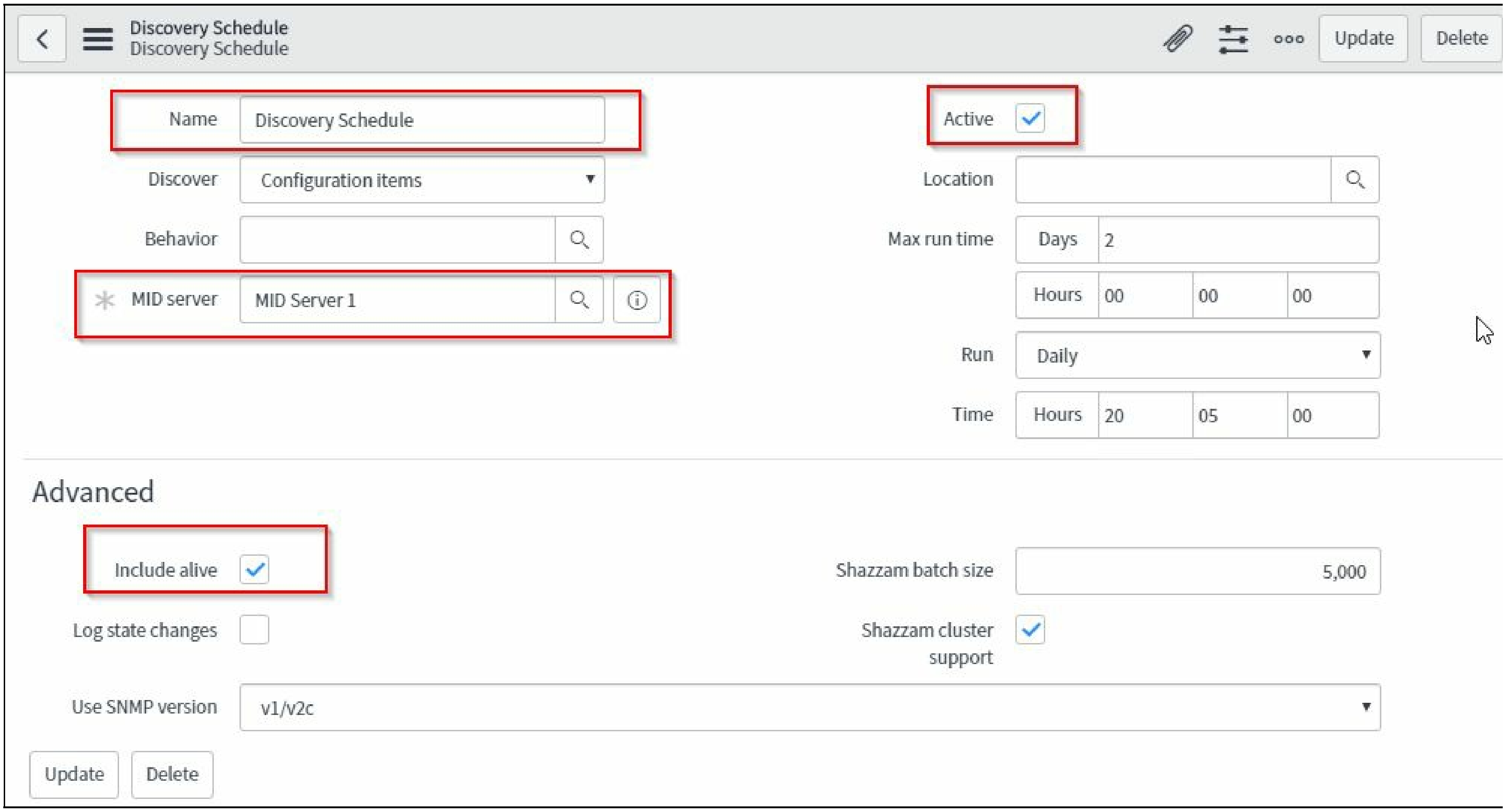
Follow these steps to configure the discovery schedule:

1. Search for Discovery Schedules on the application navigator that brings up all the existing schedules, click on the existing schedule to modify an existing schedule, or click on New to create a new schedule:



Name ▲	Run	Discover
Discovery Schedule	Daily	Configuration items

2. Click on New to create a new Discovery Schedule, you will be able to configure different parameters for these schedules. Some of the key values for configuring are:
   - Discover: Discovers configuration items, IP addresses, networks, or web services.
   - MID server: Specifies the MID Server to use for this discovery. This is used when there are multiple MID Servers available.
   - Include alive: Includes an alive scan even when it is not active.



Name: Discovery Schedule

Active: ☑

Discover: Configuration items

Location:

Behavior:

Max run time: Days 2

Hours 00 00 00

* MID server: MID Server 1

Run: Daily

Time: Hours 20 05 00

Advanced

Include alive: ☑

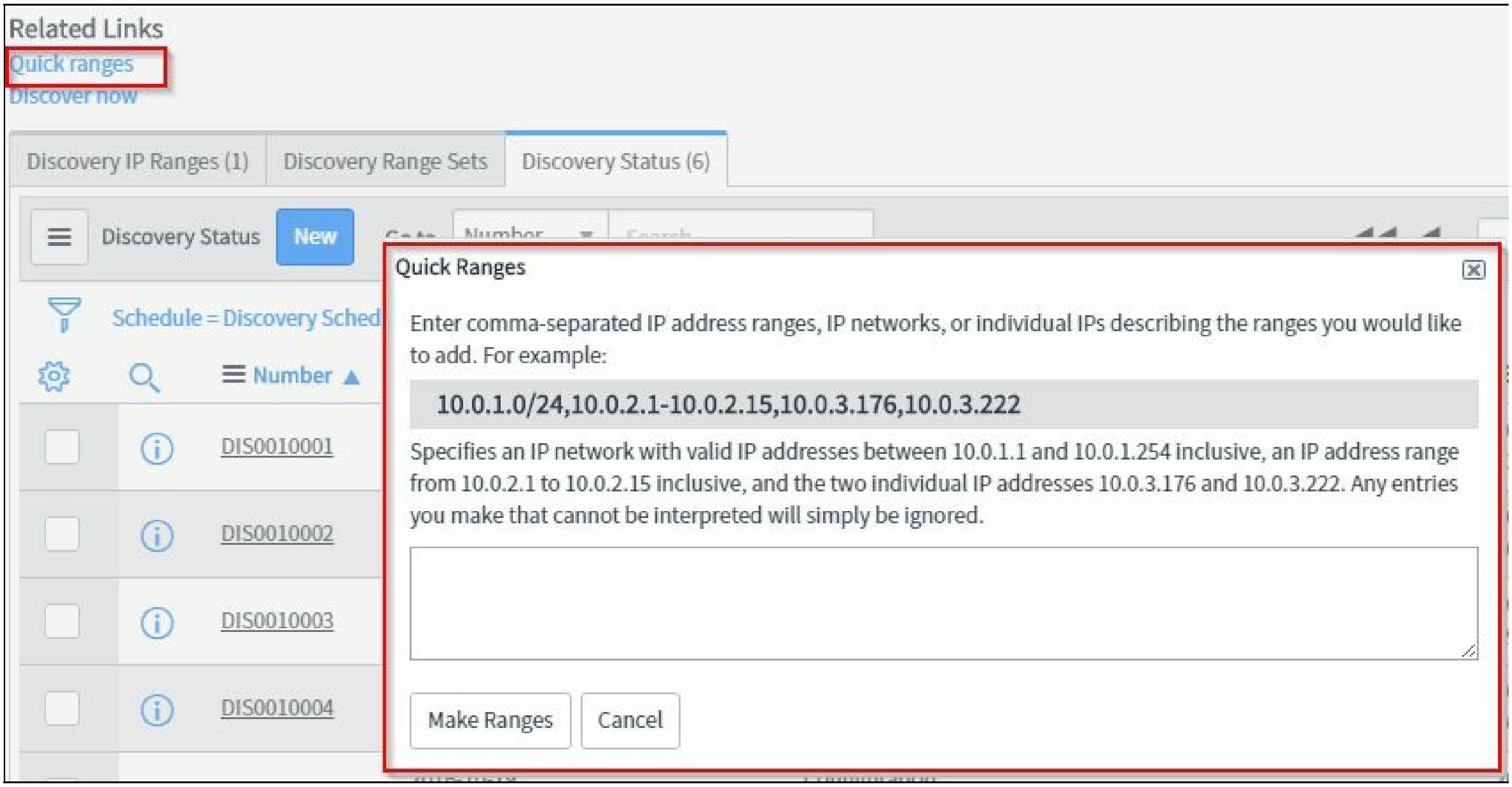
Shazzam batch size: 5,000

Log state changes: ☐

Shazzam cluster support: ☑

Use SNMP version: v1/v2c

3. Click on Quick Ranges if you need to specify multiple IP ranges for the discovery. Clicking on Quick Ranges opens up a window to specify the IP ranges:



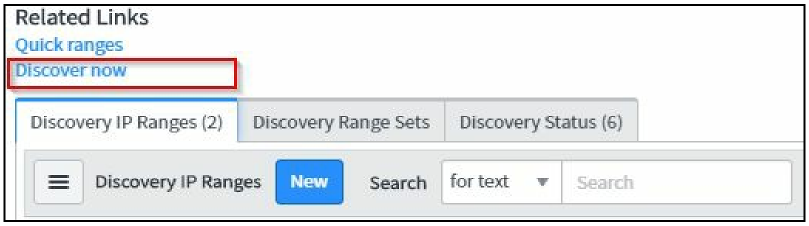
Quick Ranges

Enter comma-separated IP address ranges, IP networks, or individual IPs describing the ranges you would like to add. For example:

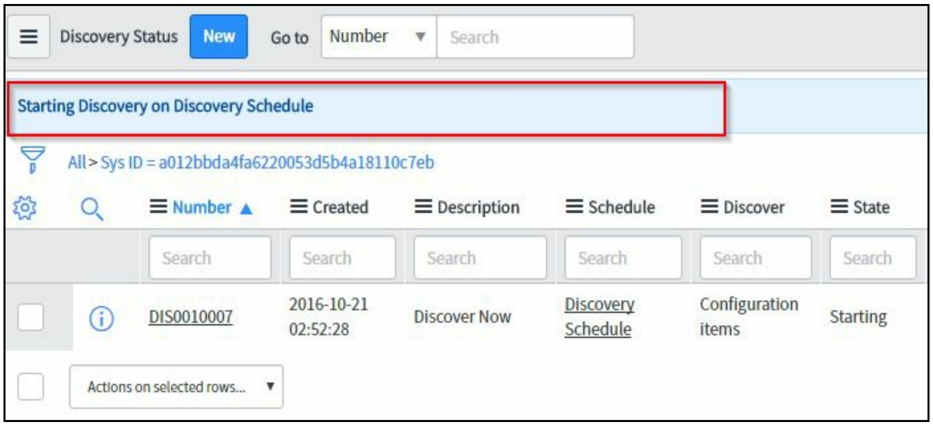
```
10.0.1.0/24,10.0.2.1-10.0.2.15,10.0.3.176,10.0.3.222
```

Specifies an IP network with valid IP addresses between 10.0.1.1 and 10.0.1.254 inclusive, an IP address range from 10.0.2.1 to 10.0.2.15 inclusive, and the two individual IP addresses 10.0.3.176 and 10.0.3.222. Any entries you make that cannot be interpreted will simply be ignored.

4. Click on Discover now to run the discovery schedule:



5. Discovery Status shows the status of the discovery run:

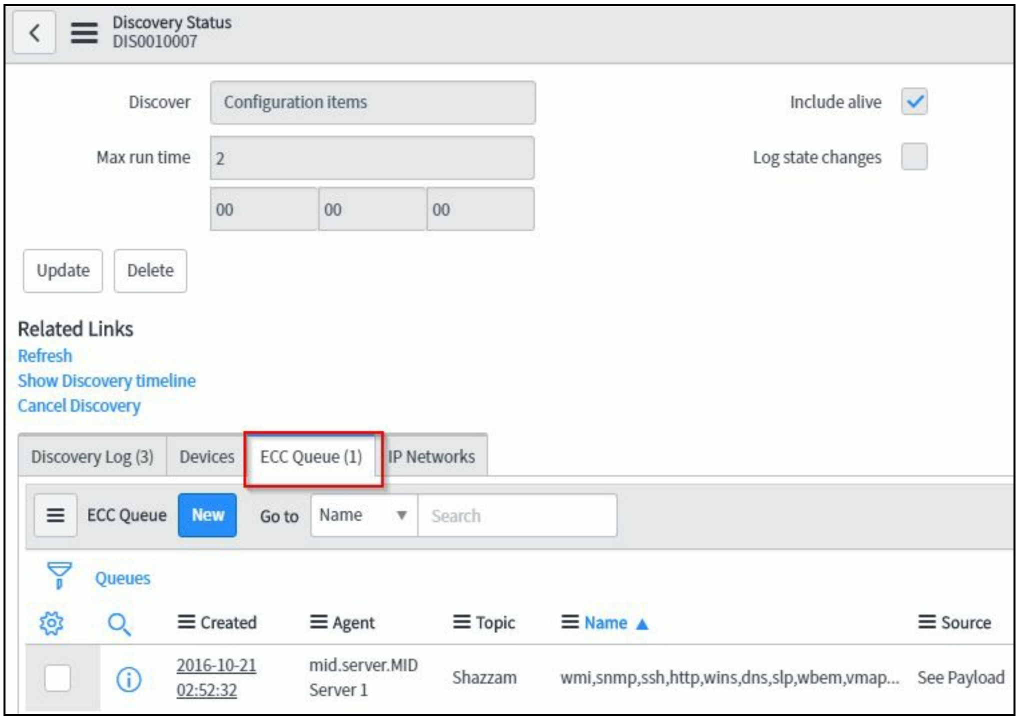


Starting Discovery on Discovery Schedule

All > Sys ID = a012bbda4fa6220053d5b4a18110c7eb

Number ▲	Created	Description	Schedule	Discover	State
DIS0010007	2016-10-21 02:52:28	Discover Now	Discovery Schedule	Configuration items	Starting

6. The ECC Queue tab shows the response back from the MID Server to the instance on the discovery:


Discovery Status
DIS0010007

Discover: Configuration items

Max run time: 2 | 00 | 00 | 00

Include alive ☑

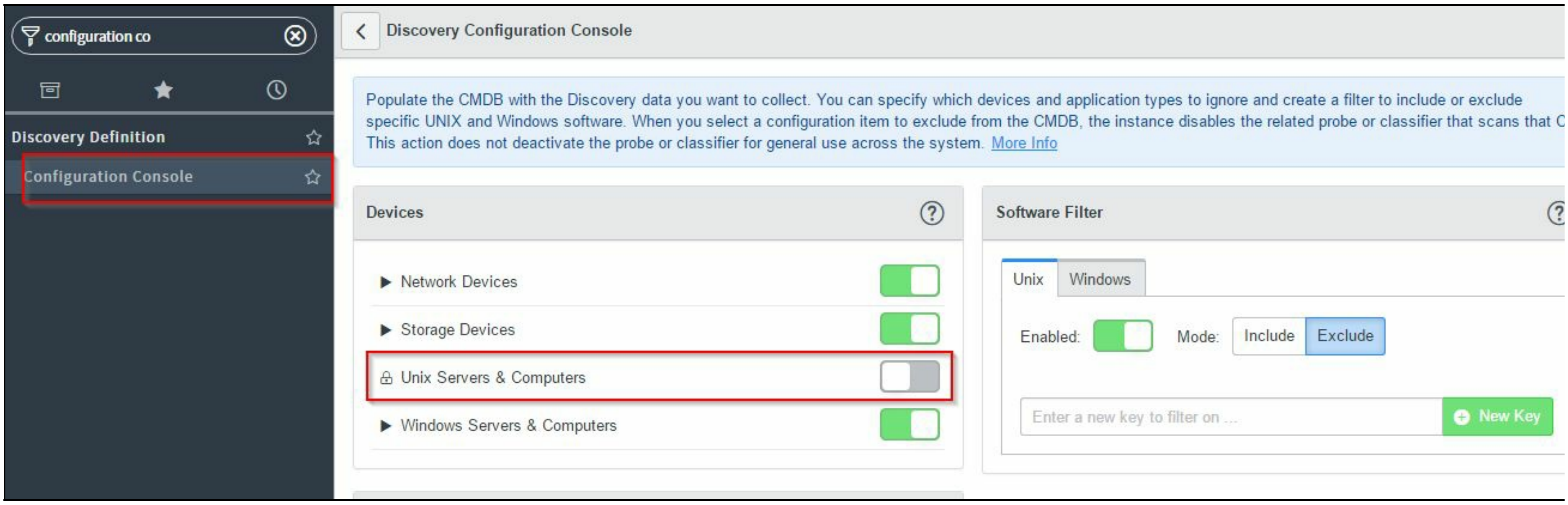
Log state changes □

Created	Agent	Topic	Name ▲	Source
2016-10-21 02:52:32	mid.server.MID Server 1	Shazzam	wmi,snmp,ssh,http,wins,dns,slp,wbem,vmap...	See Payload

Discovery configuration console

The **discovery configuration console** lets you specify which devices and application types to ignore for the discovery.

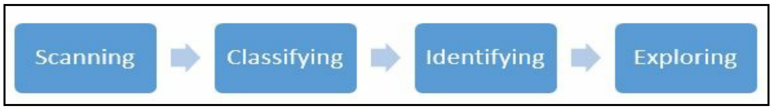
Search for Configuration Console on the application navigator, which will open up a console to configure types to ignore or include for discovery.



Populate the CMDB with the Discovery data you want to collect. You can specify which devices and application types to ignore and create a filter to include or exclude specific UNIX and Windows software. When you select a configuration item to exclude from the CMDB, the instance disables the related probe or classifier that scans that C This action does not deactivate the probe or classifier for general use across the system. More Info

Discovery phases

The following are the different phases that are used to discover configuration items in the environment:



Scanning or port scanning phase

TCP and UDP IP ports are scanned by discovery to determine the open ports and also try to get responses from the ports that are open. WMI, SSH, and SNMP are the protocols that discovery searches responses from. Port scanning results are finally posted into the ECC queue.

Discovery follows through these steps of scanning the ports:

1. Find IP addresses with open ports with WMI, SSH, and SNMP protocol:
    - Lists the IP address in *Shazzam returns*
2. No response from the port:
    - Does not list the IP address in the returns in *Shazzam returns*
3. Refused connection from the port:
    - Lists the IP address and ports that refused in *Shazzam returns*

Classifying

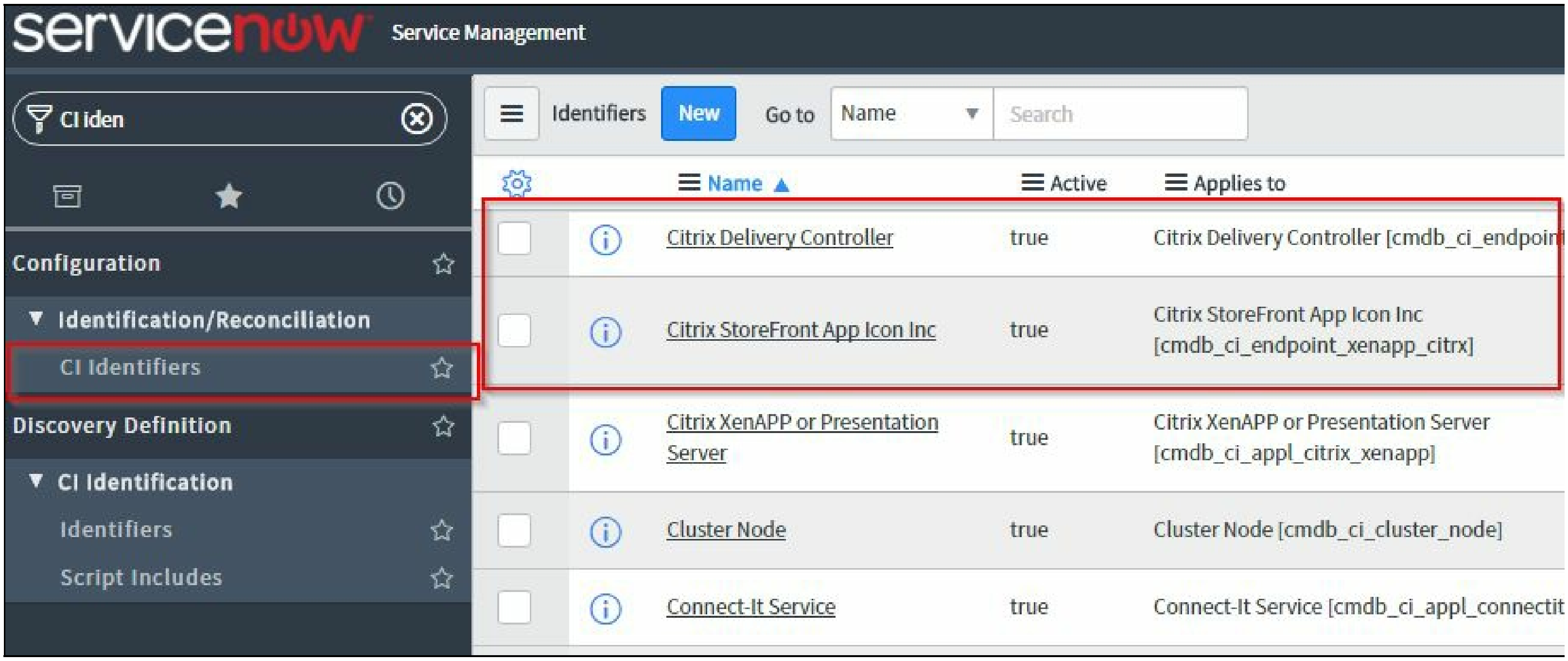
Classify what type of device has been discovered that is available for IP address discovery type. Discovery classification occurs when a discovery is configured to discovery configuration items. This enables the discovery identifiers and it is the only scan used to update the CMDB.

When the discovery scanning is initiated at the first step and when the discovery has determined the device class, the discovery launches an identify probe or multi identify probe to run the command. The identity probe is the one that asks the device for attribute information on the device name, serial number, make, model, and so on.

Identification

After the device is classified and has found a match class, the scan results are processed by the identity sensor and passed to the identifier. The identifier tries to find a matching device in the CMDB and performs the following actions:

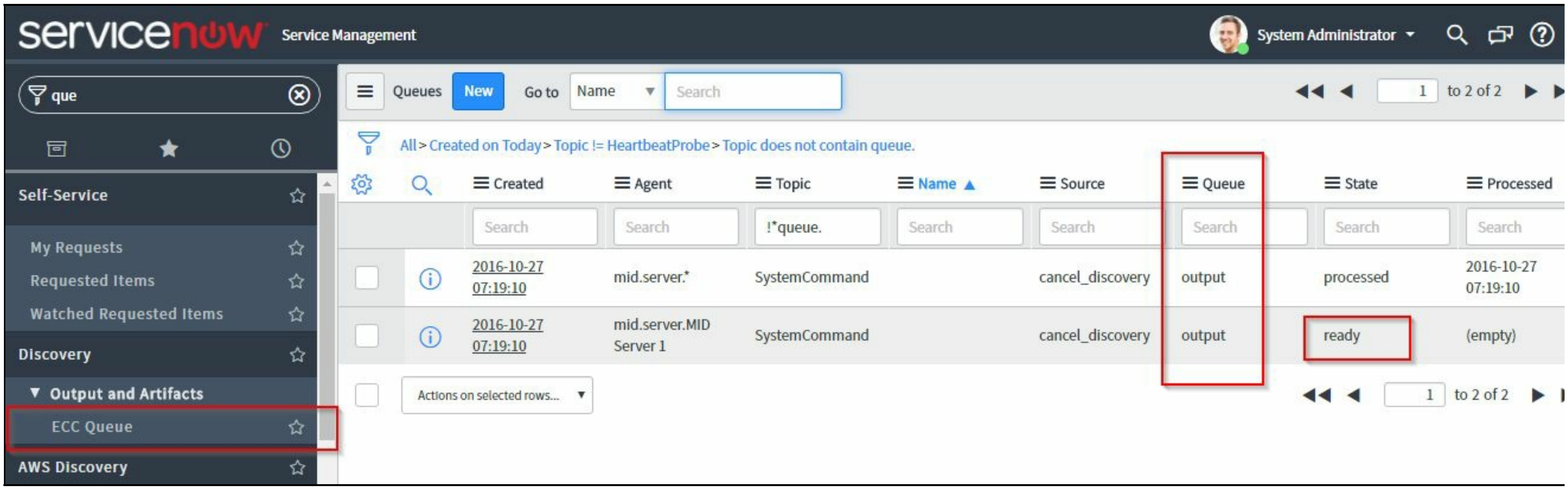
- **No match in the CMDB**: Creates a CI
- **Single match**: Updates the existing CI
- **Multiple match**: Stops



Name ▲	Active	Applies to
Citrix Delivery Controller	true	Citrix Delivery Controller [cmdb_ci_endpoin
Citrix StoreFront App Icon Inc	true	Citrix StoreFront App Icon Inc [cmdb_ci_endpoint_xenapp_citrx]
Citrix XenAPP or Presentation Server	true	Citrix XenAPP or Presentation Server [cmdb_ci_appl_citrix_xenapp]
Cluster Node	true	Cluster Node [cmdb_ci_cluster_node]
Connect-It Service	true	Connect-It Service [cmdb_ci_appl_connectit

Probes and sensors

Discovery probes and sensors perform key tasks of data gathering and processing of the data that was gathered by discovery. Probe and sensor activities are controlled by the ECC queue. A job monitors the ECC queue, which looks for the ECC queue output and the ready state:



All > Created on Today > Topic != HeartbeatProbe > Topic does not contain queue.

Created	Agent	Topic	Name ▲	Source	Queue	State	Processed
Search	Search	!*queue.	Search	Search	Search	Search	Search
2016-10-27 07:19:10	mid.server.*	SystemCommand		cancel_discovery	output	processed	2016-10-27 07:19:10
2016-10-27 07:19:10	mid.server.MID Server 1	SystemCommand		cancel_discovery	output	ready	(empty)

The output ECC messages are taken by the MID Server and processed, MID Server runs the necessary probes and returns the probe results to the ECC queue. The results from the probe are put back to the ECC queue as input entries. A business rule is fired on inserting data on to the ECC queue as input. The sensor processes the data that is required, which updates the CMDB.

Probes

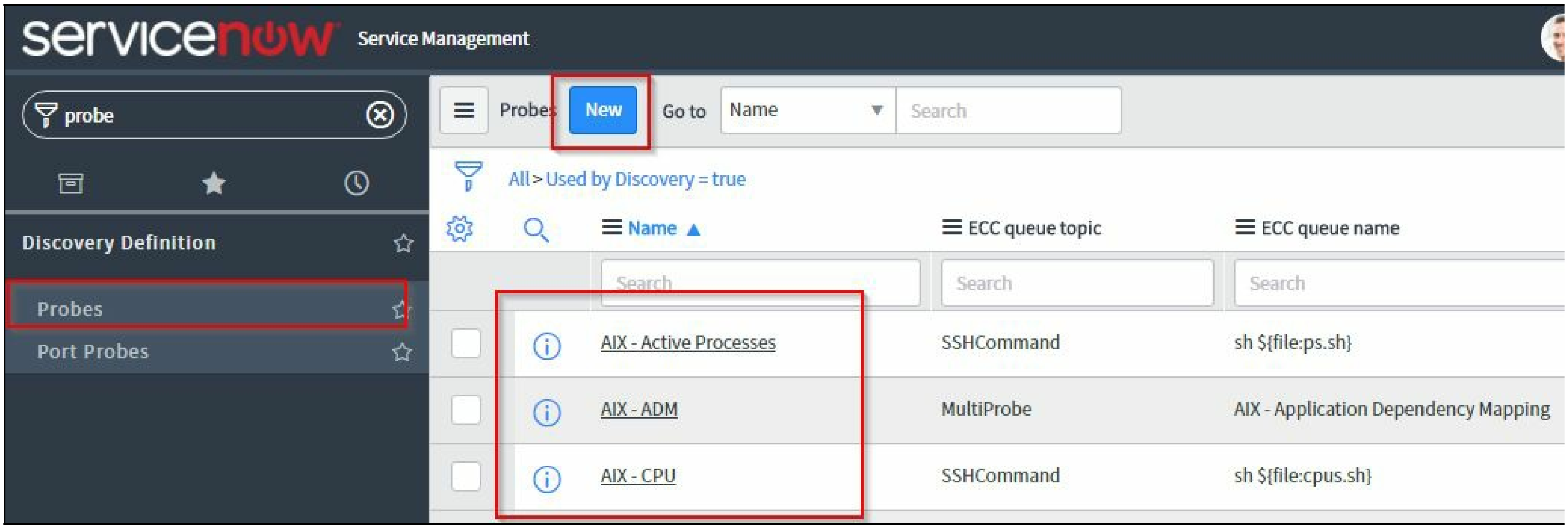
Probes are responsible for collecting the information that is launched by the MID Server. A probe might be configured to get specific attribute information such as a configuration item name or a server IP address. An exploration probes return more specific information about the IP addresses.

Configuring probes

Probes can be configured from the ServiceNow instances, and attributes can be changed to what information is required and to be probed.

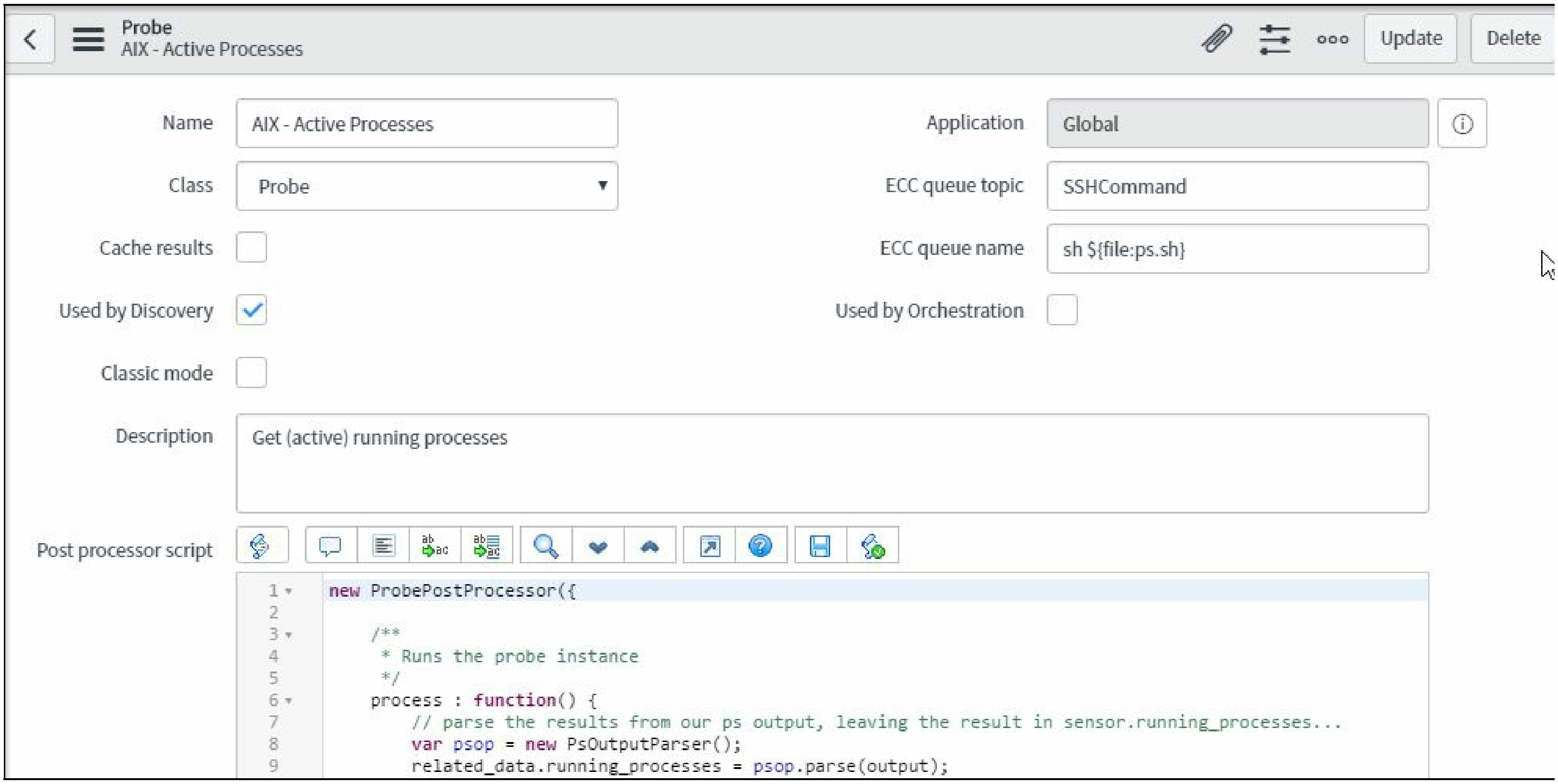
Steps to configure or modify probes:

1. On the application navigator, search for probes under the Discovery Definition. Discovery definition | Probes, on the content pane you will find the list of all the probes currently in place, click on any probe that you would like to modify, or click New to create a new probe:



Name ▲	ECC queue topic	ECC queue name
AIX - Active Processes	SSHCommand	sh ${file:ps.sh}
AIX - ADM	MultiProbe	AIX - Application Dependency Mapping
AIX - CPU	SSHCommand	sh ${file:cpus.sh}

2. Click on any existing probe to modify, or click New to create a new probe. In this walk-through, we will open an existing probe. Setting different values on these probes might change the behavior of the probes, so you will need to understand more about what these fields are.



Name: AIX - Active Processes

Class: Probe

Cache results: □

Used by Discovery: ☑

Classic mode: □

Application: Global

ECC queue topic: SSHCommand

ECC queue name: sh ${file:ps.sh}

Used by Orchestration: □

Description: Get (active) running processes

Post processor script:

```
new ProbePostProcessor({

    /**
     * Runs the probe instance
     */
    process : function() {
        // parse the results from our ps output, leaving the result in sensor.running_processes...
        var psop = new PsOutputParser();
        related_data.running_processes = psop.parse(output);
```

We will see some of the important fields available to configure a probe:

- **Class**: Type of probe to query on the operating system. Probe classes available are:

  - **CIM probe**: Used to query CIM Server using WBEM protocols
  - **Multiprobe**: Runs one or more simple or mix probes on different types
  - **SNMP**: Used for network devices
  - **WMIRunner probe**: Used for Windows devices

- **ECC queue topic**: Used for labeling ECC queue topics for incoming ECC queue messages. My default ServiceNow probe uses the following ECC queue topics:
  - CimProbe
  - Multiprobe
  - PowerShell probe
  - SCRelay
  - SSHCommand
  - SNMP
  - WMIRunner

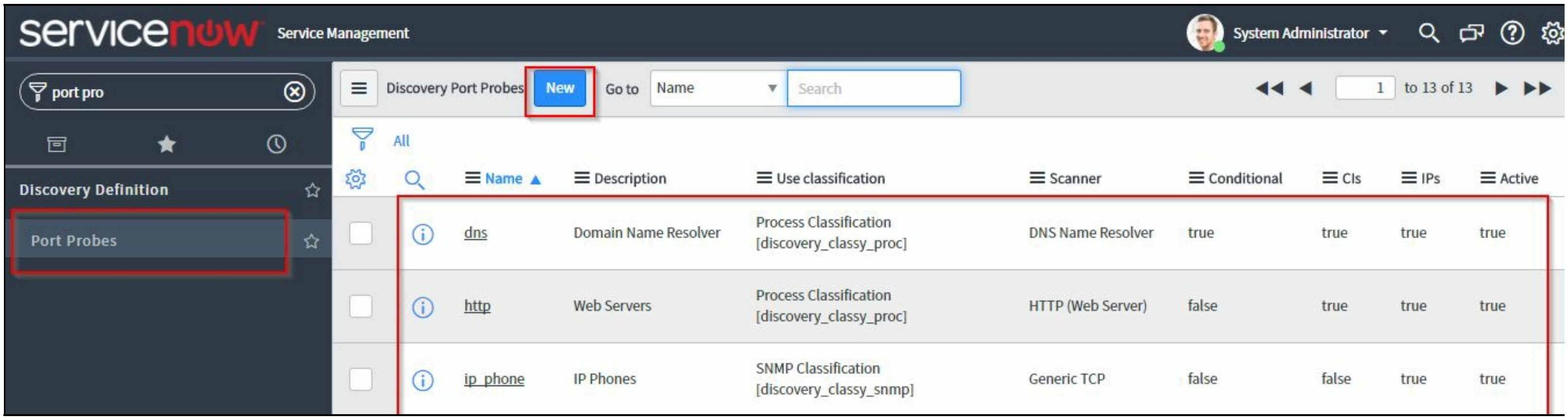
- **ECC queue name**: The actual command the probe is to run.
- **Cache results**: Specifies to the cache probe the results in the probe results cache.

Port probe

The *Shazzam* probe uses the port probe to look for protocol activity on open ports on devices it comes across. When an open port is found, the *Shazzam* sensor checks the port probe to identify the classification probe to launch on that port, which might be SSH, WMI, SNMP, or something else. By default, the WMI probe is launched if the port does not respond to the WMI, then the SSH probe is launched to gather information about the device. Finally, when the port does not respond to the WMI or the SSH, the SNMO probe will allow identification if the device is running multiple protocols.

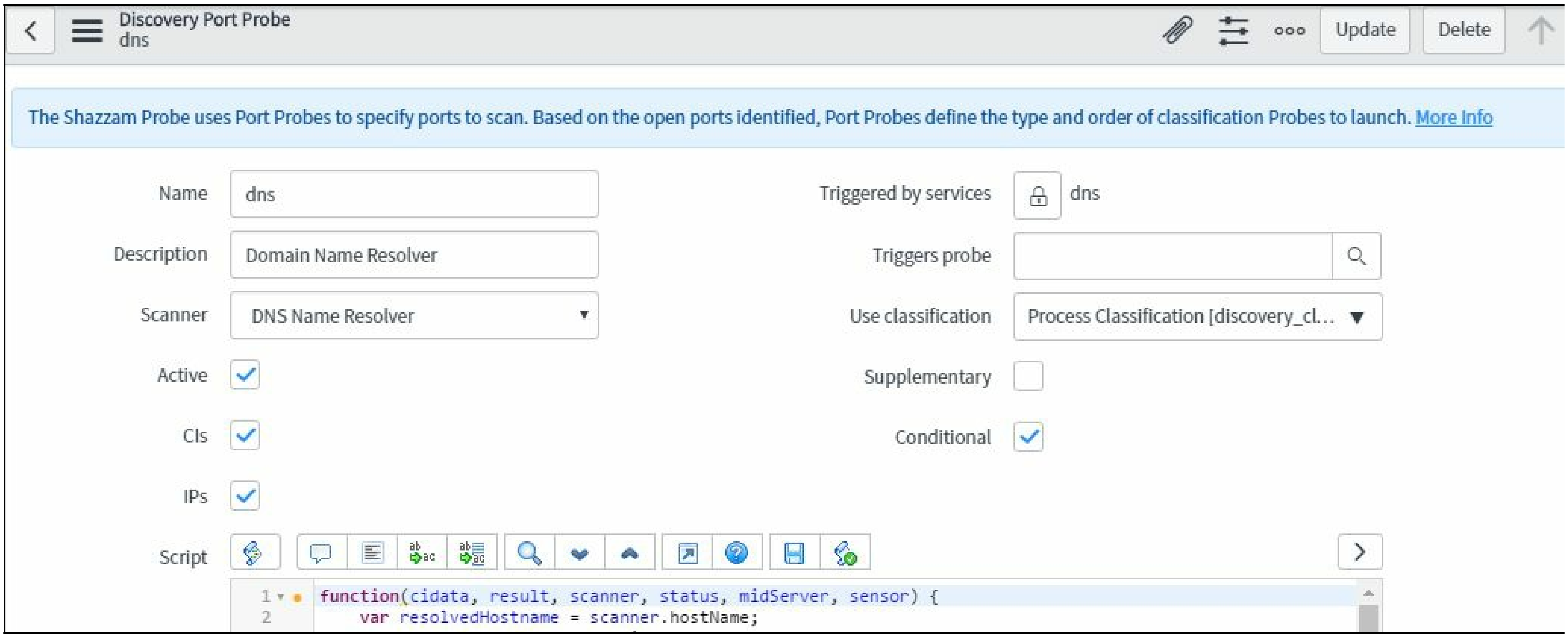
Now let's see how to configure the port probe scan:

1. Search for Port Probes in the application navigator, which will bring up ports that are already configured. Clicking on New lets you create a new port probe:



	Name ▲	Description	Use classification	Scanner	Conditional	CIs	IPs	Active
ⓘ	dns	Domain Name Resolver	Process Classification [discovery_classy_proc]	DNS Name Resolver	true	true	true	true
ⓘ	http	Web Servers	Process Classification [discovery_classy_proc]	HTTP (Web Server)	false	true	true	true
ⓘ	ip_phone	IP Phones	SNMP Classification [discovery_classy_snmp]	Generic TCP	false	false	true	true

2. Click on any existing port probe to modify an existing configuration of a port probe. There are several options or settings to configure a port probe, changing options or settings will change the behavior of the port probe or it might not work as intended.



The Shazzam Probe uses Port Probes to specify ports to scan. Based on the open ports identified, Port Probes define the type and order of classification Probes to launch. More Info

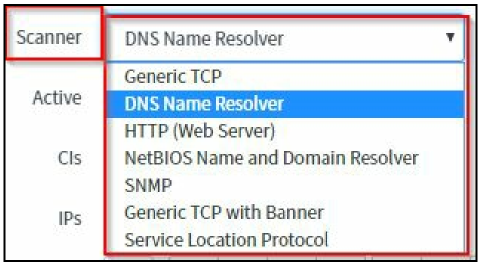
Name	dns	Triggered by services	dns
Description	Domain Name Resolver	Triggers probe	
Scanner	DNS Name Resolver ▾	Use classification	Process Classification [discovery_cl... ▾
Active	☑	Supplementary	□
CIs	☑	Conditional	☑
IPs	☑		

Script

```
function(cidata, result, scanner, status, midServer, sensor) {
    var resolvedHostname = scanner.hostName;
```

Some of the important configurations and settings are explained as follows:

- Scanner: The *Shazzam* scanner used to run on this port probe



- Conditional: Enabled to resolve the names of the Windows device and DNS names when non-conditional probes return an open port
- CIs: Enabled or disabled for discovering configuration items
- IPs: Indicates whether this port probe is enabled or disabled for discovering configuration items
- Trigger probe: Name of the classify probe to use
- Classification priority: Specifies the priority in which the port probes must run

About sensors

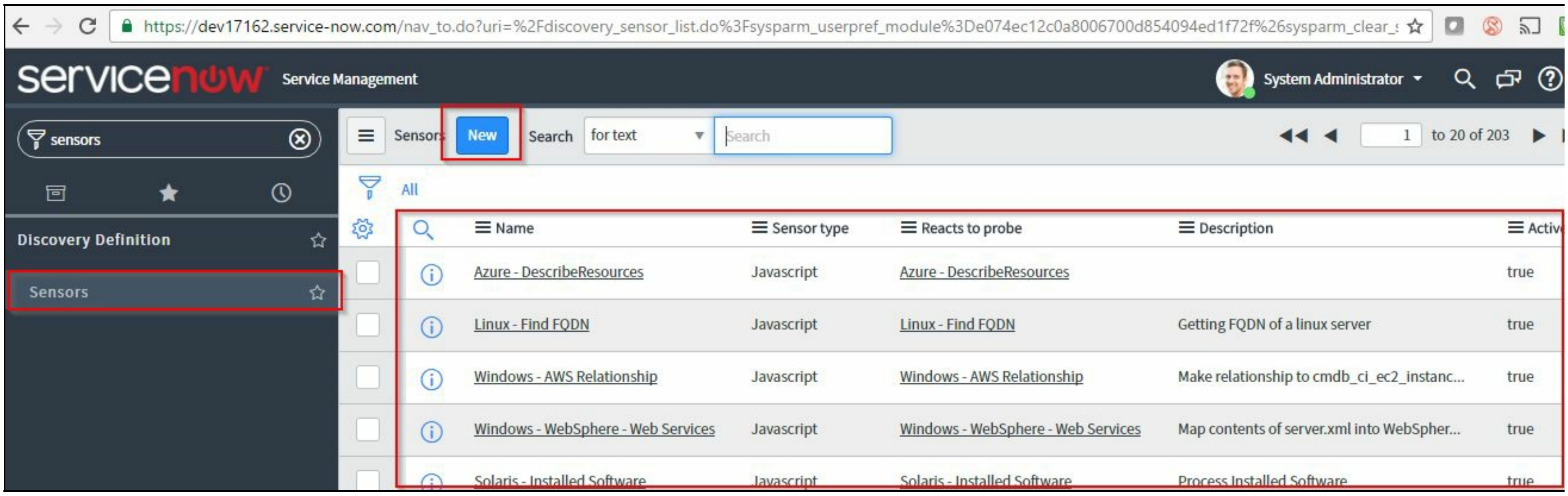
Probes are used to identify and classify the device and gather information about the device, but there should be some mechanism to process the data, processing the data is taken care of by the sensors.

Let's take an example of mail coming in. In a post office, everyday they receive a bulk load of mail for a town, there are multiple post officers who will physically sit and process this mail based on area and street. Similarly, the data received by the port probes are like mail received, and sensors are the post officers that process the data of where to deliver and what to do.

Depending on the type of probe, the sensor is triggered accordingly.

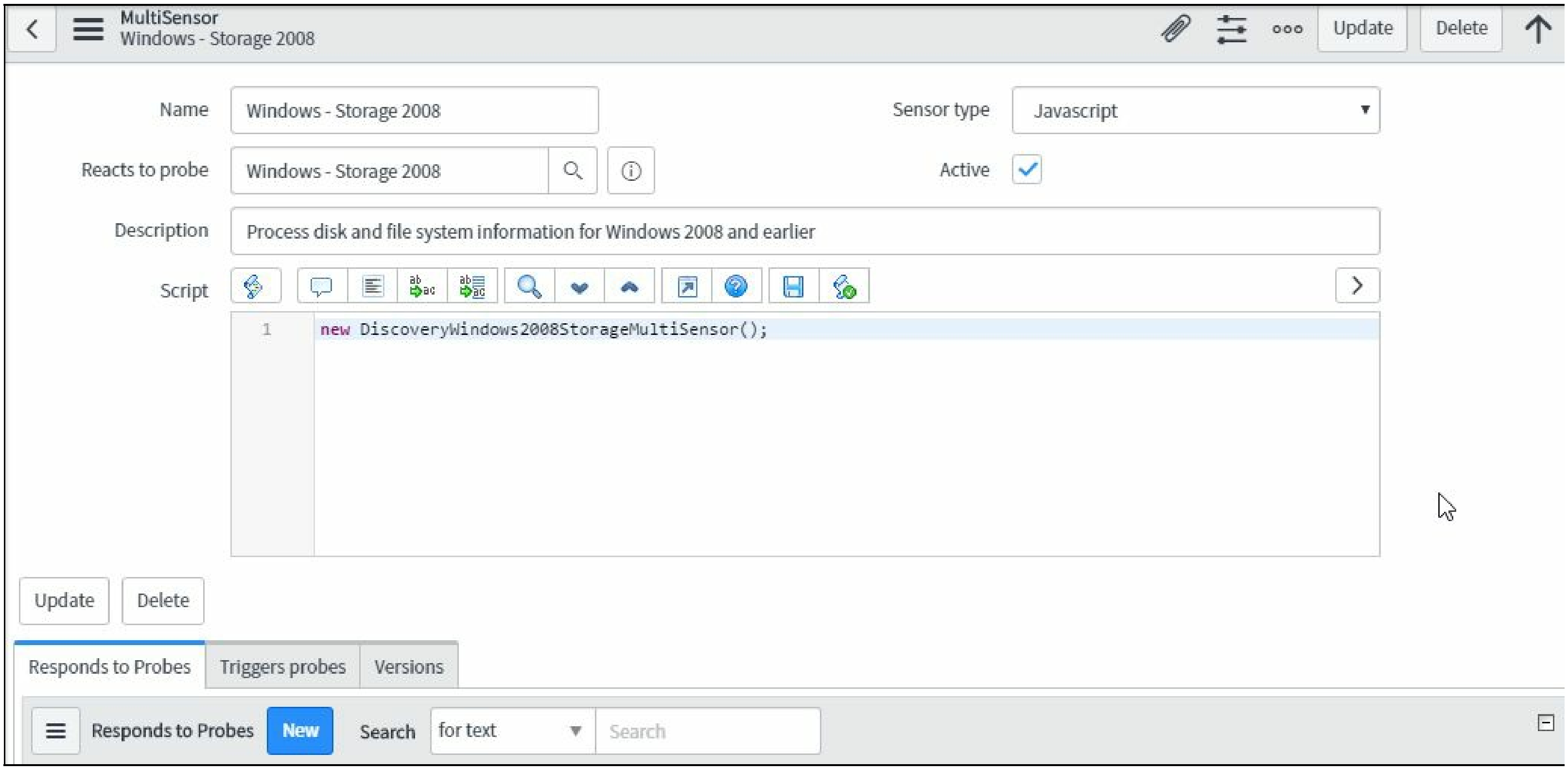
Now let's see how to configure sensors and what the important attributes available are. Search for Sensors from the application navigator, clicking on Sensors opens up the list of sensors available. To configure a new sensor, click on the New button or click on any one of the existing sensors to modify attributes of an existing sensor:

1. Search for Sensors in the application navigator, clicking on the sensor brings up all existing sensors that are configured:


https://dev17162.service-now.com/nav_to.do?uri=%2Fdiscovery_sensor_list.do%3Fsysparm_userpref_module%3De074ec12c0a8006700d854094ed1f72f%26sysparm_clear_s
servicenow
Service Management
System Administrator
sensors
Discovery Definition
Sensors
Sensors
New
Search
for text
Search
1
to 20 of 203
All

Name	Sensor type	Reacts to probe	Description	Activ
Azure - DescribeResources	Javascript	Azure - DescribeResources		true
Linux - Find FQDN	Javascript	Linux - Find FQDN	Getting FQDN of a linux server	true
Windows - AWS Relationship	Javascript	Windows - AWS Relationship	Make relationship to cmdb_ci_ec2_instanc...	true
Windows - WebSphere - Web Services	Javascript	Windows - WebSphere - Web Services	Map contents of server.xml into WebSpher...	true
Solaris - Installed Software	Javascript	Solaris - Installed Software	Process Installed Software	true

2. Click on any existing sensor to change any values or settings:



Name: Windows - Storage 2008

Sensor type: Javascript

Reacts to probe: Windows - Storage 2008

Active: ☑

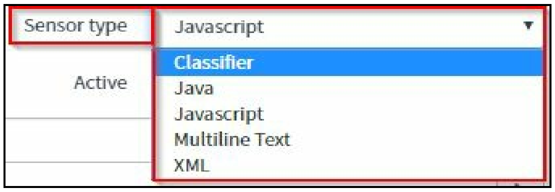
Description: Process disk and file system information for Windows 2008 and earlier

Script:

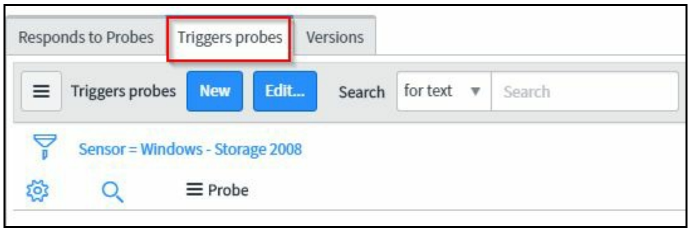
```
new DiscoveryWindows2008StorageMultiSensor();
```

Let's see some of the important settings available to configure a sensor:

- Sensor type: Used to specify how the results should be processed the results that are returned from probe. Mostly JavaScript or XML is used. When using JavaScript, the data from the probe is processed within the sensor itself, which can be viewed. When selecting XML, the data from the probe is broken into pieces used to launch the other probes.



- Script: A script that needs to be run when processing a probe.
- Sensor type: Select the type of sensor to create. The most used ones are multisensor, multiprobe, and sensor.
- Responds to probes: Use this option to specify the probe to use within a multiprobe whose payload the multisensor must process.
- Trigger probes: Used to specify which probe the sensor uses for the exploration.

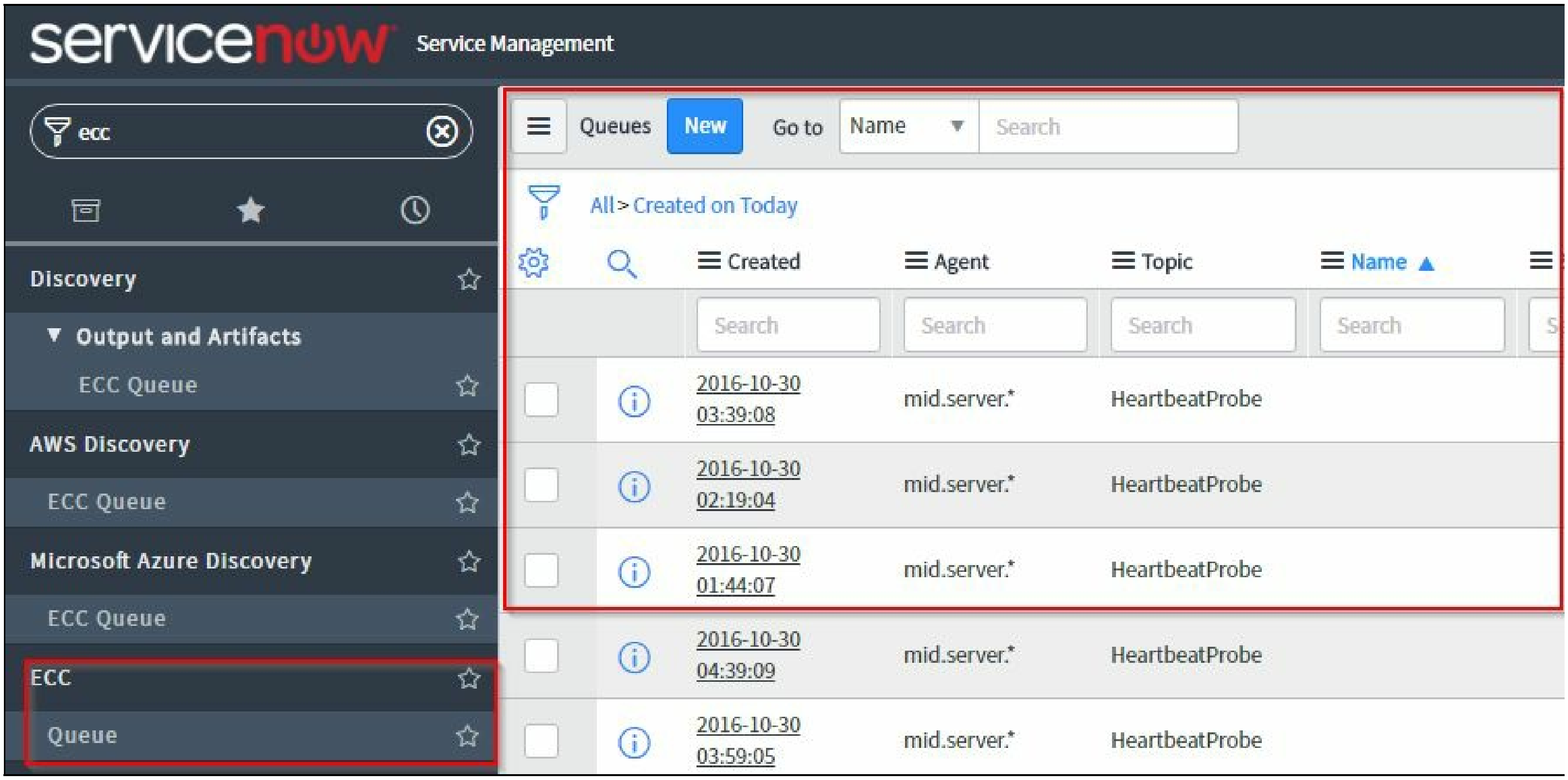


Sensor = Windows - Storage 2008

About ECC queue

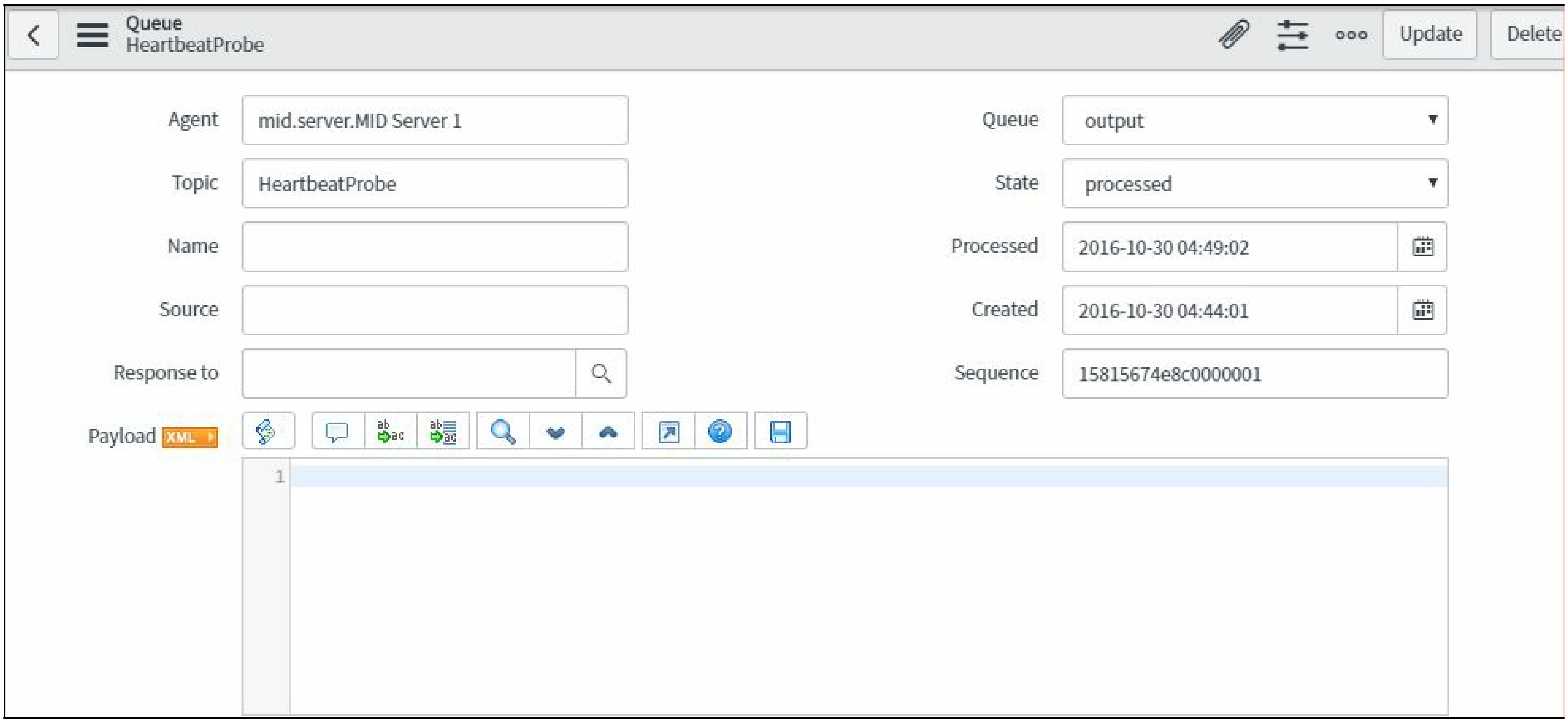
The **External Communication Channel** (**ECC**) queue displays messages from and to the MID Servers, which are usually called **input** and **output** messages. The input messages are ones that are sent from the MID Server to the instance and the output messages are the ones from the instance to the MID Server:

1. To view the ECC queue, search for ECC in the application navigator, which will bring in all the messages in the ECC queue, the queue column specifies if the message is an input message or output message:



Created	Agent	Topic	Name ▲
2016-10-30 03:39:08	mid.server.*	HeartbeatProbe	
2016-10-30 02:19:04	mid.server.*	HeartbeatProbe	
2016-10-30 01:44:07	mid.server.*	HeartbeatProbe	
2016-10-30 04:39:09	mid.server.*	HeartbeatProbe	
2016-10-30 03:59:05	mid.server.*	HeartbeatProbe	

2. Clicking on any of the messages will open up details of the ECC message:



Agent	mid.server.MID Server 1	Queue	output
Topic	HeartbeatProbe	State	processed
Name		Processed	2016-10-30 04:49:02
Source		Created	2016-10-30 04:44:01
Response to		Sequence	15815674e8c0000001
Payload XML			

Let's see some of the key values or data that is received in the ECC queue:

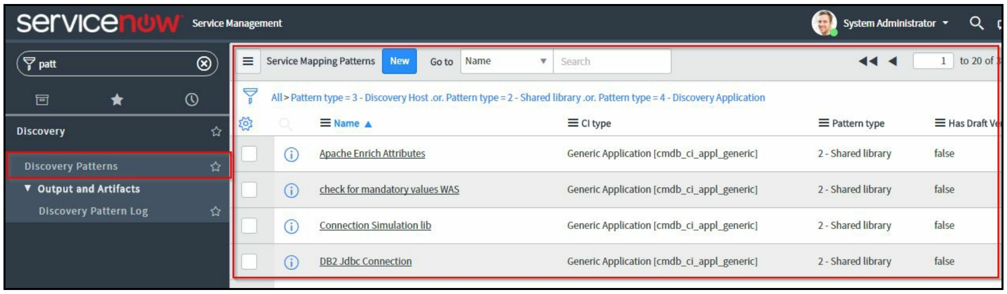
- Agent: Name of the MID Server or system from which the message is received
- Topic: Name of the probe the MID Server is set to run
- Source: Contains the IP addresses that the probe is to run against
- Payload: Returns XML messages from the probes

Discovery pattern designer

To discover the devices and applications, the pattern designer creates a sequence of commands that are mostly preconfigured and can be customized. Each discovery pattern serves to discover only one CI type, but the discovery can use more than one pattern to discover the same CI type.

Let's see how to create an empty pattern and configure important settings:

1. Search for Discovery Patterns from the application navigator, which will bring up all the existing patterns configured:

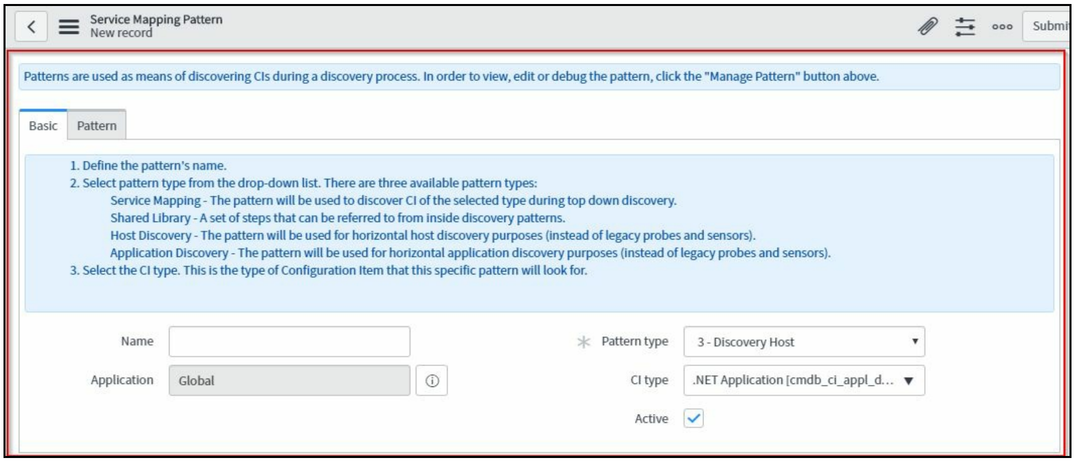


All > Pattern type = 3 - Discovery Host .or. Pattern type = 2 - Shared library .or. Pattern type = 4 - Discovery Application

Name ▲	CI type	Pattern type	Has Draft Ve
Apache Enrich Attributes	Generic Application [cmdb_ci_appl_generic]	2 - Shared library	false
check for mandatory values WAS	Generic Application [cmdb_ci_appl_generic]	2 - Shared library	false
Connection Simulation lib	Generic Application [cmdb_ci_appl_generic]	2 - Shared library	false
DB2 Jdbc Connection	Generic Application [cmdb_ci_appl_generic]	2 - Shared library	false

2. Clicking on New opens up a form to create a new pattern. The settings or configurations available are:
   - Name: Name of the pattern
   - CI type: Select CI type for this pattern to discover, as mentioned earlier you can have one pattern for a CI type
   - Pattern type: Choose Service Mapping for service mapping patterns, select Discovery Host to discover a host, and select Discovery Application to discover an application running on a host

3. Click Submit to create the new pattern using basic options, advance attributes are available in the pattern designer window:



Patterns are used as means of discovering CIs during a discovery process. In order to view, edit or debug the pattern, click the "Manage Pattern" button above.

1. Define the pattern's name.
2. Select pattern type from the drop-down list. There are three available pattern types:
   Service Mapping - The pattern will be used to discover CI of the selected type during top down discovery.
   Shared Library - A set of steps that can be referred to from inside discovery patterns.
   Host Discovery - The pattern will be used for horizontal host discovery purposes (instead of legacy probes and sensors).
   Application Discovery - The pattern will be used for horizontal application discovery purposes (instead of legacy probes and sensors).
3. Select the CI type. This is the type of Configuration Item that this specific pattern will look for.

Name		* Pattern type	3 - Discovery Host ▾
Application	Global	CI type	.NET Application [cmdb_ci_appl_d... ▼
		Active	☑

With this we have seen how to configure discovery and the different options that are available. There are a lot more settings than explained, we have just covered the core requirements to configure and set up discovery.

Summary

In this chapter we learnt about the important usage of discovery, learnt about the discovery architecture, explored the ECC queue, and saw how the discovery writes messages to the ECC queue. We also saw how to get started in setting up the discovery and finally we saw how to set important discovery attributes.

Creating and Managing Dependency Views

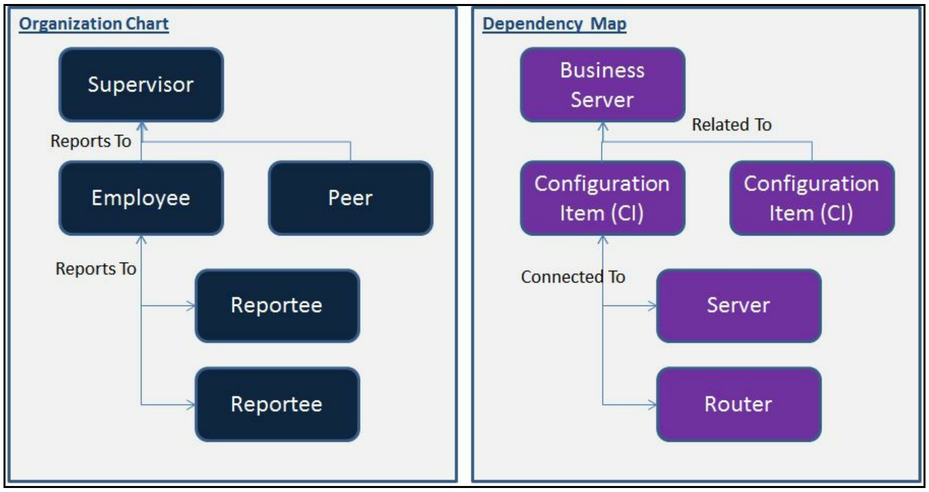
A dependency view graphically displays an infrastructure view for a configuration item and the business services that it is part of and that it supports. A dependency view indicates the status of its configuration items, and allows access to the CI related alerts, incidents, problems, changes, and business services.

Starting from the Istanbul release, dependency maps are not separately called out in the ITOM suite of applications. Dependency maps are described separately in Helsinki and prior versions.

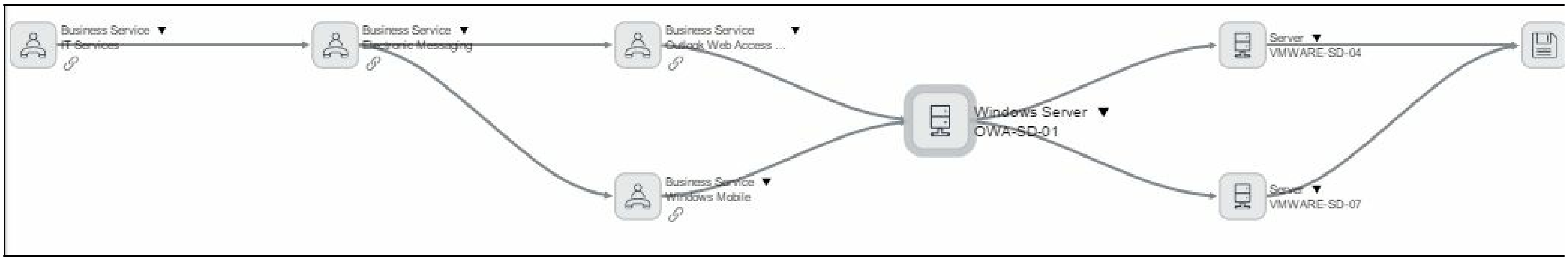
What are dependency views?

We have discussed dependency views with some examples in the first chapter. In this chapter, we will focus more on how to create and view dependency views. A dependency view shows a snapshot of how different logical and physical infrastructure items are connected and interrelated to one another. Logical grouping might be a business service, a reference to a process, or any other logical item whereas a physical infrastructure item might be any infrastructure component like a server, network device or any other infrastructure device.

Dependency views are like organization charts, which have upstream and downstream relationships such as a person whom he reports to or his supervisor and then the downstream relationship are like the person's reportee.



Now look at the following dependency map, which seems to be the same as the organization chart that shows upstream and downstream relationships of the configuration items:



Dependency views have one root configuration item or CI; by default the dependency view shows the upstream and downstream CI. Administrators can configure the number of levels to be displayed in the dependency maps. In the dependency view maps there are map indicators, the map indicators indicate any active or any pending issues against a given CI, such as any active incidents, problems, or changes associated with a CI.

Many of the dependency relationships are automatically created by the discovery process; the created dependency views can be altered or deleted or a new dependency can be manually created.

Prerequisites for dependency views

Following are the basic prerequisites required to set up the dependency views

- **ServiceNow application**: The **Configuration Management Database** (**CMBD**) application must be enabled
- **Role requirements**:
    - Administrator or ITIL Role or custom role is able to access the CMDB tables. Administrator has the ability to create or modify dependency views map indicators, create or modify map icons, create or modify map related items, create or modify dependency views menu actions, and create or edit a dependency type.
    - Dependency views role required to access dependency view maps from the navigation menu, a script API, or directly from a URL.
    - The `ecmdb_admin` role is required to perform activities related to icons, indicator, and menu actions.
- **Browser requirements**:
    - The latest version or service pack of Internet browsers are required to view and manipulate dependency views maps

The dependency views module supports the latest version or service pack of the following browsers:

- Firefox with the latest ESR
- Chrome version 25 or later (latest version recommended)
- Safari version 6 or later
- Microsoft **Internet Explorer** (**IE**), with these requirements and limitations:
    - Dependency views requires IE version 9 or later
    - You cannot export images from a dependency views map using IE as your browser
- When you save a map view, dependency views will not make a thumbnail image. You may navigate to the saved map view using the version number.

Tables in dependency views

Dependency views add the following tables:

- `ngbsm_ci_icons`: Stores all available CI class icons.
- `ngbsm_ci_type_icon`: Maps icons to CI class names.
- `ngbsm_script`: Custom scripts that run in real time and generate a custom view of a map for a specific CI.
- `ngbsm_view`: Serialized map views saved by users.
- `ngbsm_filter`: Filters saved by users.
- `ngbsm_context_menu`: Default and custom context menu actions that appear when users right-click a map.
- `ngbsm_related_item`: Stores which reference fields should be treated as relationships when building the map. This allows users to include CI's that are related via a reference field instead of a relationship.
- `bsm_edge_color`: Color definitions to use when drawing the relationships between nodes based on relationship type.
- `bsm_indicator`: Stores all map indicators.
- `bsm_graph`: Details of maps.
- `bsm_action`: Actions on the map.

Properties in dependency views

Dependency views adds the following properties:

- `glide.bsm.max_nodes`: Maximum number of CI's to display on a map at once
- `glide.bsm.too_many_children`: Maximum number of child nodes to display
- `glide.ngbsm.filters_remove_filtered_items`: Filtered out items should be removed from the graph along with any disjoint children
- `glide.ngbsm.filters_run_layout_automatically`: When filters are changed, the graph will recalculate the layout using the currently selected layout algorithm
- `glide.ngbsm.filters_fit_to_screen_automatically`: When filters are changed, the graph should be fit to screen
- `glide.ngbsm.performance_allow_curves`: Allow links between nodes to be drawn using smooth curves (may impact performance)
- `glide.ngbsm.notification_display_time`: Amount of time in milliseconds that a notification stays on the screen in dependency views
- `glide.ngbsm.search_ci_limit`: Maximum amount of results displayed when searching for CIs in dependency views
- `glide.ngbsm.search_service_limit`: Maximum amount of results displayed when searching for services
- `glide.ngbsm.search_rel_type_limit`: Maximum amount of results displayed when searching for relationship types
- `glide.bsm.color.affect_neighbors`: Color of an affected neighbor node's label
- `glide.bsm.refresh_interval`: This property has no effect on the map, and remains for backward compatibility purposes only
- `glide.ngbsm.show_class_labels`: When available, the map should display the class labels for each CI

Dependency views map indicators

Map indicators are icons that are used to display details about a configuration item such as any associated events, outages, incidents, problems, or changes. By default the dependency view maps have indicators for the following:

- Incidents that are opened and active on that CI
- Alerts that are opened related to that CI
- Planned and unplanned outages related to that CI
- Problem records that are associated to that CI
- Change records associated to that CI

The level of information on the dependency view maps and configuring the dependency view maps can be controlled by the administrator through the settings menu.

Creating a new map indicator

Following are the steps on how to create a new map indicator:

1. On the application navigator, click on Map Indicators under Dependency Views.

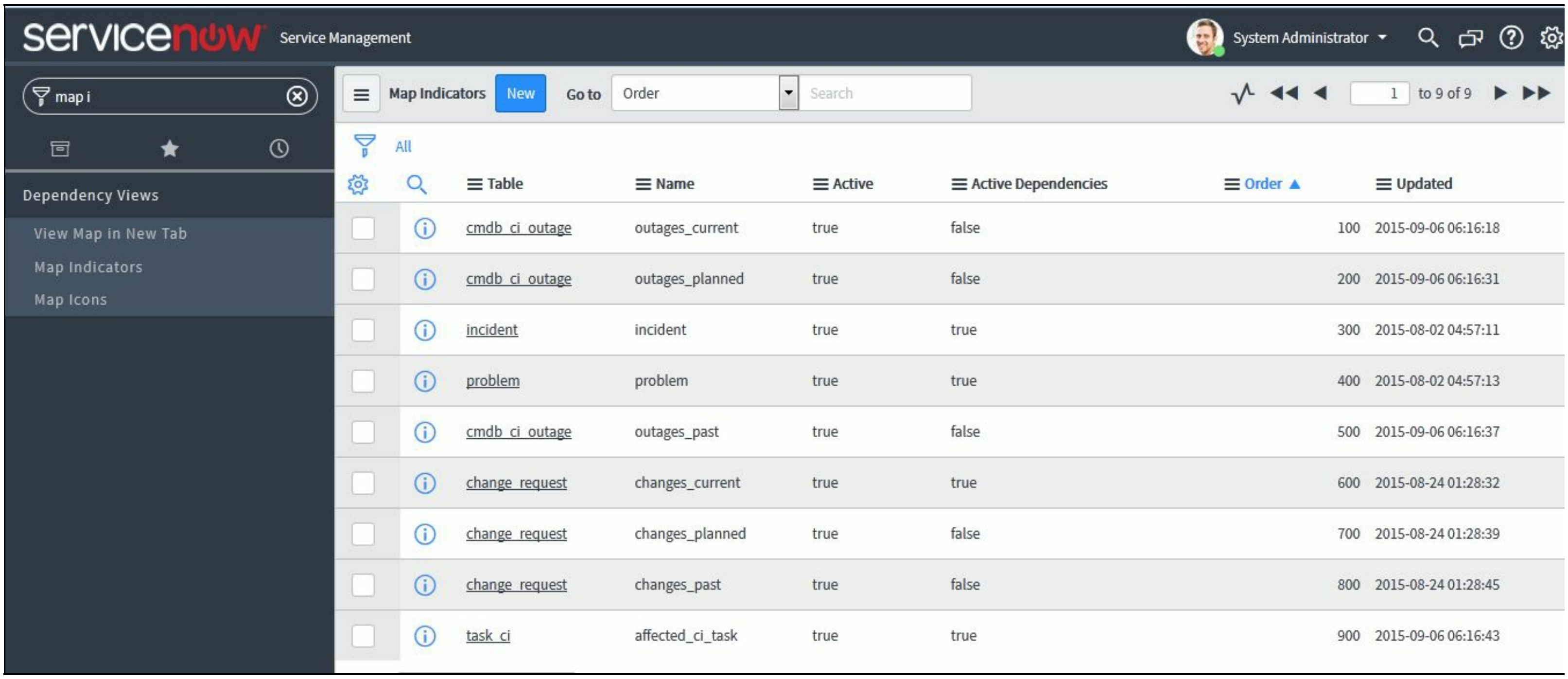
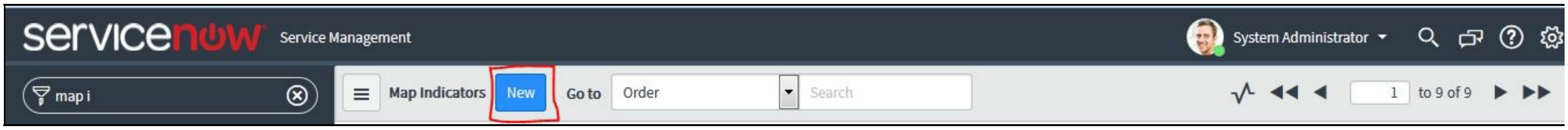


Table	Name	Active	Active Dependencies	Order ▲	Updated
cmdb_ci_outage	outages_current	true	false	100	2015-09-06 06:16:18
cmdb_ci_outage	outages_planned	true	false	200	2015-09-06 06:16:31
incident	incident	true	true	300	2015-08-02 04:57:11
problem	problem	true	true	400	2015-08-02 04:57:13
cmdb_ci_outage	outages_past	true	false	500	2015-09-06 06:16:37
change_request	changes_current	true	true	600	2015-08-24 01:28:32
change_request	changes_planned	true	false	700	2015-08-24 01:28:39
change_request	changes_past	true	false	800	2015-08-24 01:28:45
task_ci	affected_ci_task	true	true	900	2015-09-06 06:16:43

2. A list of indicators will display, click on any of the indicators to open up and modify the indicator. To create a new map indicator click on New.



3. Important fields mentioned in the Map Indicator form are discussed in detail in the following list:

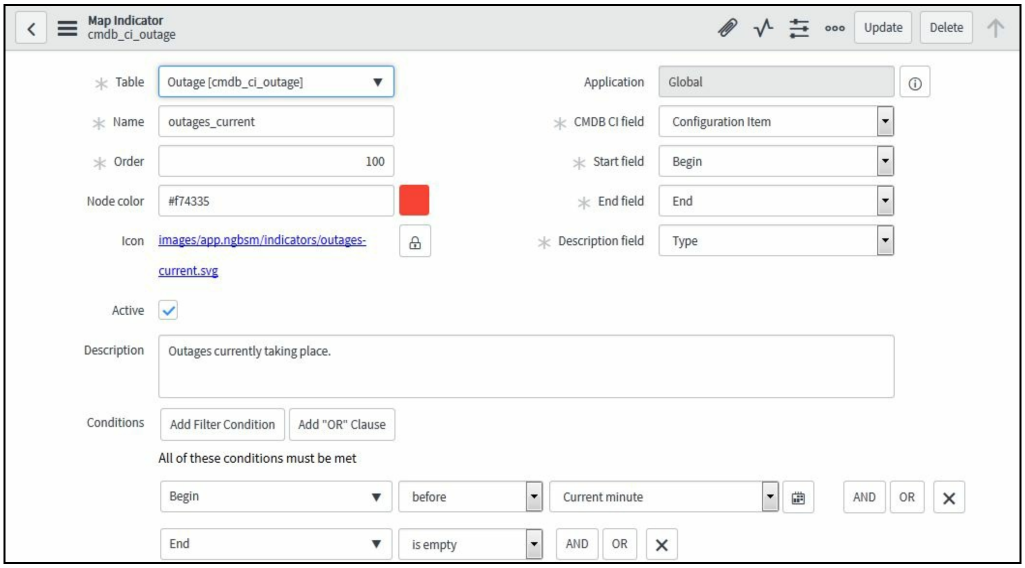


Table	Outage [cmdb_ci_outage]	Application	Global
Name	outages_current	CMDB CI field	Configuration Item
Order	100	Start field	Begin
Node color	#f74335	End field	End
Icon	images/app.ngbsm/indicators/outages-current.svg	Description field	Type
Active	☑		
Description	Outages currently taking place.		

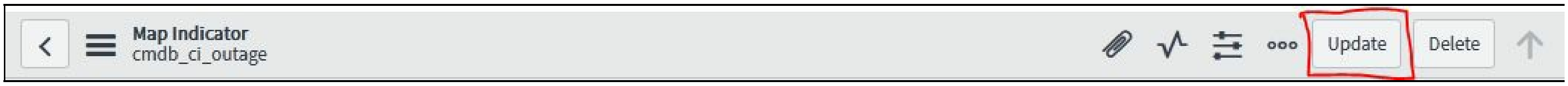
Conditions

All of these conditions must be met

Begin	before	Current minute
End	is empty	

- Order: Priority order of the task.
- Icon: Filename and path of the icon image file, which can be a system image.
- CMDB CI field: Name of the field on the selected table that contains the configuration item.
- Description field: Name of the field on the selected table that contains the description of the configuration item.
- Description: Text to display when hovering over the indicator. Alphanumeric characters and spaces are valid for this field.
- Conditions: Condition builder that specifies for which CIs to apply this indicator. For example, a CI that has a current past outage is highlighted for five days. You can configure a condition to designate a different timeframe for what is considered to be current.
- Active: Checkbox to enable display of the indicator in a dependency views map.
- Label: Text to display for the indicator on the map.
- Tooltip: Label the prefix portion of the tooltip (Tooltip Label: Tooltip info).
- Tooltip Info: The suffix portion of the tooltip (Tooltip Label: Tooltip info).

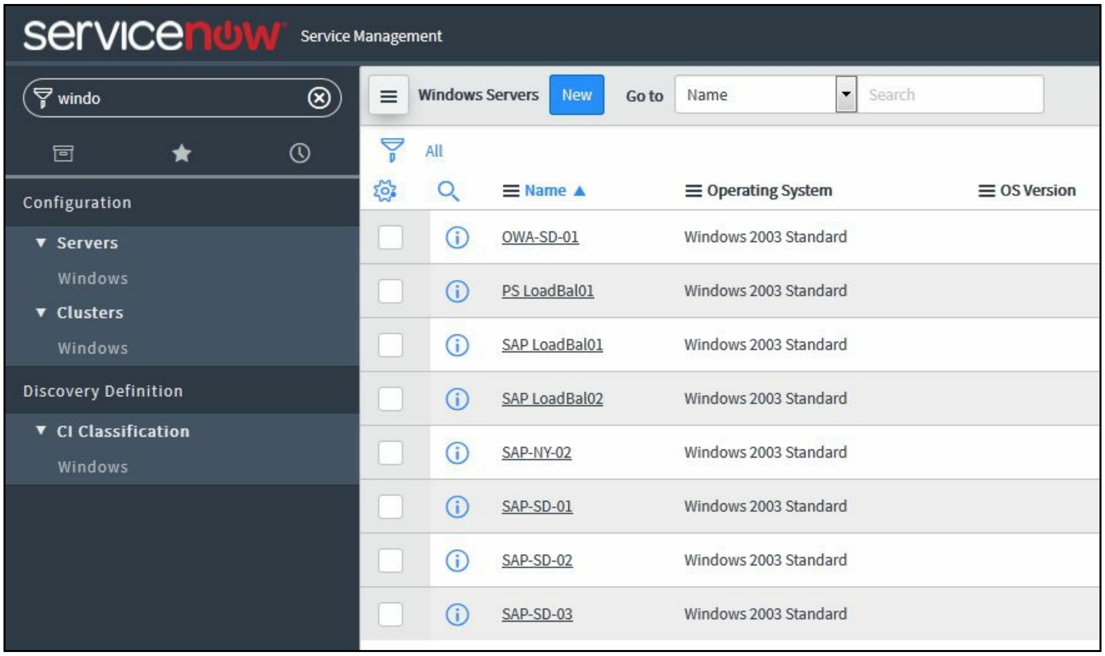
4. Once all the required attributes of the fields are filled in to create or update a map indicator, click on Update to modify the map indicator or click on Save or Submit to create a new map indicator.



How to view dependency views

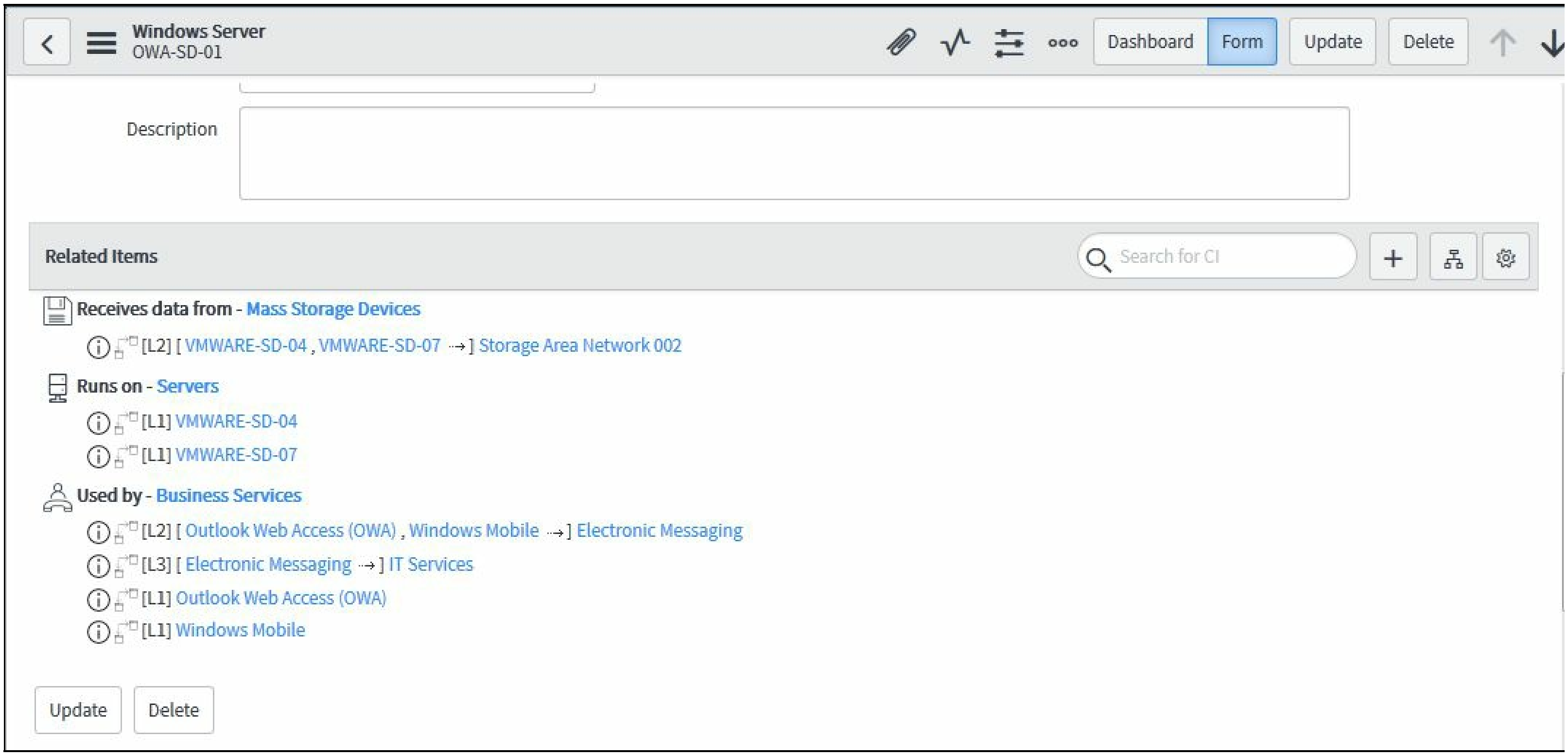
Following are the steps described on how to view the dependency views:

1. Dependency views can be viewed from the CMDB, opening up any CI record will show the dependency maps.
2. Search for any configuration item type from the application navigator, for example, search for Windows Servers CI.
3. Type in windows on the application navigator and click on Windows, from the list of Windows Servers.



Name ▲	Operating System	OS Version
OWA-SD-01	Windows 2003 Standard	
PS LoadBal01	Windows 2003 Standard	
SAP LoadBal01	Windows 2003 Standard	
SAP LoadBal02	Windows 2003 Standard	
SAP-NY-02	Windows 2003 Standard	
SAP-SD-01	Windows 2003 Standard	
SAP-SD-02	Windows 2003 Standard	
SAP-SD-03	Windows 2003 Standard	

4. Click on any Windows Server name to open up the CI record and scroll down to the related items section.



Windows Server
OWA-SD-01

Description

Related Items

Receives data from - Mass Storage Devices

[L2] [VMWARE-SD-04 , VMWARE-SD-07 →] Storage Area Network 002

Runs on - Servers

[L1] VMWARE-SD-04

[L1] VMWARE-SD-07

Used by - Business Services

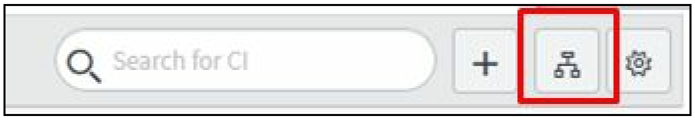
[L2] [Outlook Web Access (OWA) , Windows Mobile →] Electronic Messaging

[L3] [Electronic Messaging →] IT Services

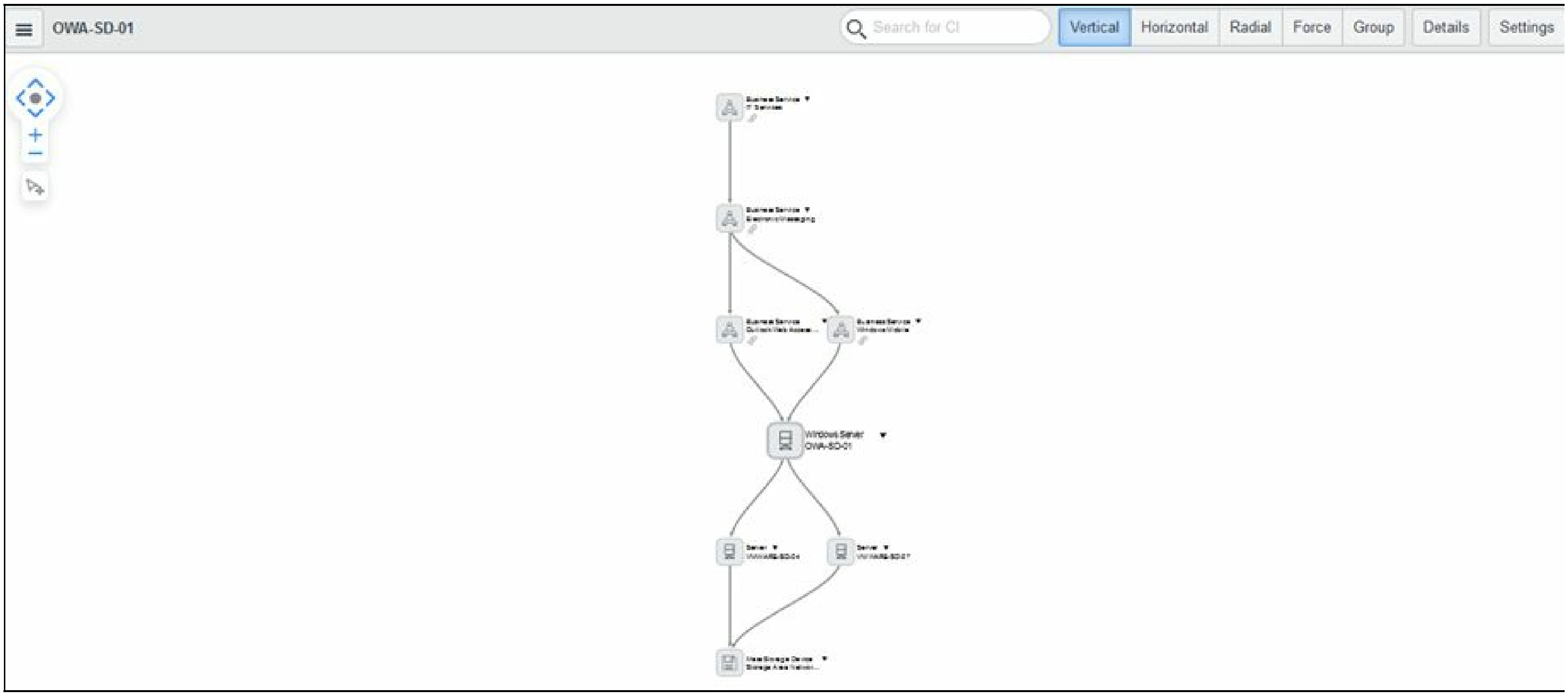
[L1] Outlook Web Access (OWA)

[L1] Windows Mobile

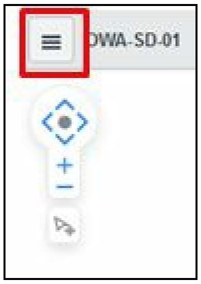
5. Click on the dependency view icon to open up the dependency map, as shown in the following screenshot:



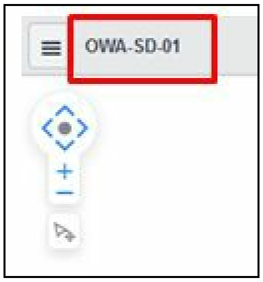
6. A dependency map will open up for the related configuration item or the CI.



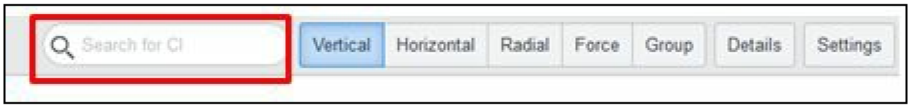
7. Dependency views maps contain the following menus and controls:
    - Menu to save, load, and export views, as shown in the following screenshot:



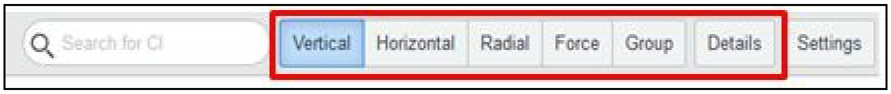
- **Root CI**: Root CI appears next to the menu icon:



- Using the Search for CI feature you can load any configuration item or a business service into the dependency map view:



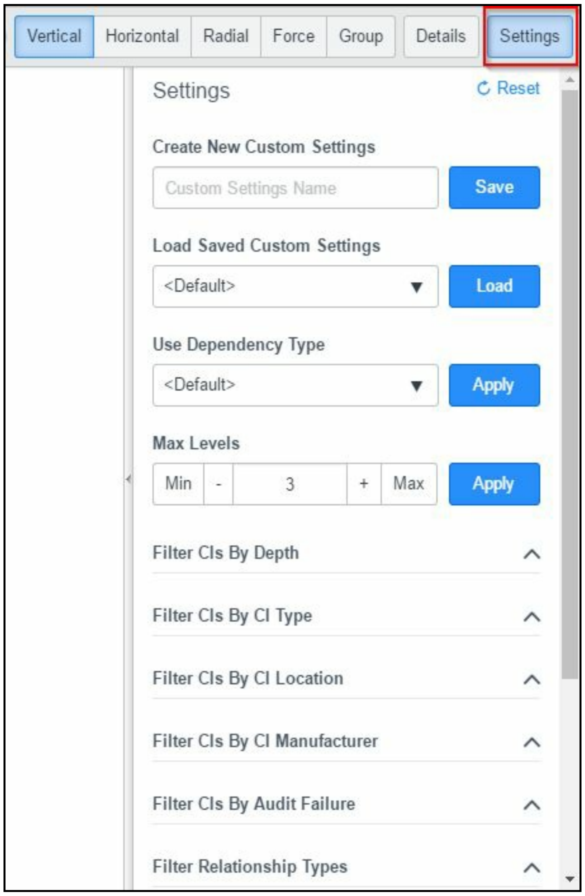
8. Dependency maps can be viewed by different positions by using the buttons that are available on the dependency maps, as shown in the following screenshot:



The following is a description of each of the options available:

- Vertical: Click to display the map in a vertical position:
- Horizontal: Click to display the map in a horizontal position:
- Radial: Click to display the map in a radial view:
- Force: Click to display centers the elements on the parent CI
- Group: Groups the elements according to their CI type
- Details: To display related lists such as problems, changes, and related business services:

9. When you click on the Setting icon, there are different options available:



Settings

Create New Custom Settings

Custom Settings Name

Load Saved Custom Settings

<Default>

Use Dependency Type

<Default>

Max Levels

Min - 3 + Max

Filter CIs By Depth

Filter CIs By CI Type

Filter CIs By CI Location

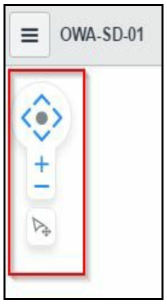
Filter CIs By CI Manufacturer

Filter CIs By Audit Failure

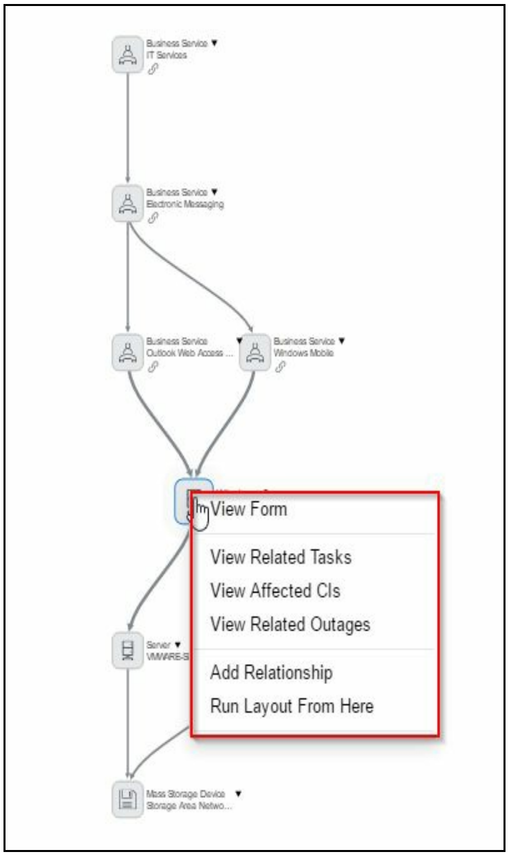
Filter Relationship Types

10. Dependency maps can be magnified using the following icons:

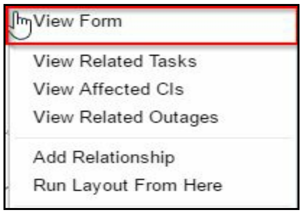
    - Use the plus sign (+) to magnify the map
    - Use the minus sign (-) to decrease the magnification
    - To center the map, click the center of the map
    - Use the direction arrows to move the page in the direction of the arrows



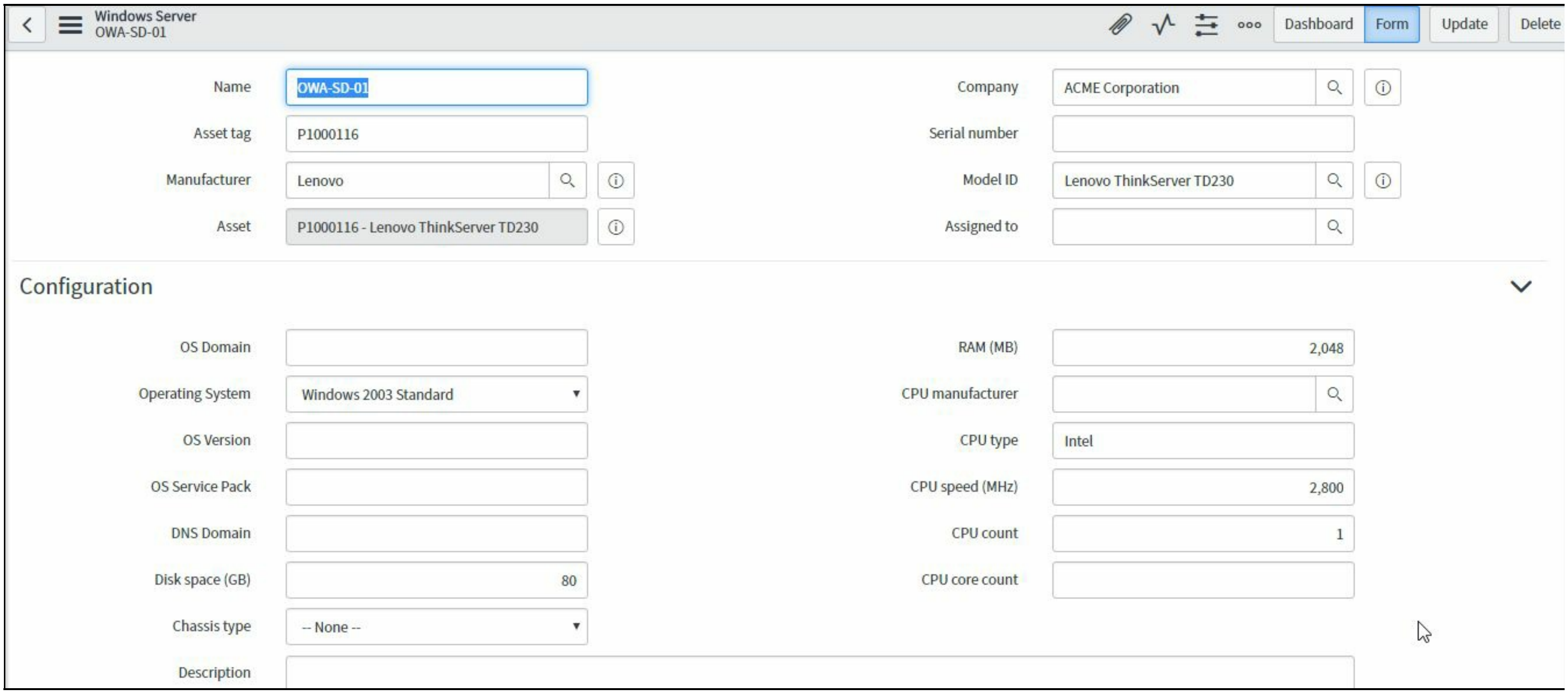
11. Right-click any icon on the dependency map to see other options available related to the selected CI:



12. The following are the different options that you will see when you click the node menu:
    - View Form: Click it to display the CMDB record of the selected CI:



Clicking on View Form opens up the CI information where you are able to set different attributes for the selected configuration item:

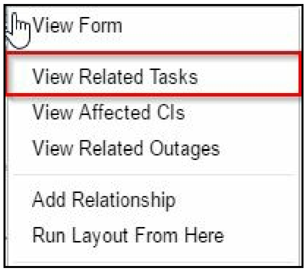


Name	OWA-SD-01	Company	ACME Corporation
Asset tag	P1000116	Serial number	
Manufacturer	Lenovo	Model ID	Lenovo ThinkServer TD230
Asset	P1000116 - Lenovo ThinkServer TD230	Assigned to	

Configuration

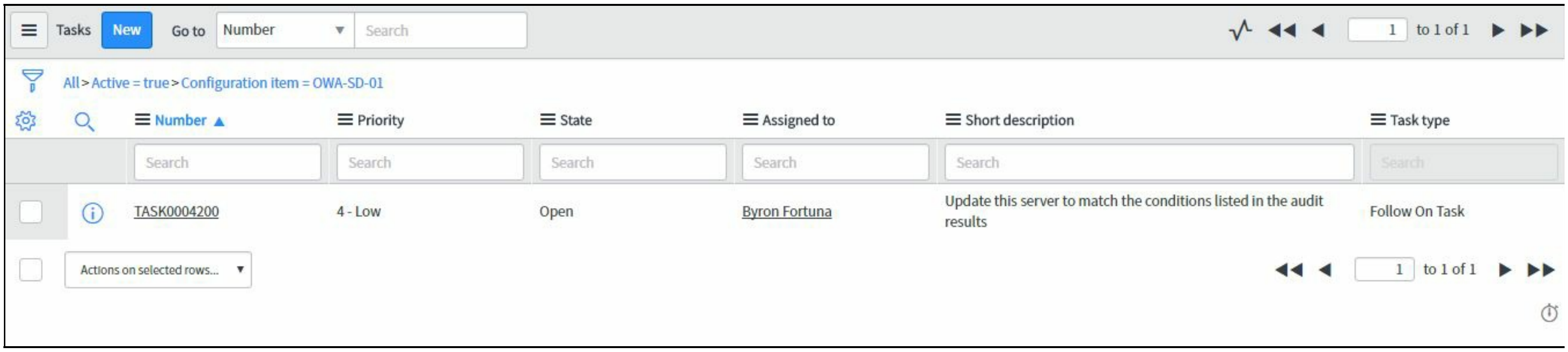
OS Domain		RAM (MB)	2,048
Operating System	Windows 2003 Standard	CPU manufacturer	
OS Version		CPU type	Intel
OS Service Pack		CPU speed (MHz)	2,800
DNS Domain		CPU count	1
Disk space (GB)	80	CPU core count	
Chassis type	-- None --		
Description			

- View Map: Click it to reload the map.
- View Related Tasks: Click it to display the associated incidents, problems, changes, tasks, or any outages associated with the configuration item or CI:



By clicking on View Related Tasks you can view all the tasks associated with the particular configuration item.

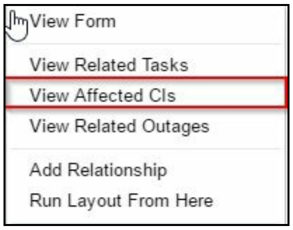
Clicking on the task number will open up the task information:



All > Active = true > Configuration item = OWA-SD-01

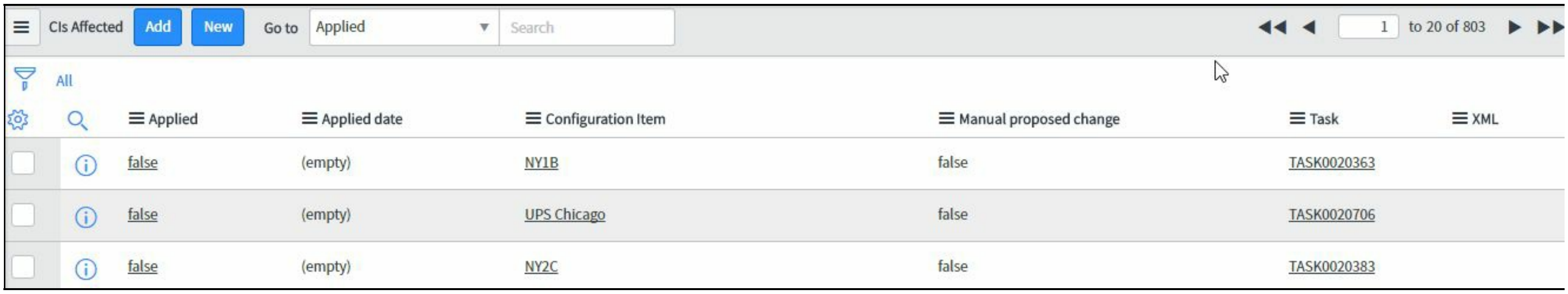
Number ▲	Priority	State	Assigned to	Short description	Task type
TASK0004200	4 - Low	Open	Byron Fortuna	Update this server to match the conditions listed in the audit results	Follow On Task

- View Affected CIs: Click on this to view all the tasks that have the CI as the affected CI:



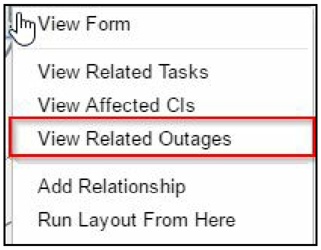
Click on View Affected CIs to see all the CIs that are affected.

By clicking on Add you are able to relate a CI as an affected CI:

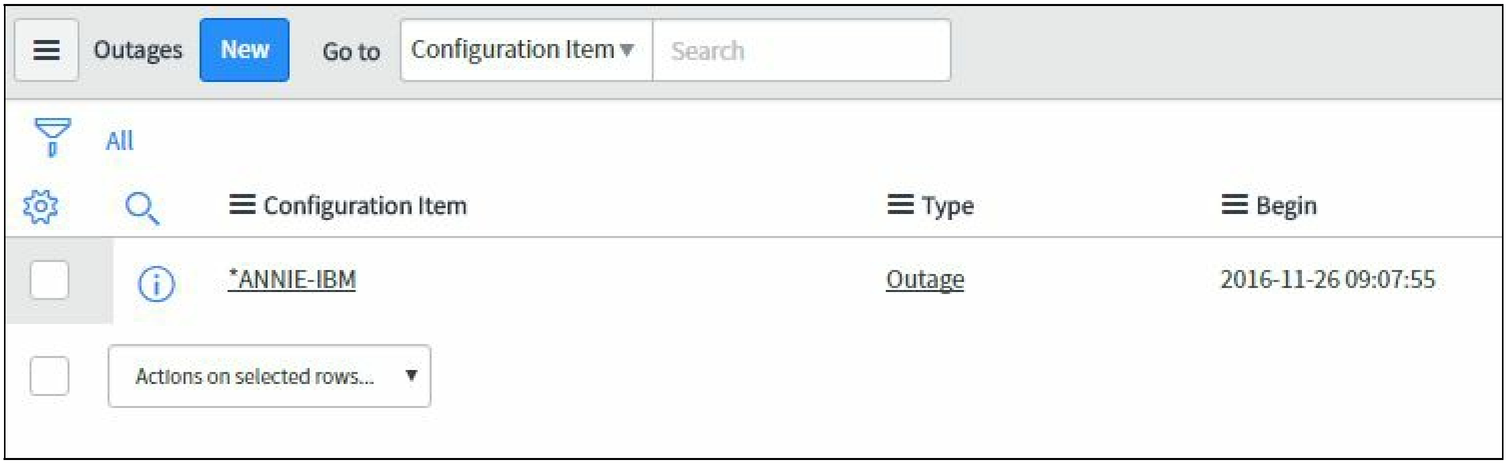


		Applied	Applied date	Configuration Item	Manual proposed change	Task	XML
□	ⓘ	false	(empty)	NY1B	false	TASK0020363	
□	ⓘ	false	(empty)	UPS Chicago	false	TASK0020706	
□	ⓘ	false	(empty)	NY2C	false	TASK0020383	

- View Related Outages: View all outages associated with that particular CI:

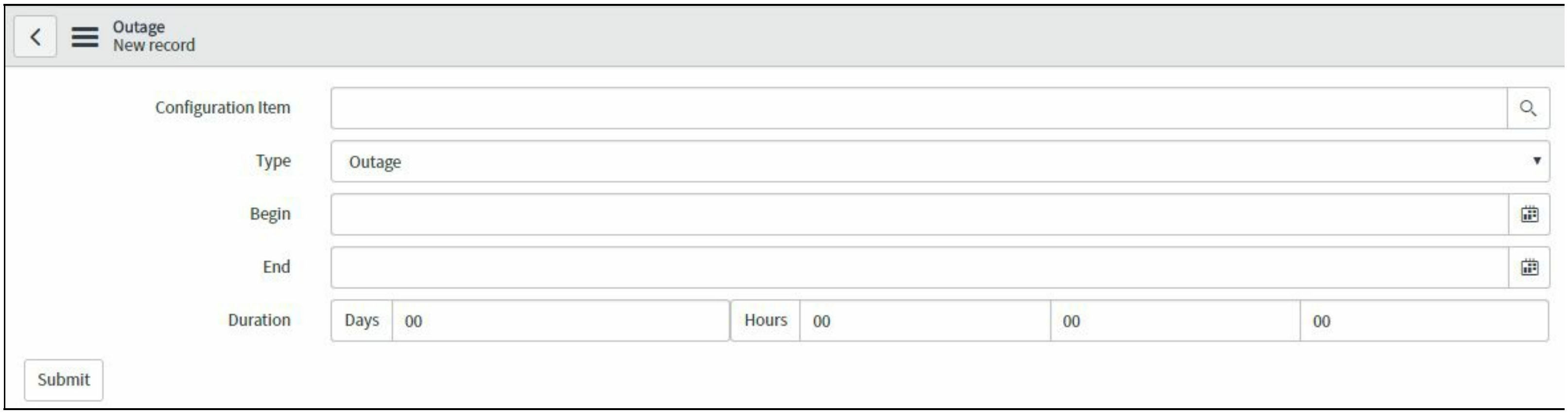


By clicking on View Related Outages, you will be able to view all the outages associated with the particular configuration item:



		Configuration Item	Type	Begin
□	ⓘ	*ANNIE-IBM	Outage	2016-11-26 09:07:55

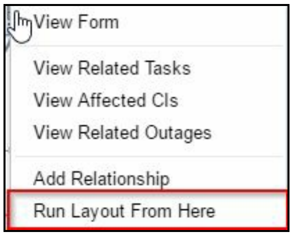
Clicking on New will bring up a window where a new outage can be entered:



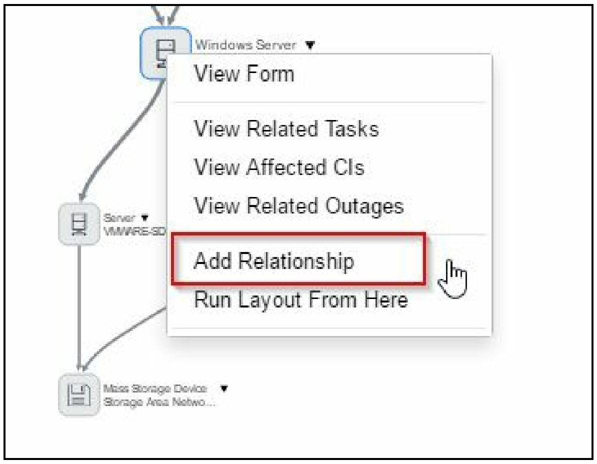
Outage
New record

Configuration Item	
Type	Outage
Begin	
End	
Duration	Days 00 Hours 00 00 00

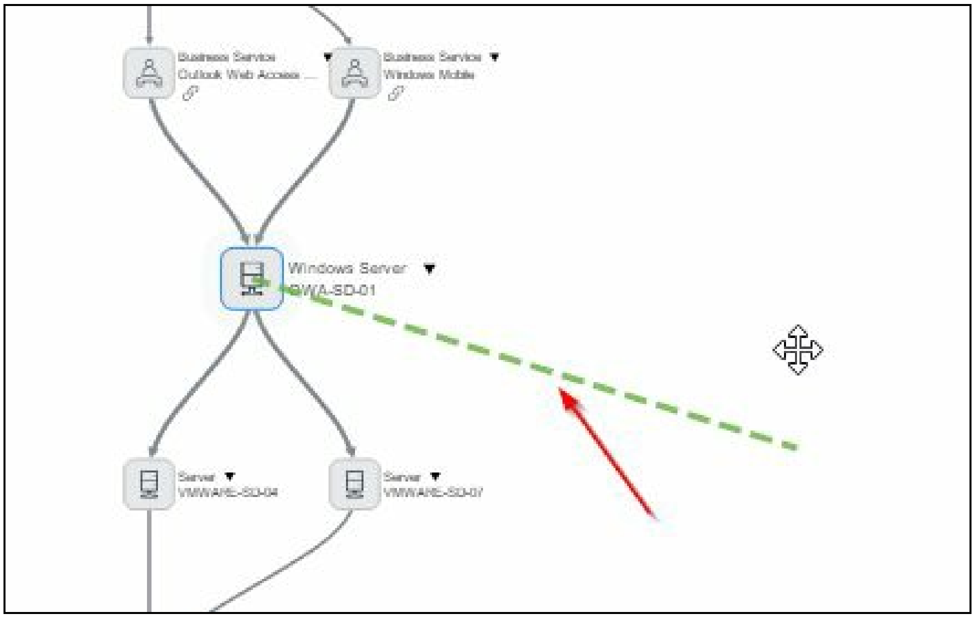
- Run Layout From Here: Rerun the layout using the current node:



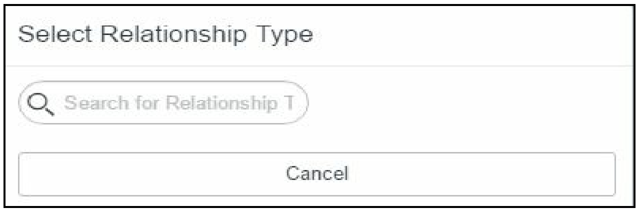
13. Creating relationships:
    1. To create a relationship, right-click on any CI and then click Add Relationship:



    2. Once you click on Add Relationship you will see a green dotted line floating from the selected CI.



3. Now drag the floated line to a CI on the map to which you want to create a relationship to. Once you click on the destination CI you will see a window to specify the type of relationship, where you will be able to search for the type of relationship required for the particular CI:

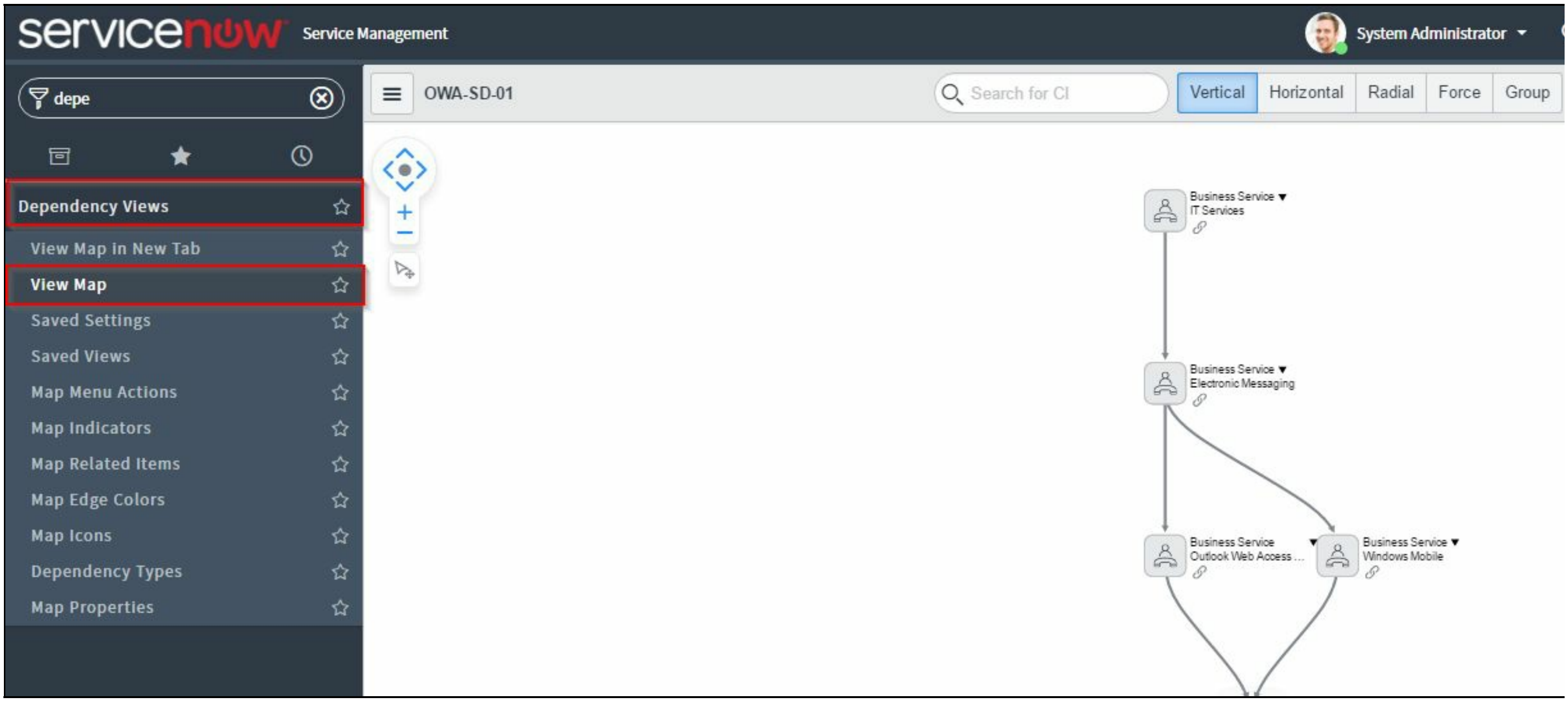


Select Relationship Type

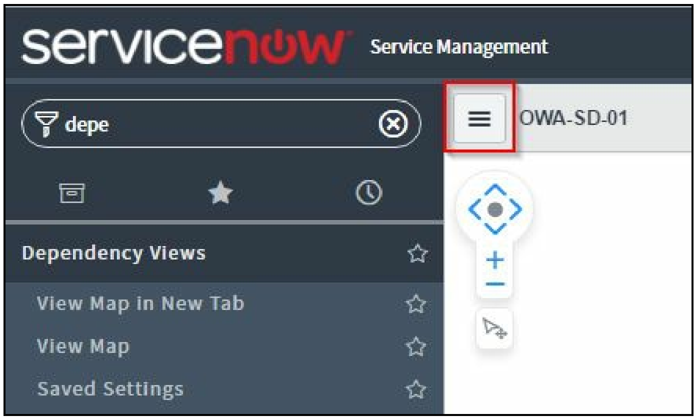
How to save or load dependency map views

Following are the steps on how to save or load dependency map views:

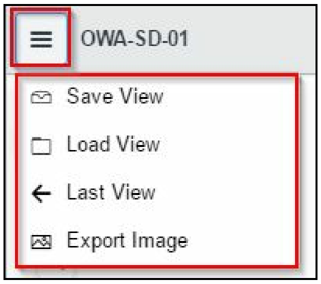
1. Navigate to Dependency Views | View Map:



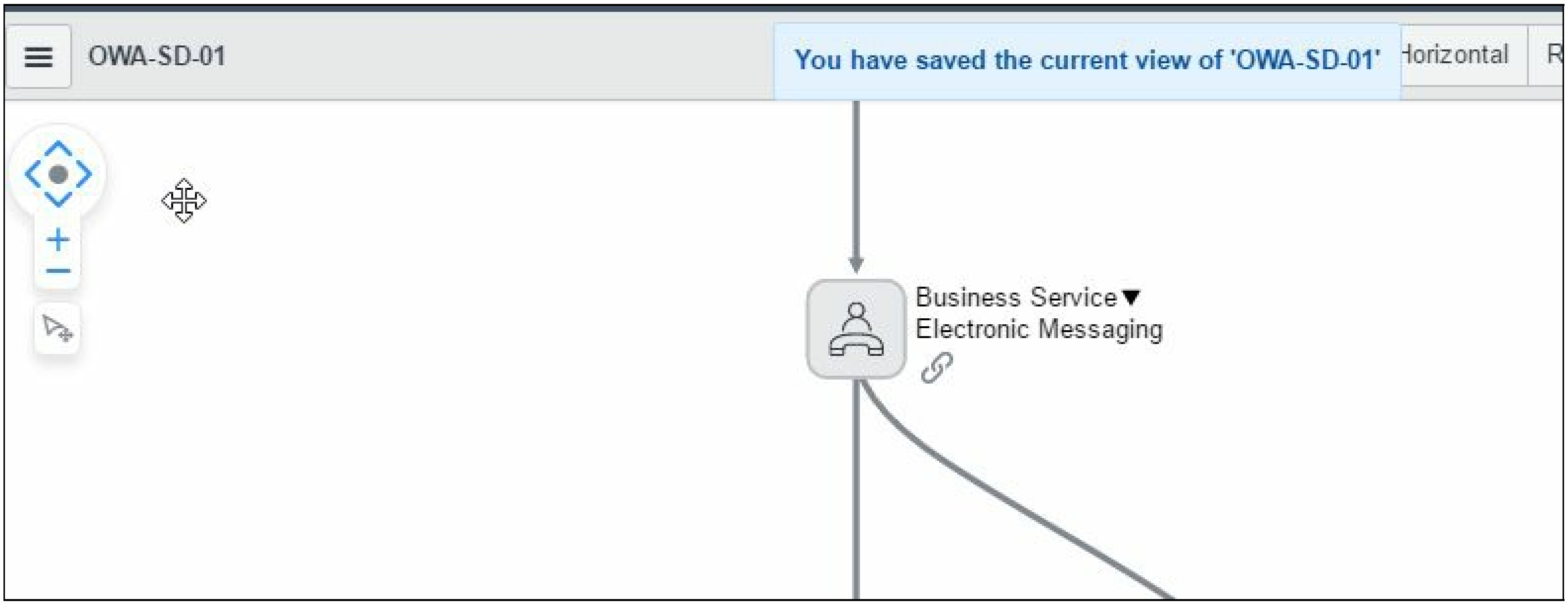
2. Click on the menu icon:



3. When clicking on the menu icon you will find different options to save and load the dependency maps:

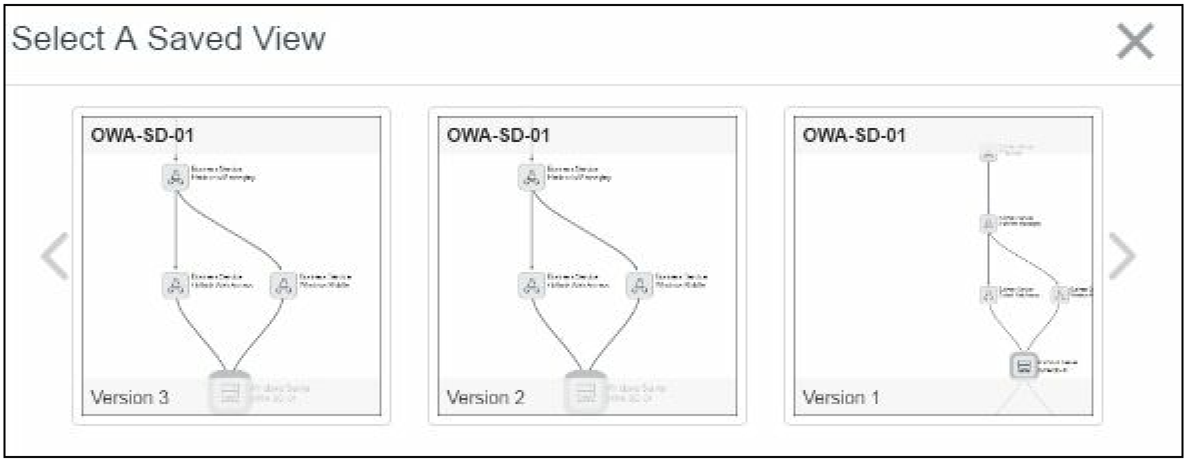


4. A particular view can be saved using Save View, once you click Save View the screen will be saved:

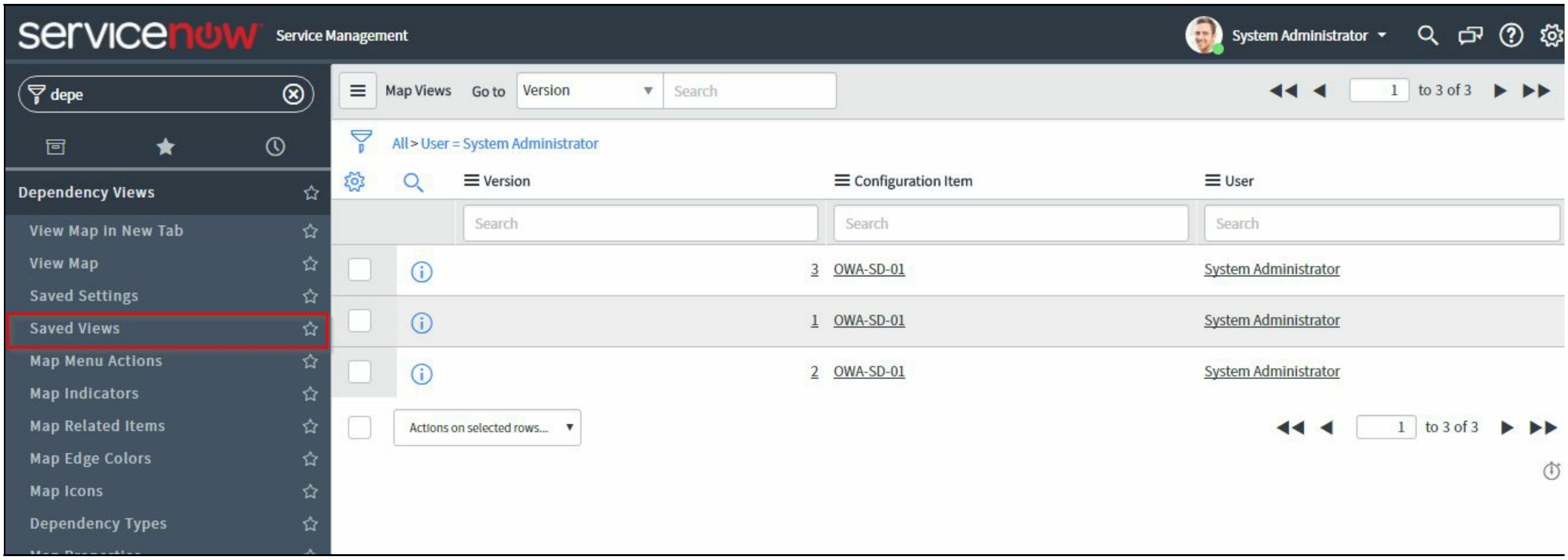


You have saved the current view of 'OWA-SD-01'

5. Clicking on Load View will give you a different saved view that you can choose to load. Clicking on any view will load the view:

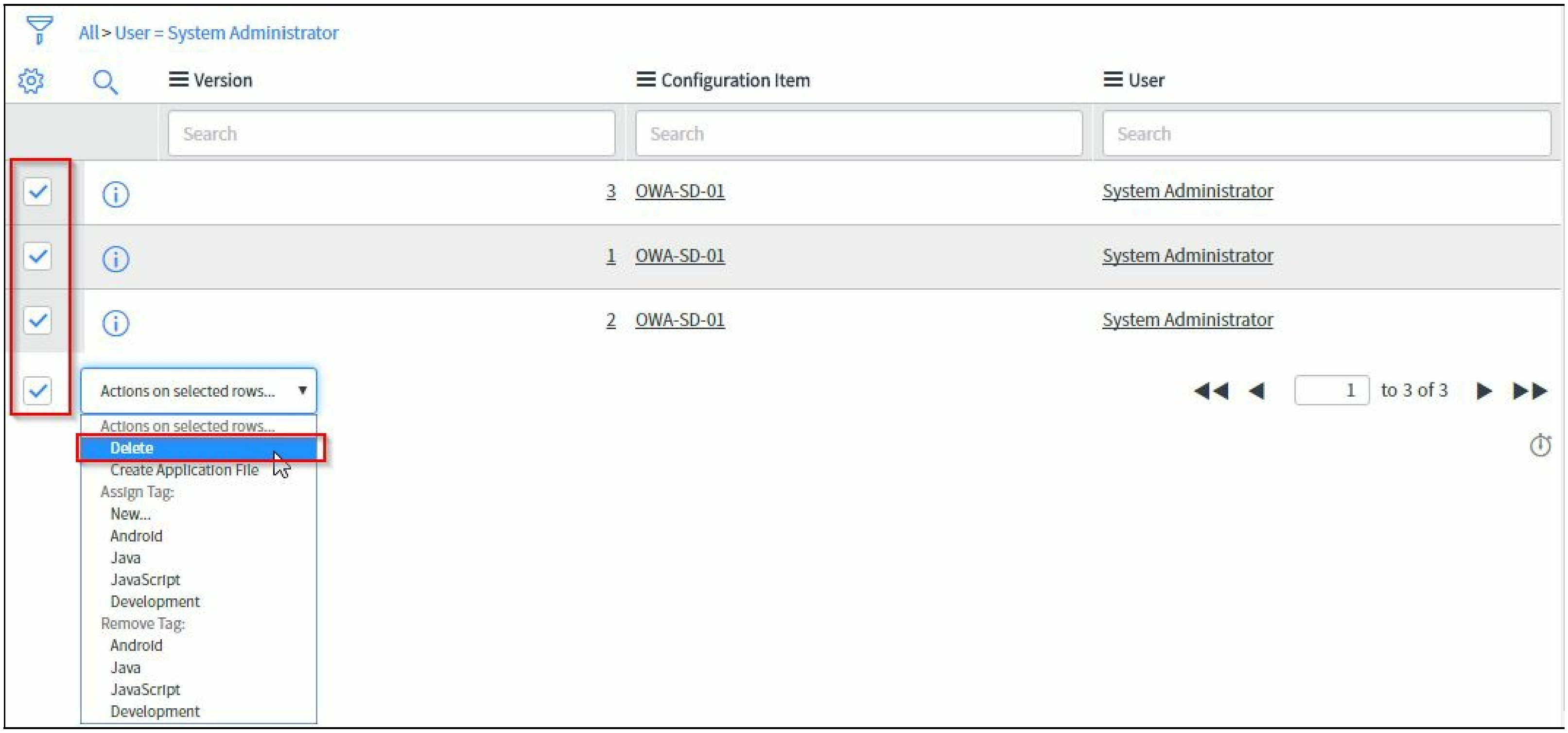


6. By clicking on Export Image you will be able to export the image and save it to a local folder.
7. The saved views can be accessed from the application navigator too. Navigate to Dependency Views | Saved Views:



Version	Configuration Item	User
3	OWA-SD-01	System Administrator
1	OWA-SD-01	System Administrator
2	OWA-SD-01	System Administrator

8. A list of all the saved views will be displayed here. You will be able to click on any view and delete any view:

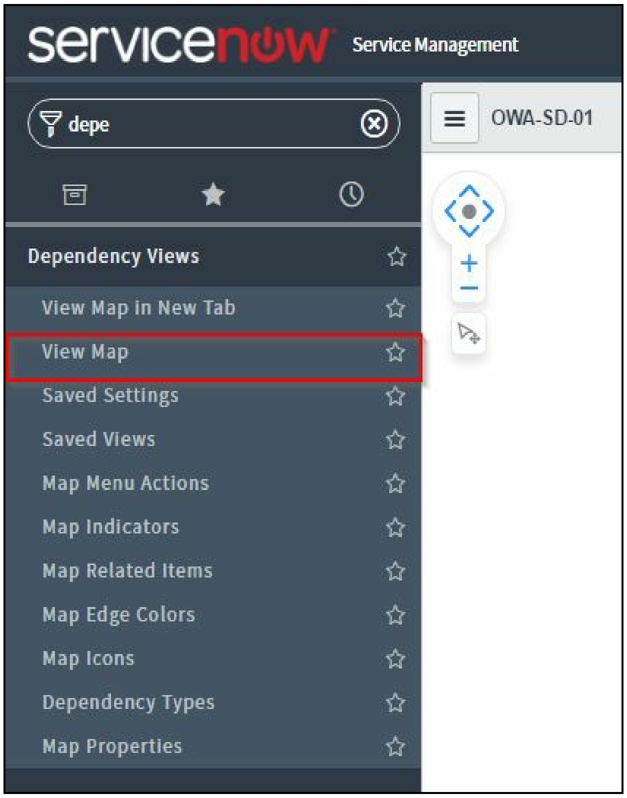


Version	Configuration Item	User
3	OWA-SD-01	System Administrator
1	OWA-SD-01	System Administrator
2	OWA-SD-01	System Administrator

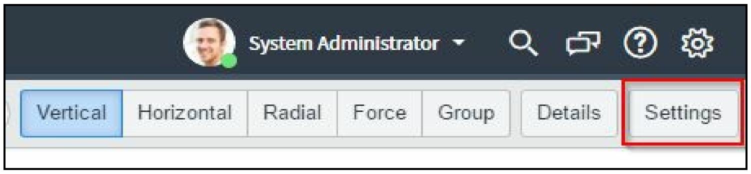
How to filter a view of a dependency view map

Following are the steps on how to filter a view of a dependency view map:

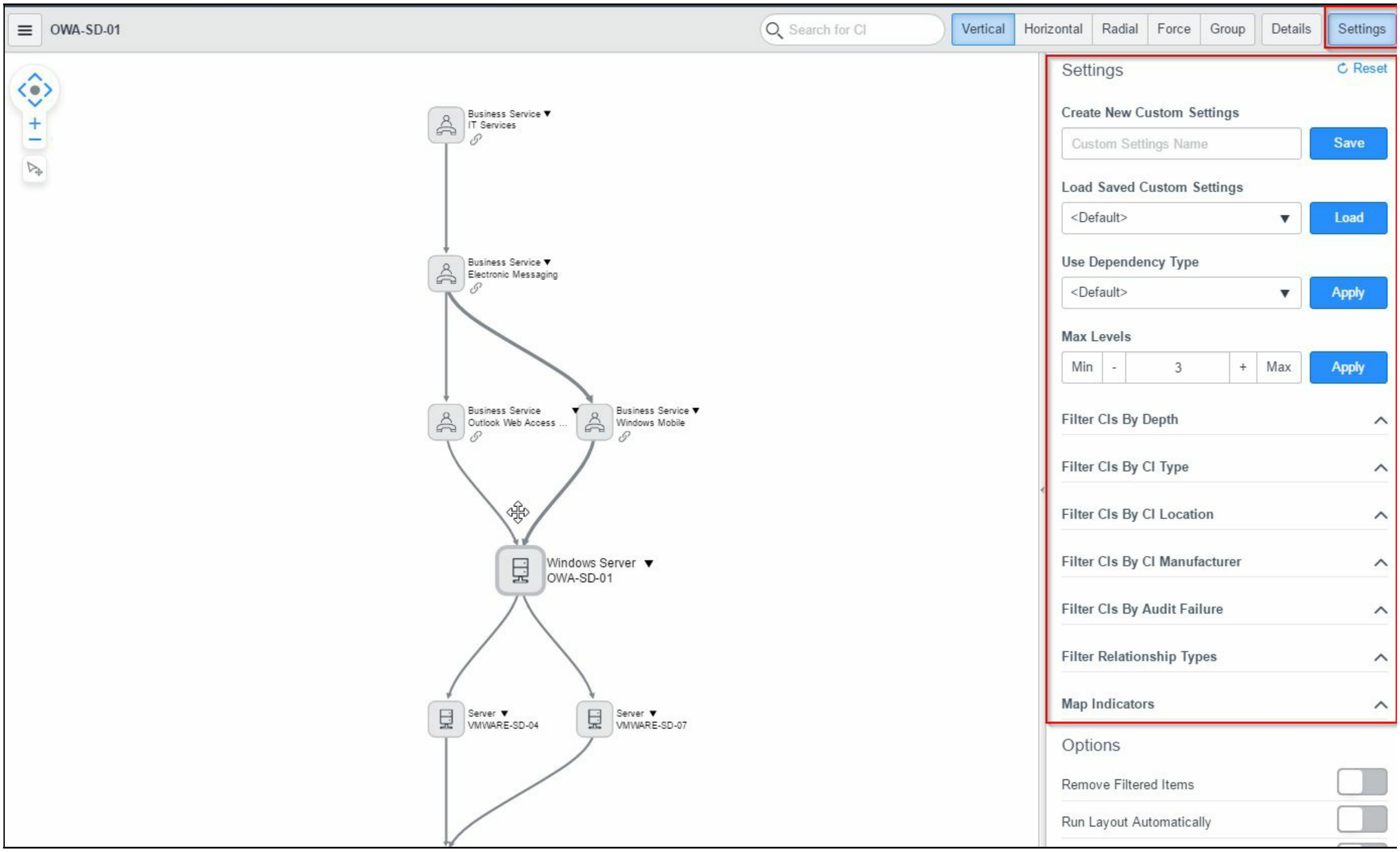
1. Navigate to Dependency Views | View Map on the application navigator:



2. Now click on Settings:



3. By clicking on Settings, you will find different options:

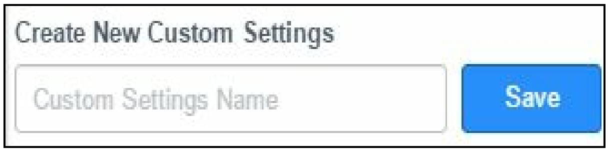


Load Saved Custom Settings: <Default>

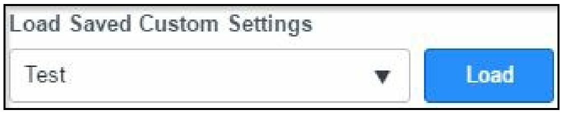
Use Dependency Type: <Default>

Max Levels: 3

4. You can use these settings appropriately as required, some of the important settings are as follows:
   - Create New Custom Settings: Use this setting to create custom settings:

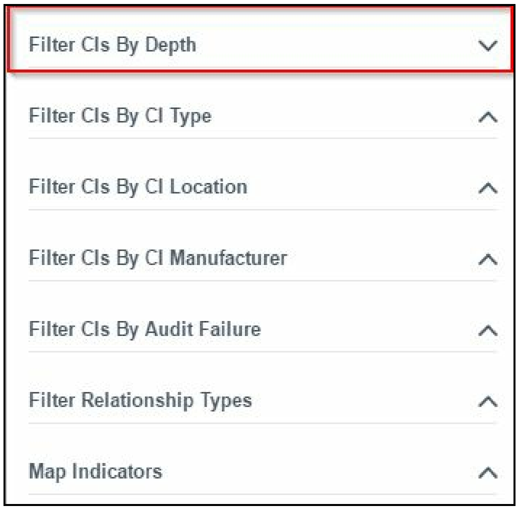


   - Load Saved Custom Settings: Use this option to load any saved custom settings:



Load Saved Custom Settings: Test

5. Clicking on Filter CIs by Depth designates which levels of CI to display on the map:


Filter CIs By Depth
Filter CIs By CI Type
Filter CIs By CI Location
Filter CIs By CI Manufacturer
Filter CIs By Audit Failure
Filter Relationship Types
Map Indicators

6. Following are the options available for the dependency maps:
    1. Clicking on Filter CIs by Type specifies what CI types to display.
    2. Using the tab filter you will be able to filter a specific configuration item.
    3. Use Filter CIs by CI Location to specify which CI locations to display on the map.
    4. Use Filter CIs by CI Manufacturer to specify what manufacturer to display on the map.
    5. Use Filter Relationship Types to specify what relationship types to display on the map.
    6. Use Map Indicators to specify what type of tasks to display on the map, for example, incidents, problems, changes, and so on.

Summary

In this chapter, we have covered how to view dependency maps and also how to customize dependency maps, detailed dependency indicators, and so on.

Cloud Management

In this chapter, we will learn about the cloud management application with ServiceNow. The cloud management application has made it very easy to manage virtual cloud resources easily, including making them available on the service catalog for people to subscribe to for the virtual resources. The cloud application has provided easy options to easily integrate with major cloud providers including Amazon AWS, Azure, and VMWare clouds. In this chapter, we will learn about:

- **Overview and understanding cloud management applications**: In this chapter, we will learn about the cloud management application and some important features in the application
- **Integrating with different cloud providers**: In our chapter, we will explore and integrate with Amazon AWS cloud and also touch on how to configure the other cloud providers
- **Integrating service catalog for cloud provisioning**: We will see how to create a service catalog using approved images.

Understanding cloud management applications

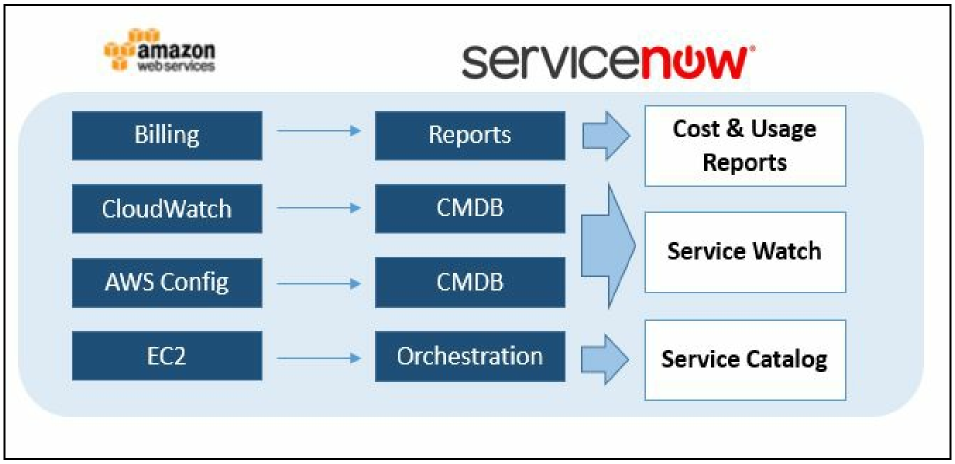
Managing the cloud instances had been difficult in the past, but nowadays it is easy to manage the cloud instances easily ServiceNow cloud management application. The ServiceNow cloud management application can be easily integrated with the major public cloud providers and also enables you to manage private clouds.

In this chapter, we will be exploring and walking thorough the steps on how to configure the Amazon AWS cloud application. The **Amazon Web Services** (**AWS**) cloud application allows you to manage the AWS products and services including:

- Amazon VMs
- Amazon **Elastic Block Stores** (**EBS**)
- Amazon **Virtual Private Clouds** (**VPCs**)
- Amazon CloudFormation
- Amazon tagging
- Amazon billing

There are different resources available on the AWS cloud application. The following picture shows the mapping between Amazon resources and the different applications within ServiceNow and how they are consumed.

- **Billing**: The data is consumed by the reporting to generate cost and usage reports
- **Cloud Watch** and **AWS Config**: The data is federated into the CMDB for the Service Watch use
- **EC2**: This is available for the ServiceNow orchestration use, which is finally integrated with the service catalogs



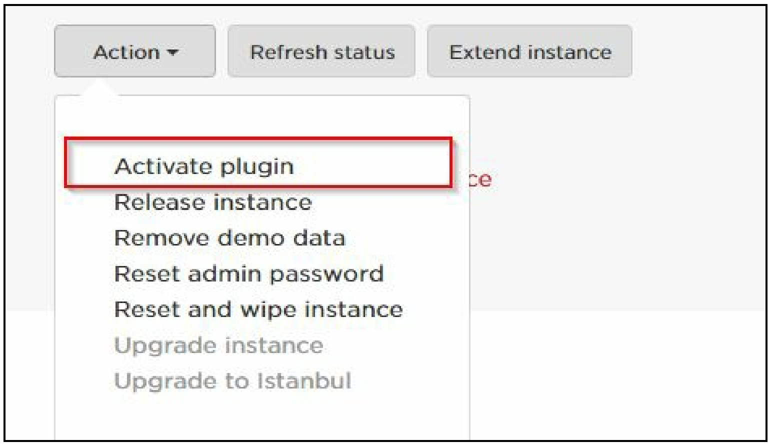
There are different steps for setting up your cloud application. Here is a sequence of steps to complete to set up your cloud application:

- Activate the Amazon web services plugin
- Create users and roles
- Registering the cloud

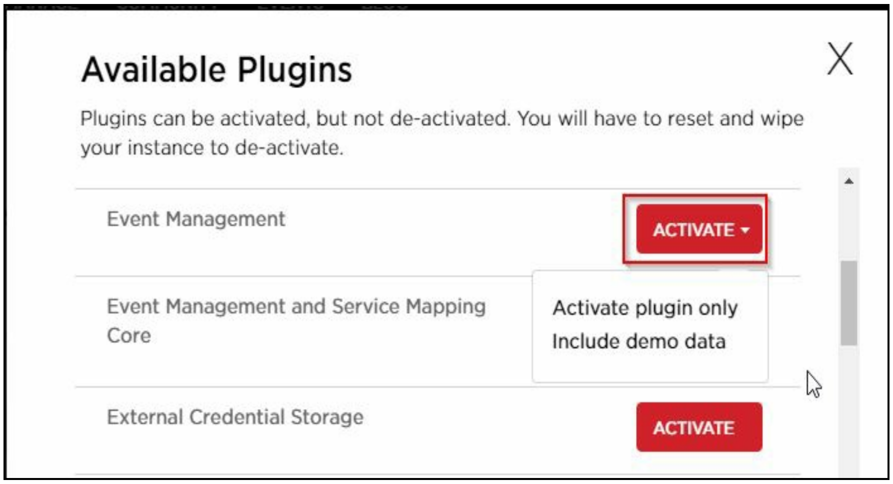
- Discover
- Create the catalog
- Provisions

Exploring integration with different cloud providers

We can activate the Amazon web services plugin as follows. Following are the steps to activate the Amazon cloud plugin, and the following screenshot is from the developer instance. Follow the steps to activate the required Amazon plugin:



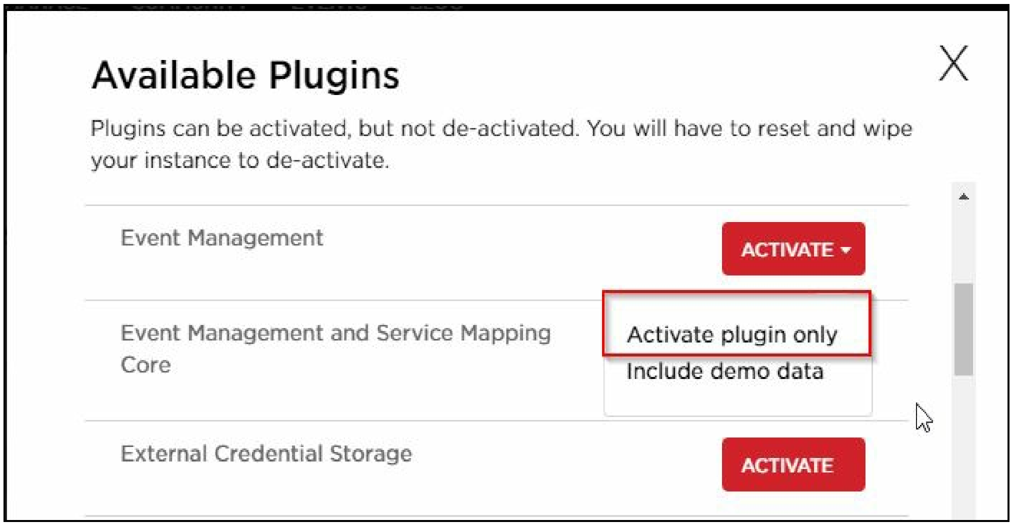
1. Search for the Cloud Management - Amazon Web Services plugin and click on Activate.



Available Plugins

Plugins can be activated, but not de-activated. You will have to reset and wipe your instance to de-activate.

2. This is a personal developer instance, so click on Activate plugin only to activate the plugin.



Available Plugins

Plugins can be activated, but not de-activated. You will have to reset and wipe your instance to de-activate.

3. Installing the AWS plugin will install the following:
   - `com.snc.aws`: The primary Amazon AWS Cloud plugin
   - `com.snc.aws.activities`: Amazon AWS Cloud activities
   - `com.snc.aws.common`: Amazon common
   - `com.snc.aws.core`: Components common to Amazon AWS Cloud

If you need to install Microsoft Azure and VMWare related-cloud applications, use the same to search for the following plug in and activate them.

4. To configure the Microsoft Azure application you will need to activate the following plugin:
   - Cloud management - Microsoft Azure
   - Microsoft Azure management application
5. To configure the VMWare virtual resources you will need to configure the following plugin:
   - Orchestration - VMware support
   - Orchestration activities - VMware

Users and roles creation

There are specific roles available for managing your cloud applications and specific resources. There are three different types of cloud users which are common for all the cloud providers or when managing virtual resources.

- **Cloud administrator**: Who sets up the system
- **Cloud operator**: Ensure provisioning and management
- **Cloud user**: Requests virtual resources

Role-based assignment needs to be done to provide the user with the right role. A user belongs to a user group and the cloud-related role is given to the user group. There are three different types of user groups:

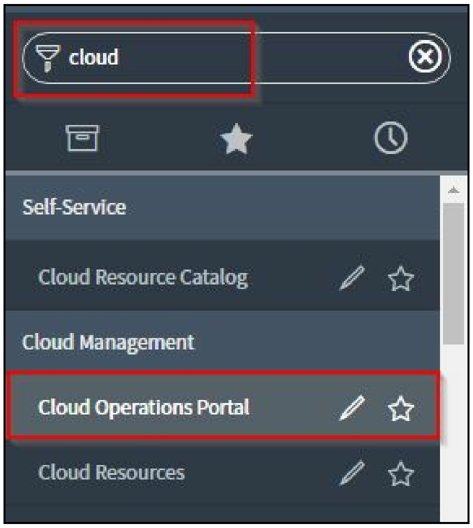
- **Cloud user group**
  - **User group**: Virtual provisioning cloud users
  - **User role**: cloud_user
  - **Privileges**: Requests virtual resources from the service catalog and uses the *my virtual assets portal* to manage virtual resources that are assigned to them
- **Cloud approver group**
  - **User group**: Azure Approves , EC2 Approves, VMware Approves
  - **User role**: ITIL
- **Cloud operator user group**
  - **User group**: Virtual provisioning cloud operators
  - **User role**: cloud_operator
  - **User group**: EC2 operator
  - **User role**: ec2_operator
  - **User group**: Azure operator
  - **User role**: azure_operator
  - **User group**: VMware operator
  - **User role**: vmware_operator

- **Cloud administrator**: Cloud administrators can monitor the cloud management environment using the cloud admin portal
  - **User group**: Virtual Provisioning cloud administrators
  - **User role**: cloud_admin, cloud_user, itil

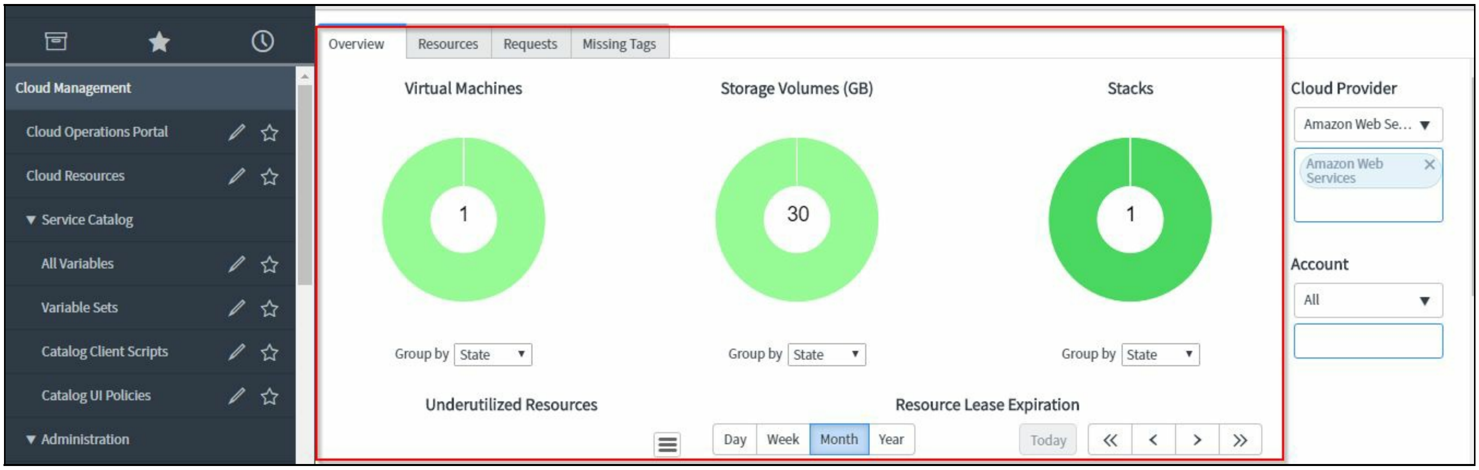
Cloud operations portal

The **Cloud operations portal** is available to the cloud administrator and the cloud operator who have a view of all the cloud resources in a single view. To access the cloud operations portal, navigate to the following:

1. Type `cloud` in the application navigator.
2. Under Cloud Management, click on Cloud Operations Portal.
3. Clicking on the Cloud Operations Portal opens a dashboard on the content pane.



4. The cloud portal has a dashboard that has several different views available:
   - **Overview**: Gives a snapshot of all the virtual resources available, such as storage volumes, stacks, and release renewal information
   - **Resources**: Displays the virtual resource based on each cloud provider
   - **Requests**: Displays all the requests raised by the cloud users
   - **Missing tags**: Reports resource's missing tag value assignments



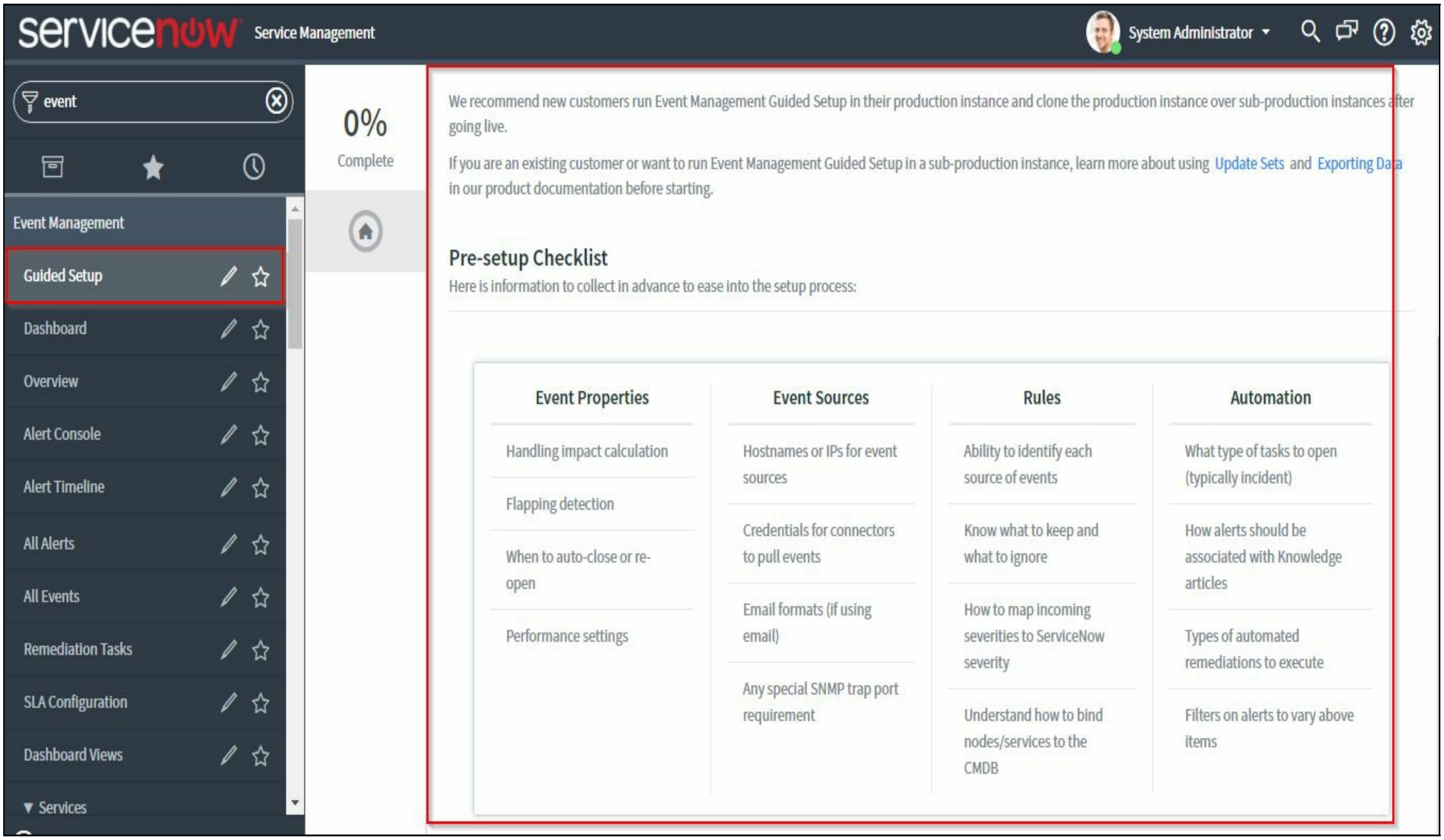
Configuring Amazon AWS cloud

AWS cloud administrators are able to configure the AWS cloud application. After the cloud administrator has started on this, the first step is to get the following information from the Amazon AWS account:

- Account IT
- Access key ID
- Secret access key

The following steps are from an Amazon AWS account:

1. Collect the AWS credentials account settings from the associated Amazon account.



We recommend new customers run Event Management Guided Setup in their production instance and clone the production instance over sub-production instances after going live.

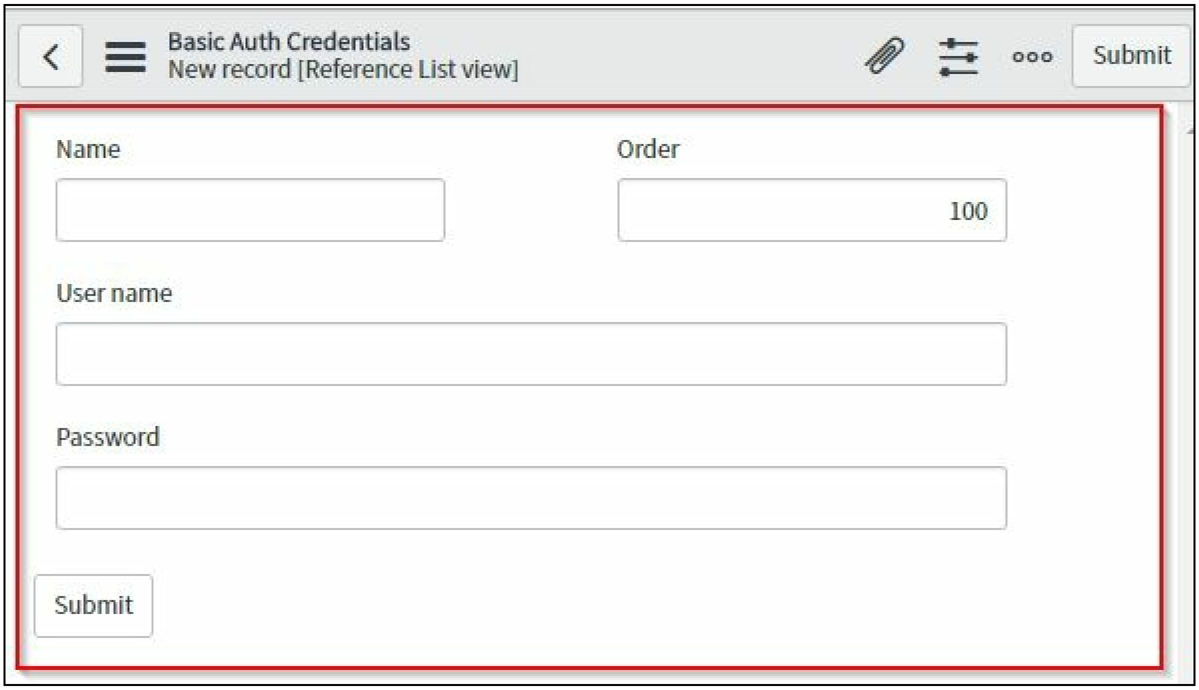
If you are an existing customer or want to run Event Management Guided Setup in a sub-production instance, learn more about using Update Sets and Exporting Data in our product documentation before starting.

Pre-setup Checklist

Here is information to collect in advance to ease into the setup process:

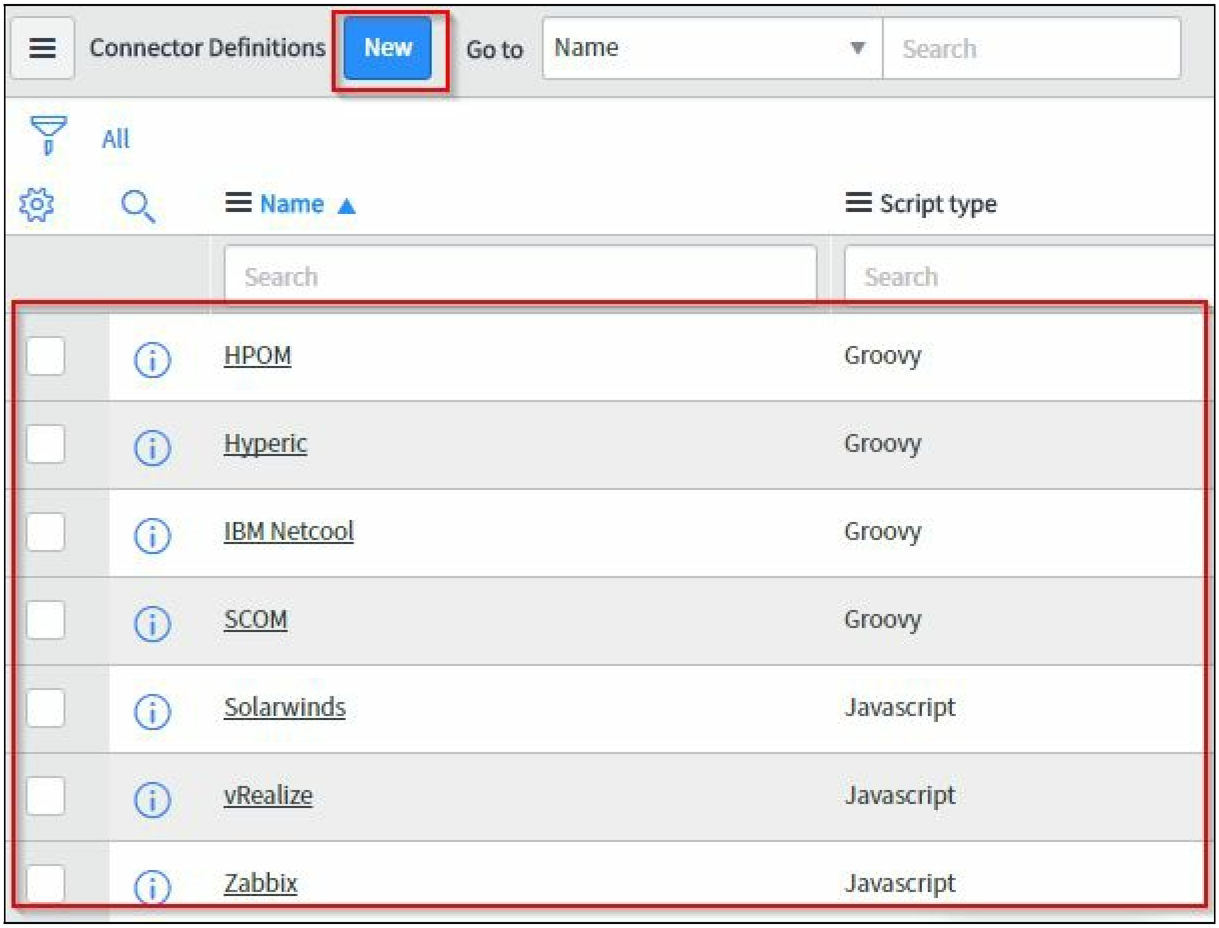
Event Properties	Event Sources	Rules	Automation
Handling impact calculation	Hostnames or IPs for event sources	Ability to identify each source of events	What type of tasks to open (typically incident)
Flapping detection	Credentials for connectors to pull events	Know what to keep and what to ignore	How alerts should be associated with Knowledge articles
When to auto-close or re-open	Email formats (if using email)	How to map incoming severities to ServiceNow severity	Types of automated remediations to execute
Performance settings	Any special SNMP trap port requirement	Understand how to bind nodes/services to the CMDB	Filters on alerts to vary above items

2. The next thing is to go to Security Credentials and click on the Access Keys (Access Key ID and Secret Access Key) to get the keys.



Order: 100

3. By clicking on Create New Access Key, you are able to create a new access key and a secret key.

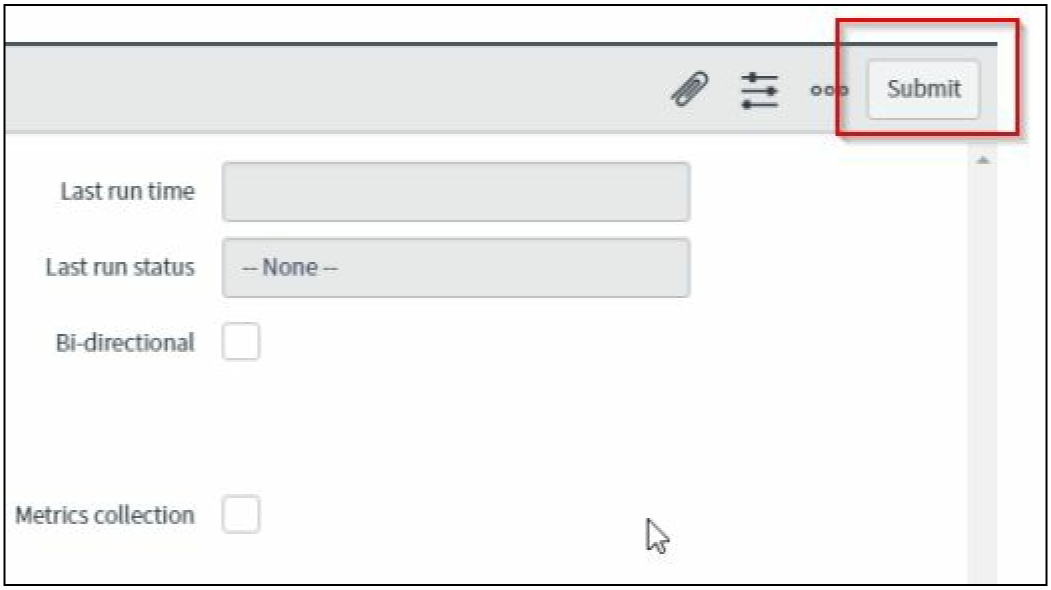


Name	Script type
HPOM	Groovy
Hyperic	Groovy
IBM Netcool	Groovy
SCOM	Groovy
Solarwinds	Javascript
vRealize	Javascript
Zabbix	Javascript

Adding the AWS account to the ServiceNow instance

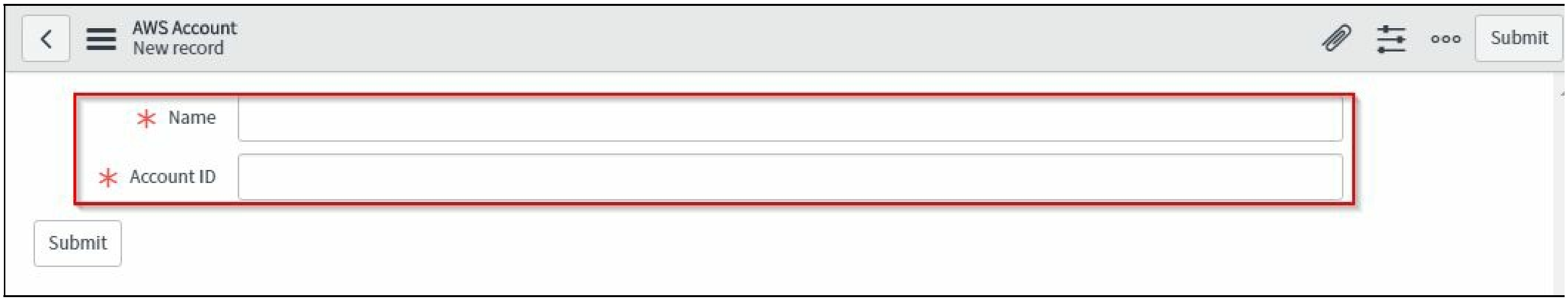
The next step is to add the AWS account to the ServiceNow instance. In order to configure and add the Amazon account, complete the following steps:

1. Type `Amazon` on the application navigator to open the AWS application.
2. Click on Accounts under the Amazon AWS Cloud and fill in the required information.
3. Now click on New.



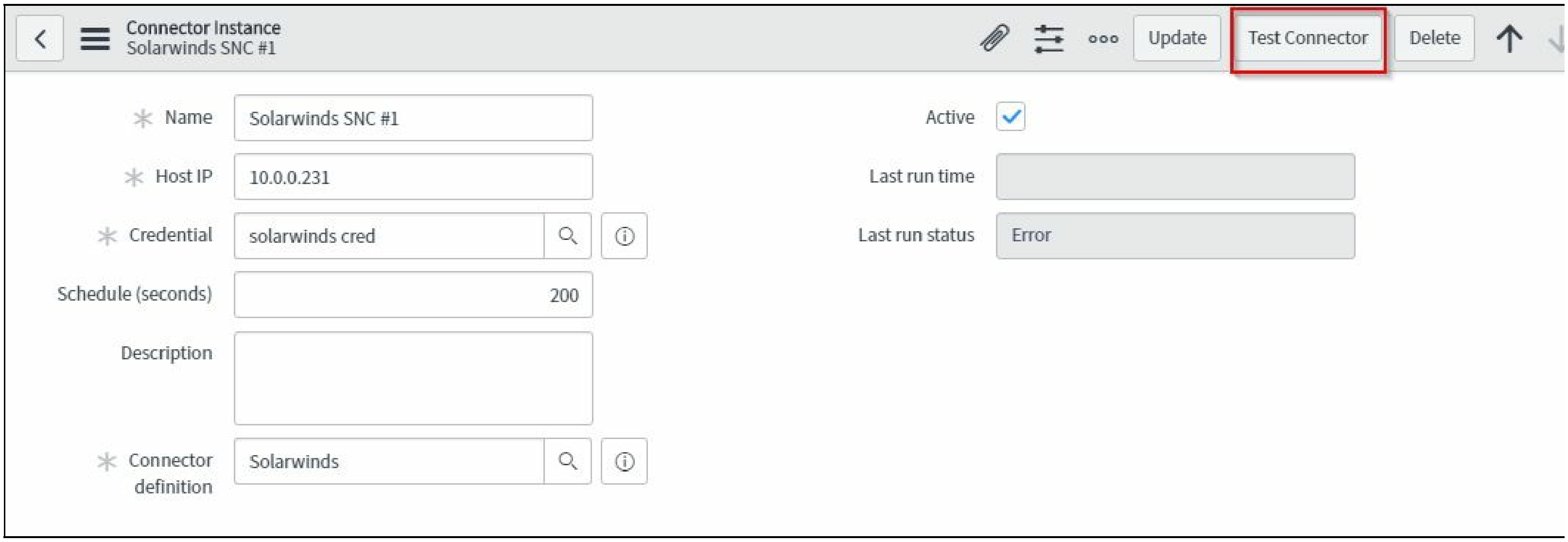
Last run time	
Last run status	-- None --
Bi-directional	□
Metrics collection	□

4. Clicking on New opens up a form for entering the AWS account information. Enter a Name for the AWS account and the Account ID. You can get the AWS account ID from your Amazon AWS account. Click on the requested information and click on Submit.


AWS Account
New record

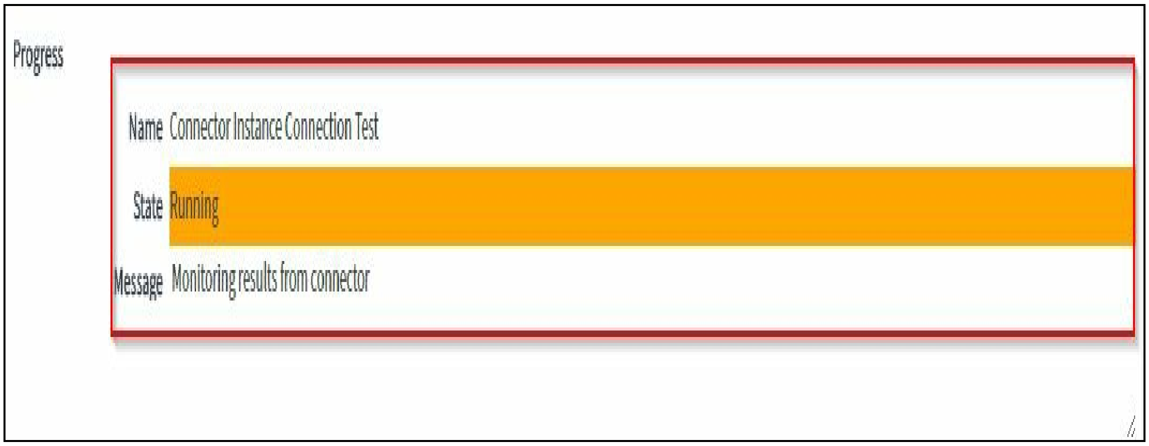
* Name	
* Account ID	

5. Right-clicking on the header and clicking the Save button gives additional options for you to enter the Primary AWS Credential. Clicking on the magnifying glass icon brings up additional options for selecting an existing AWS Account Credential or enabling you to enter a new credential.



Name	Solarwinds SNC #1	Active	☑
Host IP	10.0.0.231	Last run time	
Credential	solarwinds cred	Last run status	Error
Schedule (seconds)	200		
Description			
Connector definition	Solarwinds		

6. On the AWS Credentials window, click on the New button to create an AWS credential.



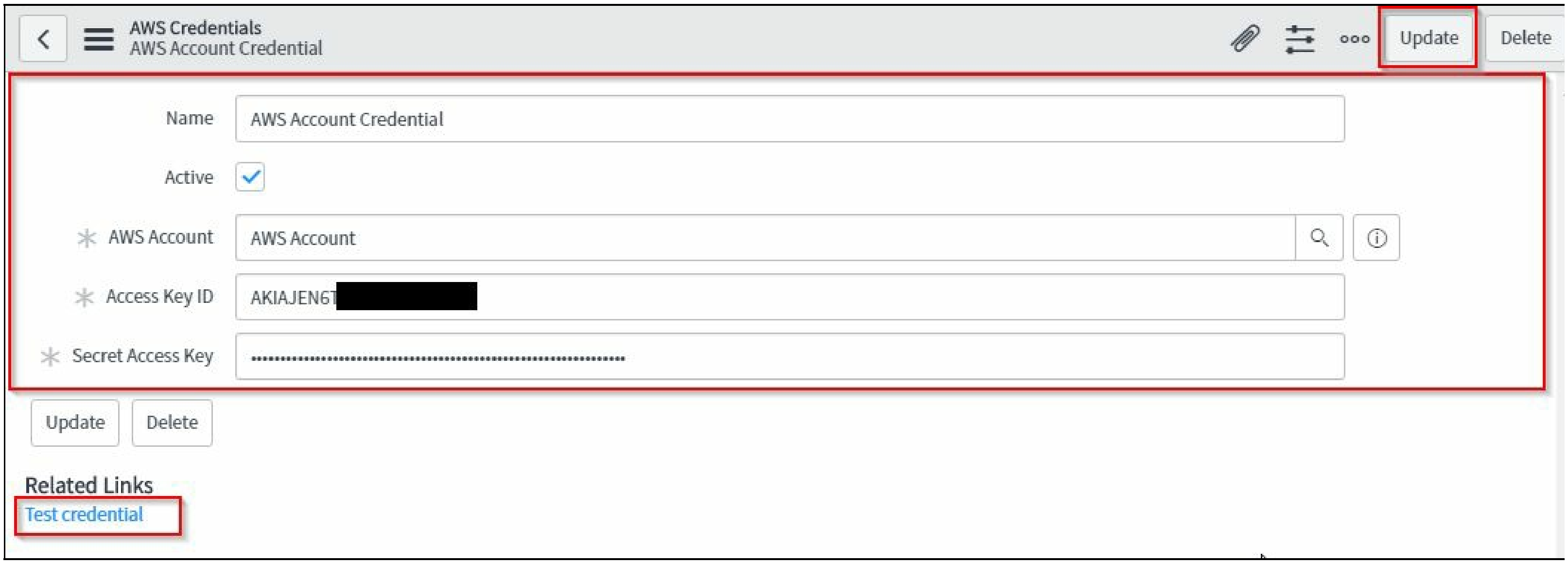
Name Connector Instance Connection Test

State Running

Message Monitoring results from connector

7. Options appear to enter information related to the AWS credentials, so enter the required information and click on Update button.
   - **Name**: Meaningful name for the AWS account
   - **Active**: Enable the AWS credential
   - **AWS Account**: You are able to select the AWS account against which the AWS credential is created
   - **Access Key ID**: Got from the Amazon AWS account
   - Secret Access Key: Got from the Amazon AWS account

8. Once you have filled in the required information, click on Test Credential to test the AWS credentials.



AWS Credentials
AWS Account Credential

Name: AWS Account Credential

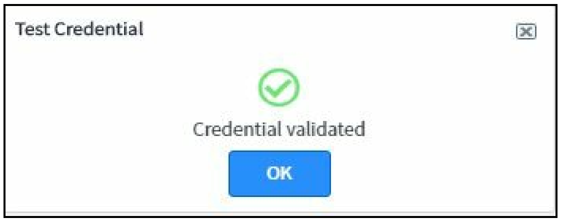
Active: ☑

* AWS Account: AWS Account

* Access Key ID: AKIAJEN6[redacted]

* Secret Access Key: ••

9. Once you click on Test Credential, you get a prompt about the validation's success.



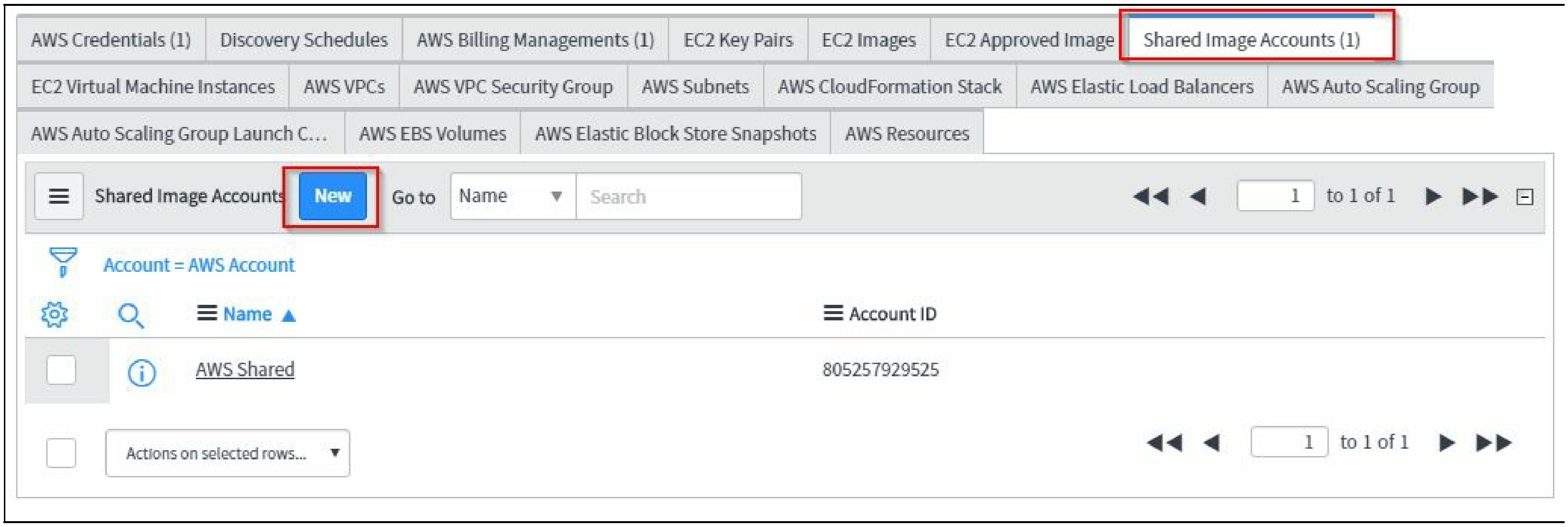
Test Credential

Credential validated

How to create and customize an image permission

If the AWS account has images created and is able to access the images, we can configure the account to receive these images into the account.
In order to add shared image accounts to this, follow the steps:

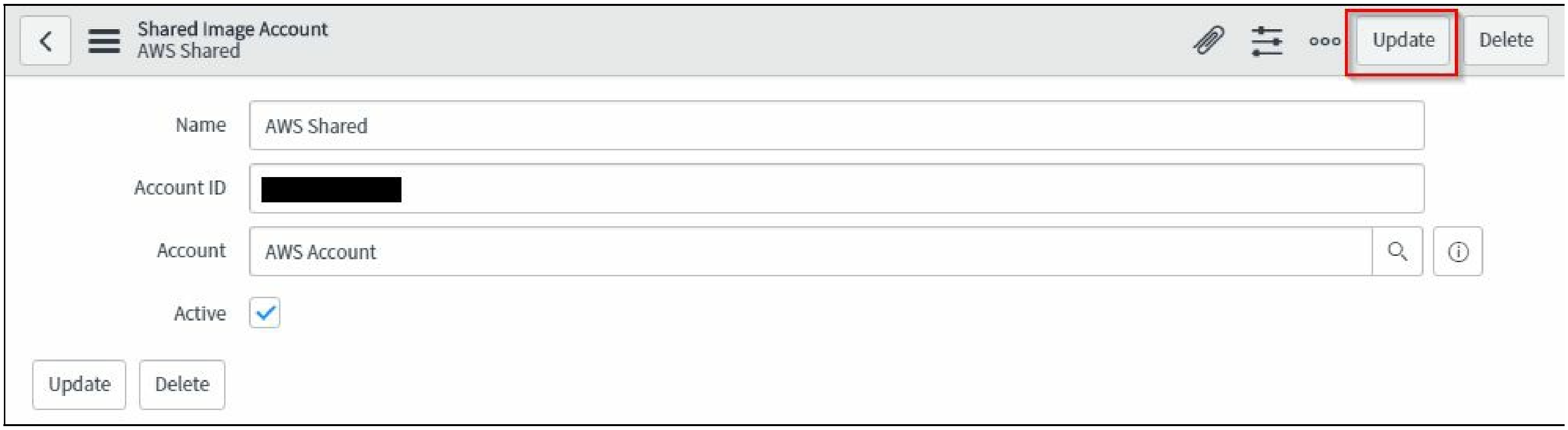
1. Click on the related link Shared Image Accounts link; by clicking on this link you see a New button next to the option Shared Image Accounts.



Account = AWS Account

Name ▲	Account ID
AWS Shared	805257929525

2. Clicking on New opens up a form. We need to fill in the following details in the form:
    - Name: Meaningful name for the shared image account
    - Account ID: AWS account ID
    - Account: The AWS credential for this shared image account
    - Active**:** Clicking on active we are able to make this shared image account active or inactive
3. Once you have all the information entered, click on the Update button to save the information.



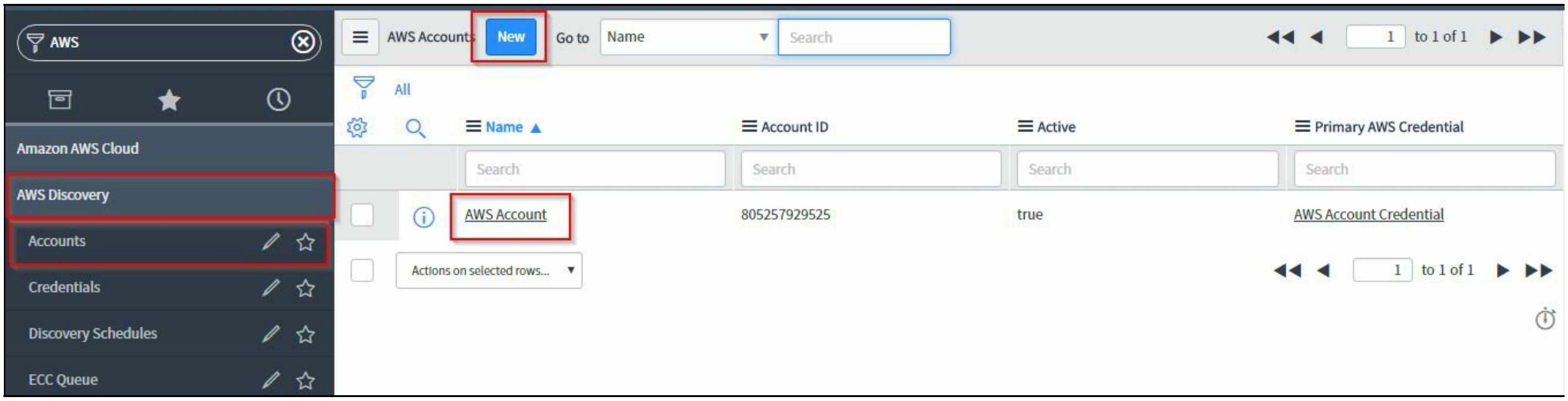
Name	AWS Shared
Account ID	[redacted]
Account	AWS Account
Active	☑

Discover and view AWS resources

The discovery of AWS virtual resources is done based on an AWS account rather than traditional discovery using the MID Server. Cloud administrators are able to perform the discovery activities. Note that the discovery is done trough the AWS API and does not use the MID server at all.
A discovery schedule is capable of discovering more than one AWS account. With the help of MID Server, a host-based discovery of virtual hosts can also be performed. The MID server needs to be placed in the AWS cloud, but the host discovery may not be as rich as *normal* discovery due to limitations in the AWS cloud. You can follow Chapter 2, *MID Server Essentials*, to learn how to configure and set up a MID Server.

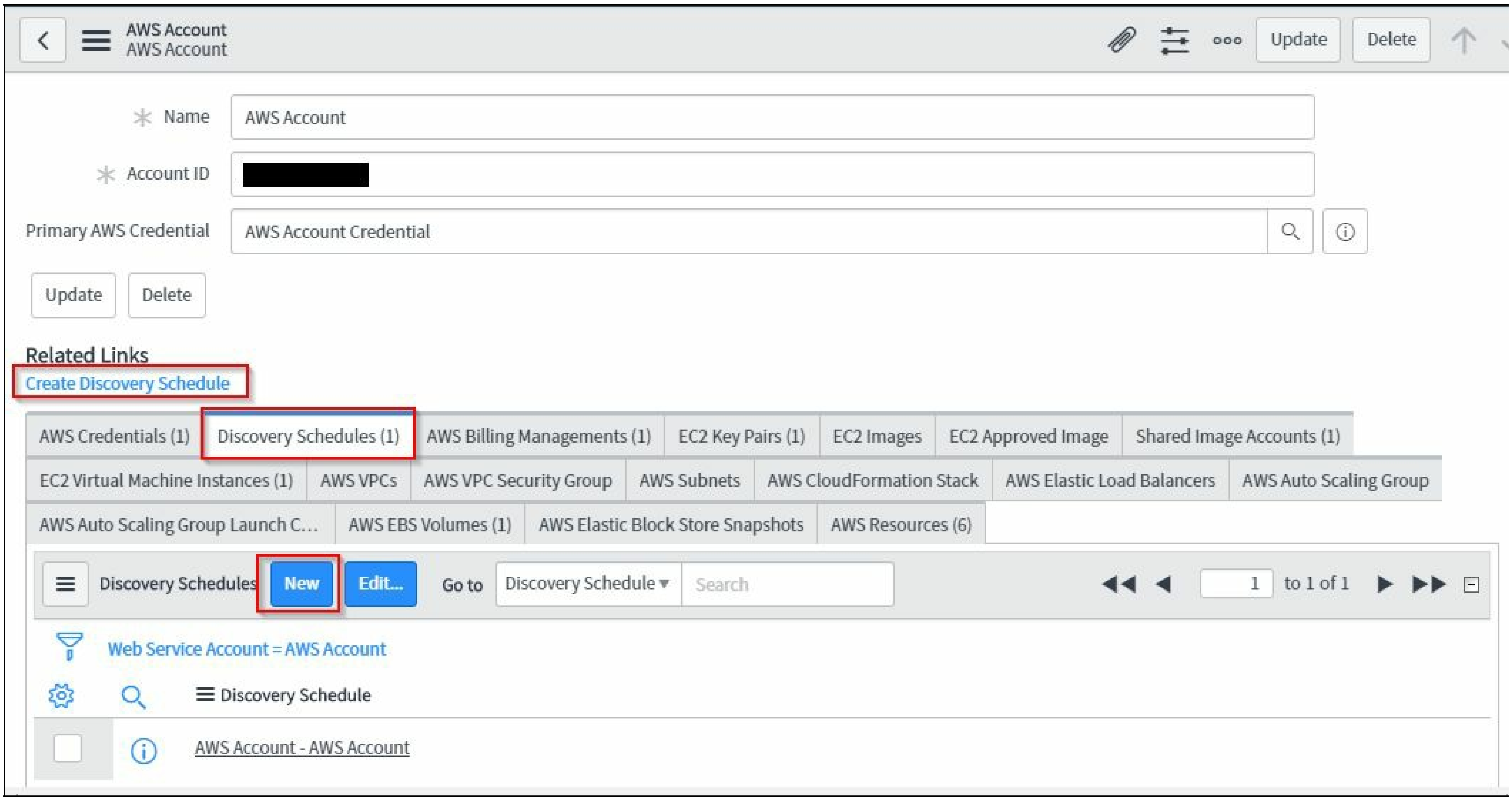
Let's now create a discovery schedule; to create a discovery schedule, perform the following steps:

1. Navigate to Amazon AWS Cloud | AWS Discovery | Accounts. Click on an existing account or click on New button to create a new one. Now click on AWS Account; it is the existing AWS account that we had created.



Name ▲	Account ID	Active	Primary AWS Credential
AWS Account	805257929525	true	AWS Account Credential

2. Clicking the existing AWS Account opens up the form. Now scroll down to the related list below and click on Discovery Schedules, or you can click on the related links Create Discovery Schedule. You can click on create New.



* Name: AWS Account

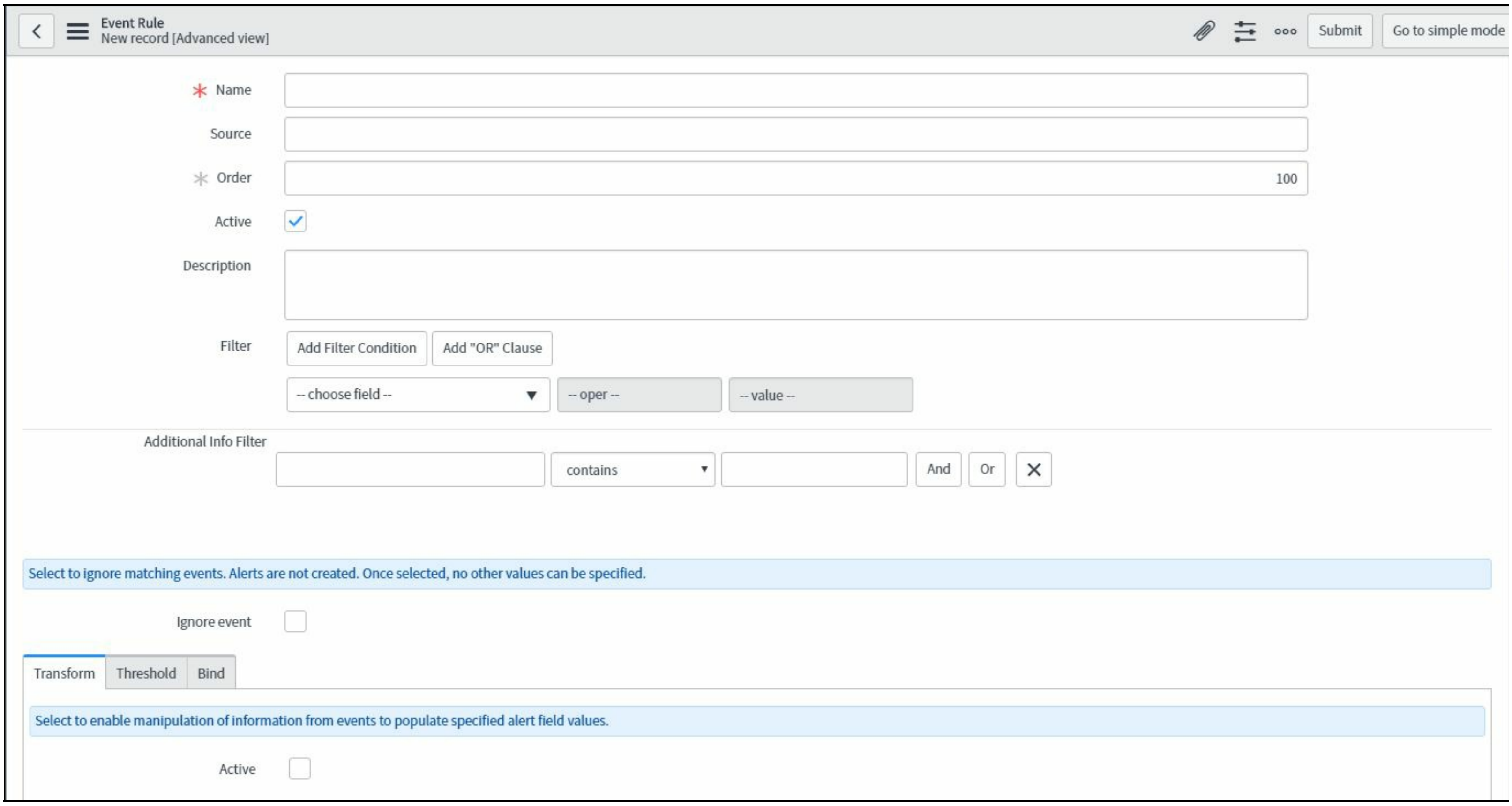
* Account ID: [redacted]

Primary AWS Credential: AWS Account Credential

Web Service Account = AWS Account

Discovery Schedule
AWS Account - AWS Account

3. Clicking on New, you are able to create a new discovery schedule. There are certain fields that need to be filled in.
   - Name: Name of the discovery schedule
   - Discover: There option available in a Web Service
   - MID Server: You are able to select a MID Server if the discovery is going to be a IP based, if not the AWS account based discovery will be done.
   - Active: To make enable to disable the discovery schedule
   - Schedule: Max run time, Run, and Time are some of the options available to provide a schedule



* Name	
Source	
* Order	100
Active	☑
Description	
Filter	Add Filter Condition · Add "OR" Clause -- choose field -- · -- oper -- · -- value --
Additional Info Filter	contains · And · Or · ✕

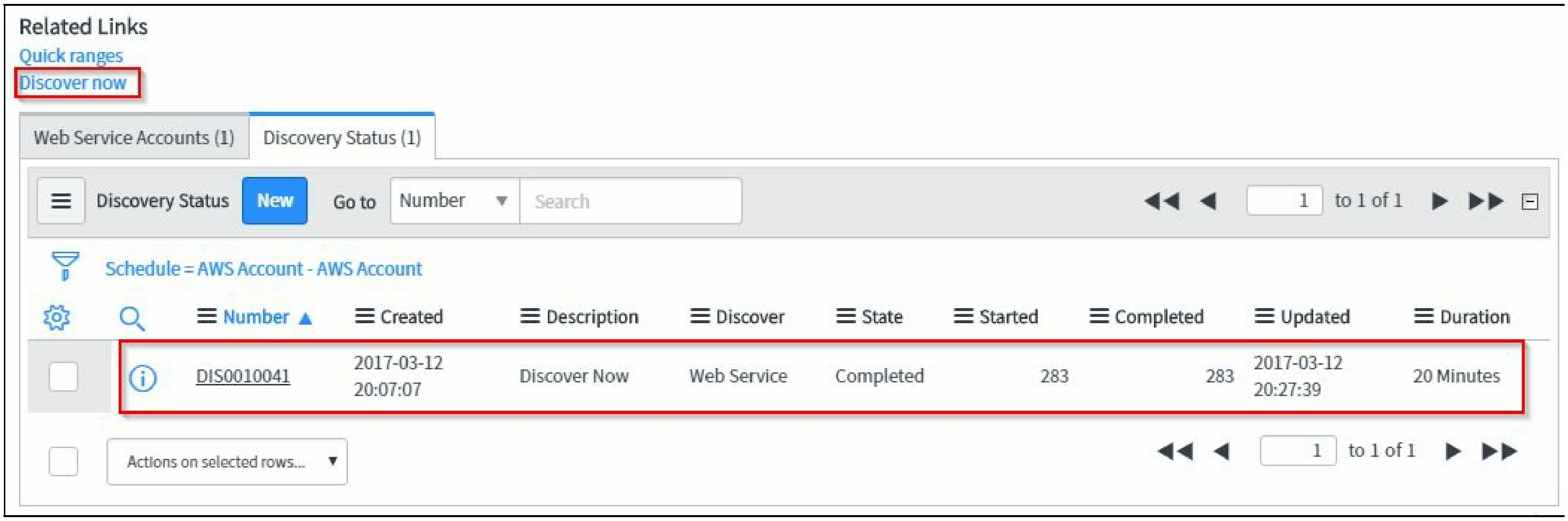
Select to ignore matching events. Alerts are not created. Once selected, no other values can be specified.

Ignore event □

Select to enable manipulation of information from events to populate specified alert field values.

Active □

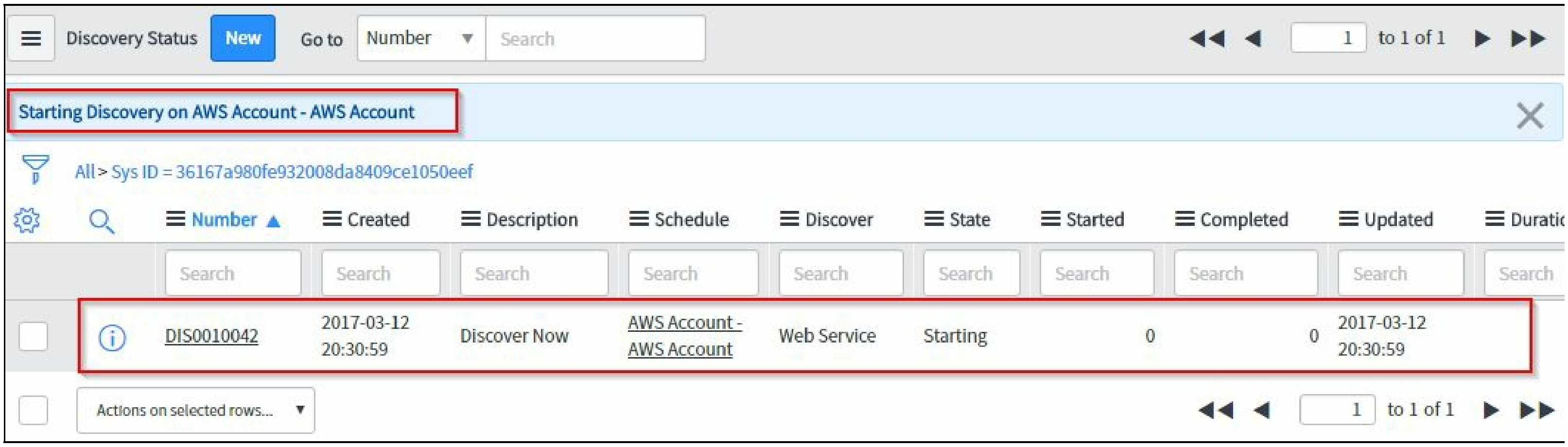
4. Once you enter the required information, you can click on Discover now to start discovering the AWS resources based on the given credentials.



Schedule = AWS Account - AWS Account

Number ▲	Created	Description	Discover	State	Started	Completed	Updated	Duration
DIS0010041	2017-03-12 20:07:07	Discover Now	Web Service	Completed	283	283	2017-03-12 20:27:39	20 Minutes

5. If there is no MID Server selected, the AWS discovery starts and you are able to see the status of the discovery.



Discovery Status | New | Go to | Number | Search | 1 to 1 of 1

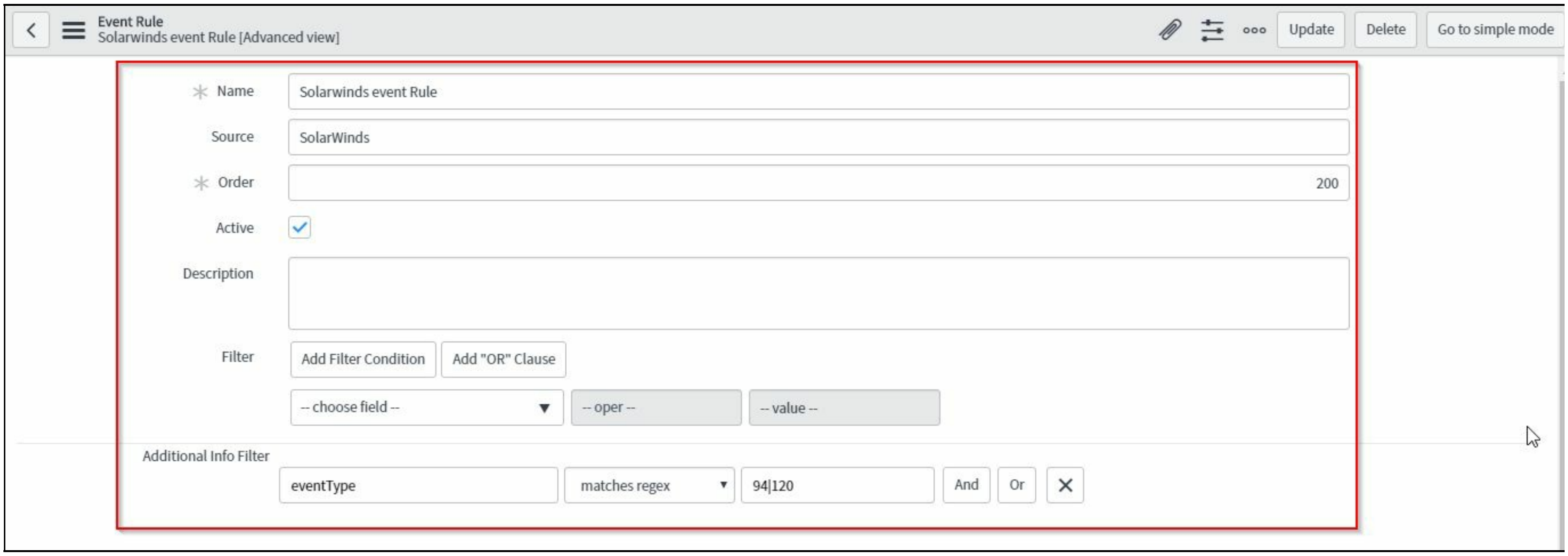
Starting Discovery on AWS Account - AWS Account

All > Sys ID = 36167a980fe932008da8409ce1050eef

Number ▲	Created	Description	Schedule	Discover	State	Started	Completed	Updated	Duratic
DIS0010042	2017-03-12 20:30:59	Discover Now	AWS Account - AWS Account	Web Service	Starting	0	0	2017-03-12 20:30:59	

Actions on selected rows... | 1 to 1 of 1

6. Once the AWS discovery runs, you can notice in the related list that there are numbers filled in after the AWS discovery has run. The related tabs are filled in based on what is available and subscribed to in the AWS account. You will get an error saying com.glide.attachment.max_get_size is too small. This property sets the maximum size of the payload, and in most cases the default size of this property is too small for getting all the details from the cloud provider. Default is 5 MB, and this needs to be extended to match the size of the current implementation.



Event Rule
Solarwinds event Rule [Advanced view]

Update | Delete | Go to simple mode

Name	Solarwinds event Rule
Source	SolarWinds
Order	200
Active	☑
Description	
Filter	Add Filter Condition · Add "OR" Clause -- choose field -- · -- oper -- · -- value --

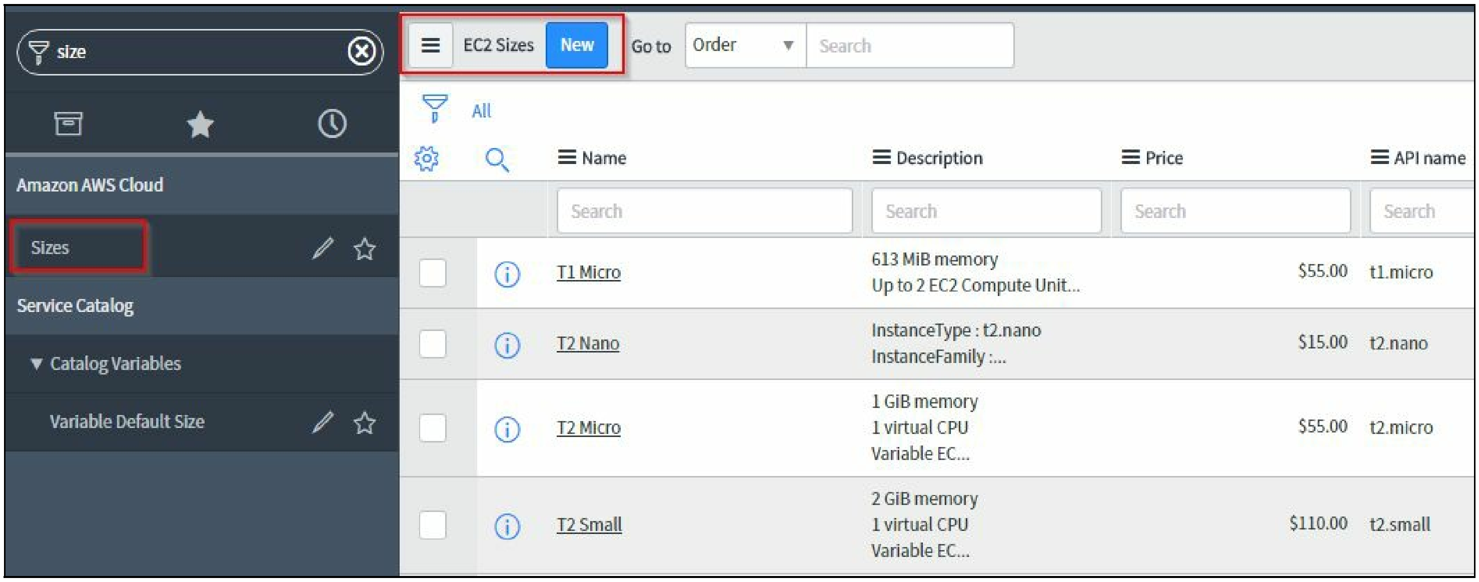
Additional Info Filter

eventType | matches regex | 94\|120 | And | Or | ✕

Integrating the service catalogs with cloud provisioning

In this chapter, we will see how to integrate the service catalog with cloud provisioning.

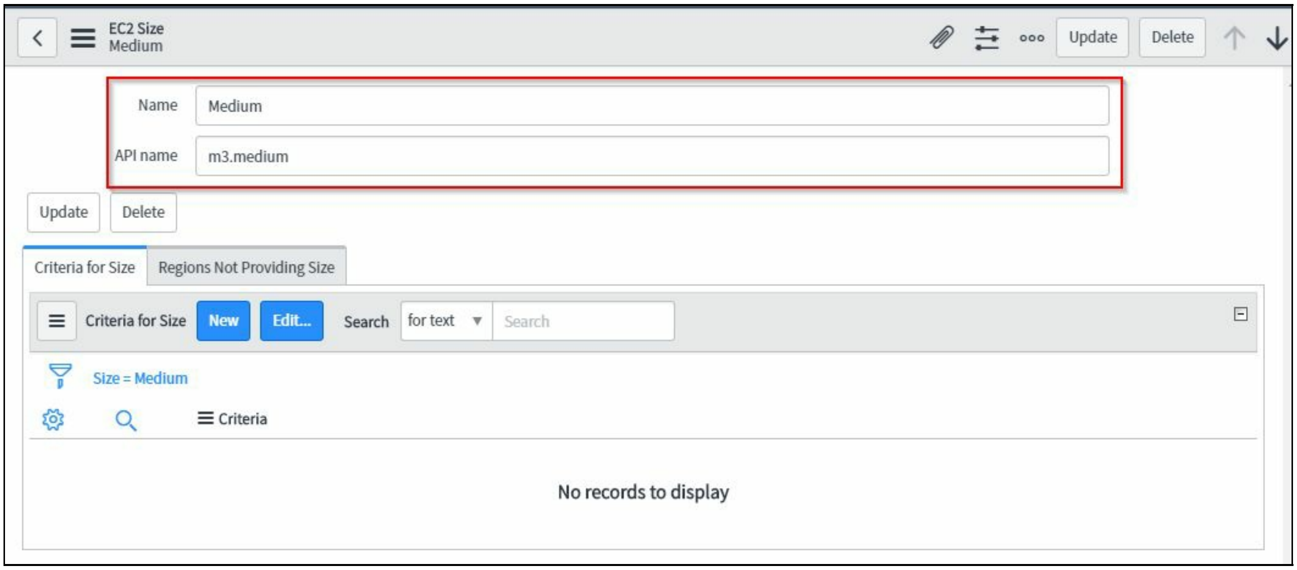
1. The first step is to create the sizes; to create the sizes, follow the steps to set up the service catalog for the AWS cloud offering.



Name	Description	Price	API name
T1 Micro	613 MiB memory Up to 2 EC2 Compute Unit...	$55.00	t1.micro
T2 Nano	InstanceType : t2.nano InstanceFamily :...	$15.00	t2.nano
T2 Micro	1 GiB memory 1 virtual CPU Variable EC...	$55.00	t2.micro
T2 Small	2 GiB memory 1 virtual CPU Variable EC...	$110.00	t2.small

2. Clicking on New opens up a form to fill in the EC2 size.

These sizes are available on the Amazon AWS website, usually located on the AWS pricing chart.



Name: Medium

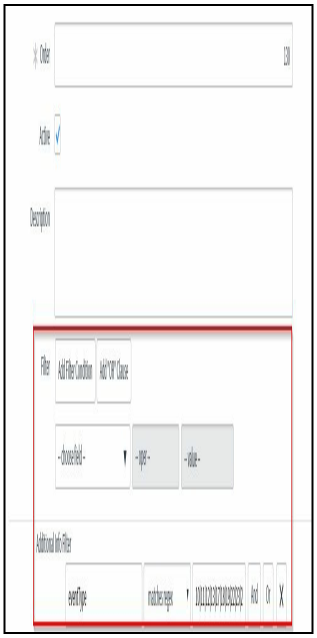
API name: m3.medium

Size = Medium

No records to display

3. Images need to be approved before they are available to create a service catalog. Follow the steps to approve the images that have been created:

1. Type aws under the Amazon AWS Cloud application to search for Available Images. Click on Available Images.



* Order: 130

Active: ☑

Description:

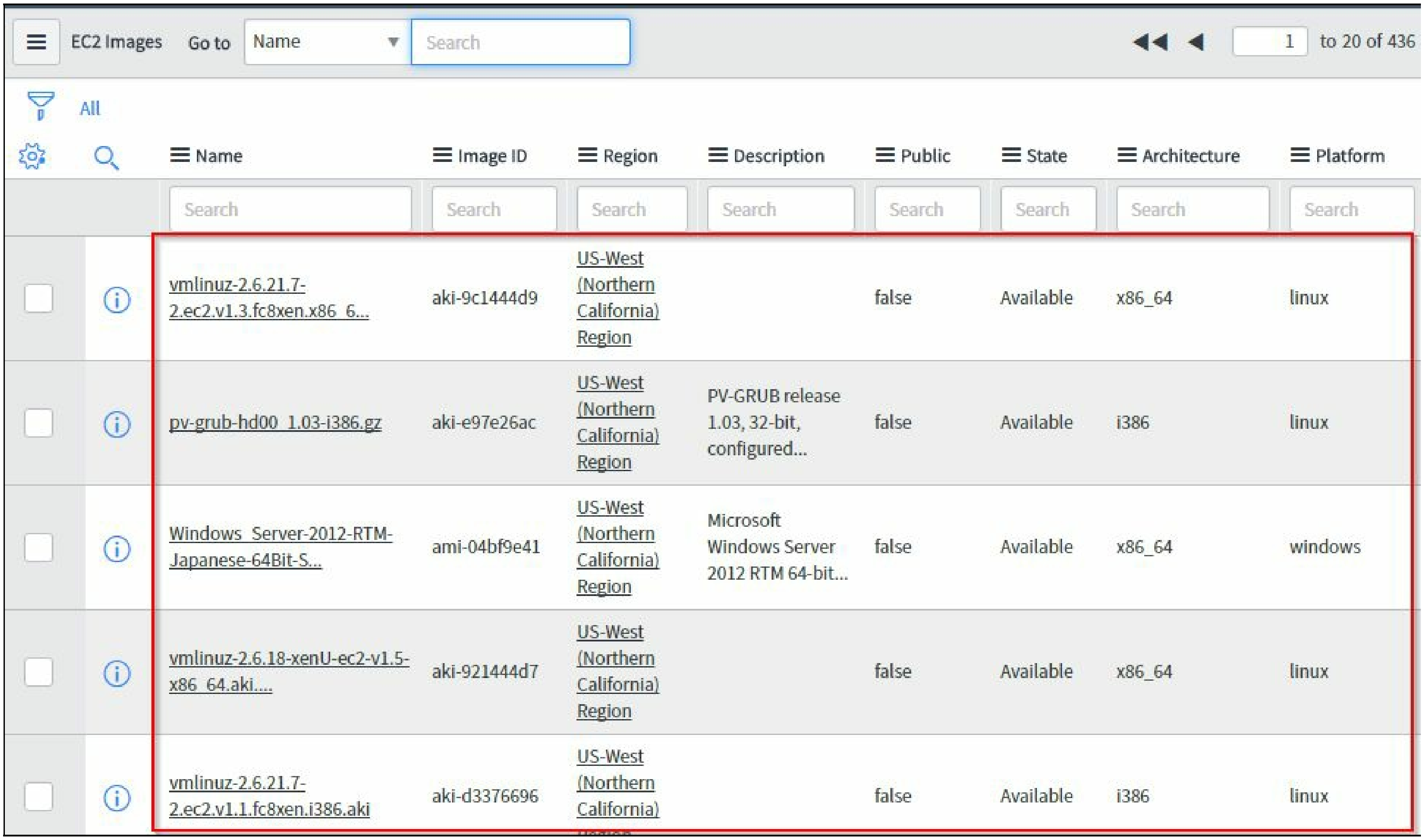
Filter: Add Filter Condition | Add "OR" Clause

-- choose field -- ▾ | -- oper -- | -- value --

Additional Info Filter

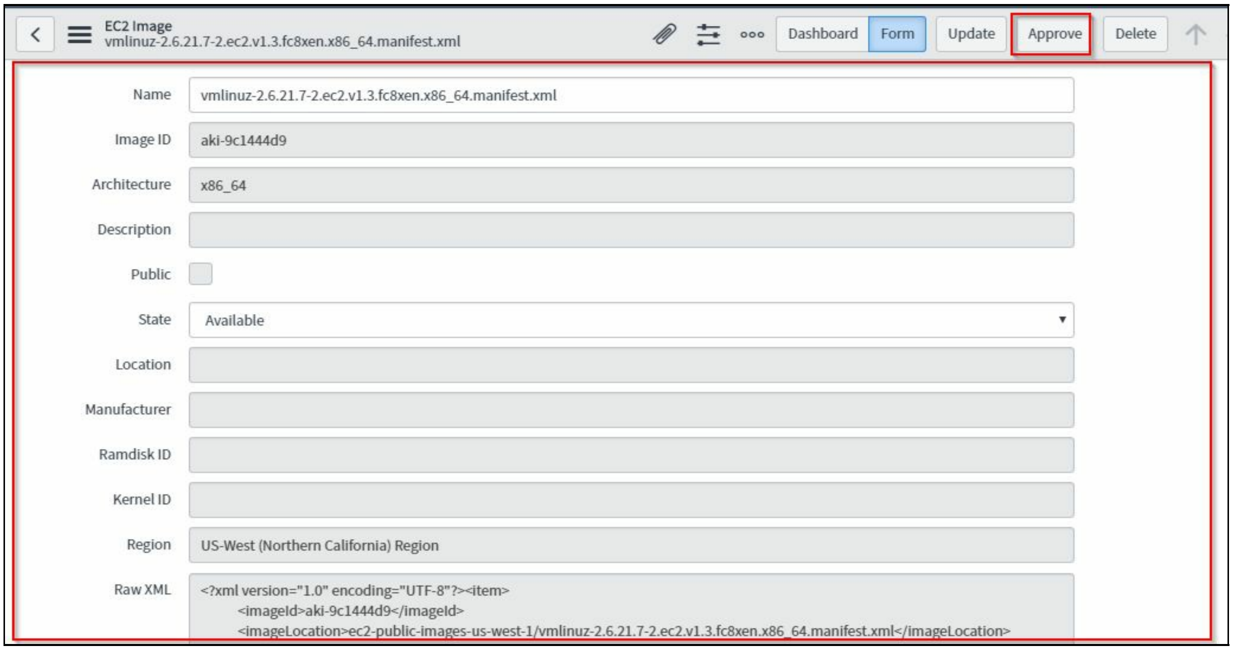
eventType | matches regex ▾ | 10|11|12|13|17|18|19|22|23|2 | And | Or | X

2. Clicking on Available Images will list all the available images. Click on any available image to open it.



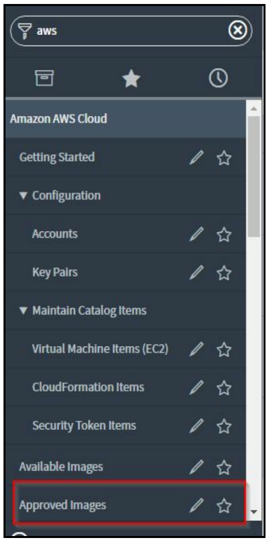
		Name	Image ID	Region	Description	Public	State	Architecture	Platform
		Search	Search	Search	Search	Search	Search	Search	Search
□	ⓘ	vmlinuz-2.6.21.7-2.ec2.v1.3.fc8xen.x86_6...	aki-9c1444d9	US-West (Northern California) Region		false	Available	x86_64	linux
□	ⓘ	pv-grub-hd00_1.03-i386.gz	aki-e97e26ac	US-West (Northern California) Region	PV-GRUB release 1.03, 32-bit, configured...	false	Available	i386	linux
□	ⓘ	Windows_Server-2012-RTM-Japanese-64Bit-S...	ami-04bf9e41	US-West (Northern California) Region	Microsoft Windows Server 2012 RTM 64-bit...	false	Available	x86_64	windows
□	ⓘ	vmlinuz-2.6.18-xenU-ec2-v1.5-x86_64.aki....	aki-921444d7	US-West (Northern California) Region		false	Available	x86_64	linux
□	ⓘ	vmlinuz-2.6.21.7-2.ec2.v1.1.fc8xen.i386.aki	aki-d3376696	US-West (Northern California)		false	Available	i386	linux

3. Now click on the Approve button to approve a particular selected image. When approving an image this makes it possible to create a catalog item from it.

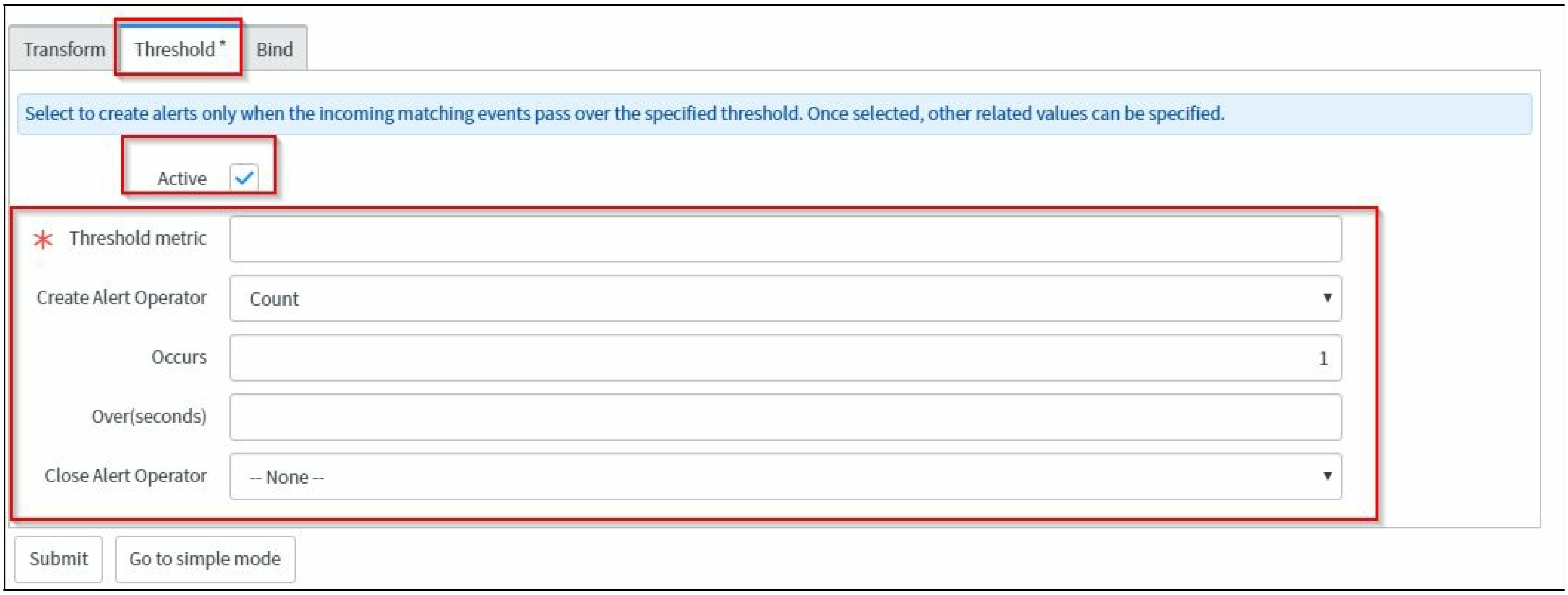


Name	vmlinuz-2.6.21.7-2.ec2.v1.3.fc8xen.x86_64.manifest.xml
Image ID	aki-9c1444d9
Architecture	x86_64
Description	
Public	□
State	Available
Location	
Manufacturer	
Ramdisk ID	
Kernel ID	
Region	US-West (Northern California) Region
Raw XML	<?xml version="1.0" encoding="UTF-8"?><item> <imageId>aki-9c1444d9</imageId> <imageLocation>ec2-public-images-us-west-1/vmlinuz-2.6.21.7-2.ec2.v1.3.fc8xen.x86_64.manifest.xml</imageLocation>

4. All approved images are available under Approved Images. Clicking on that lists all the approved images.



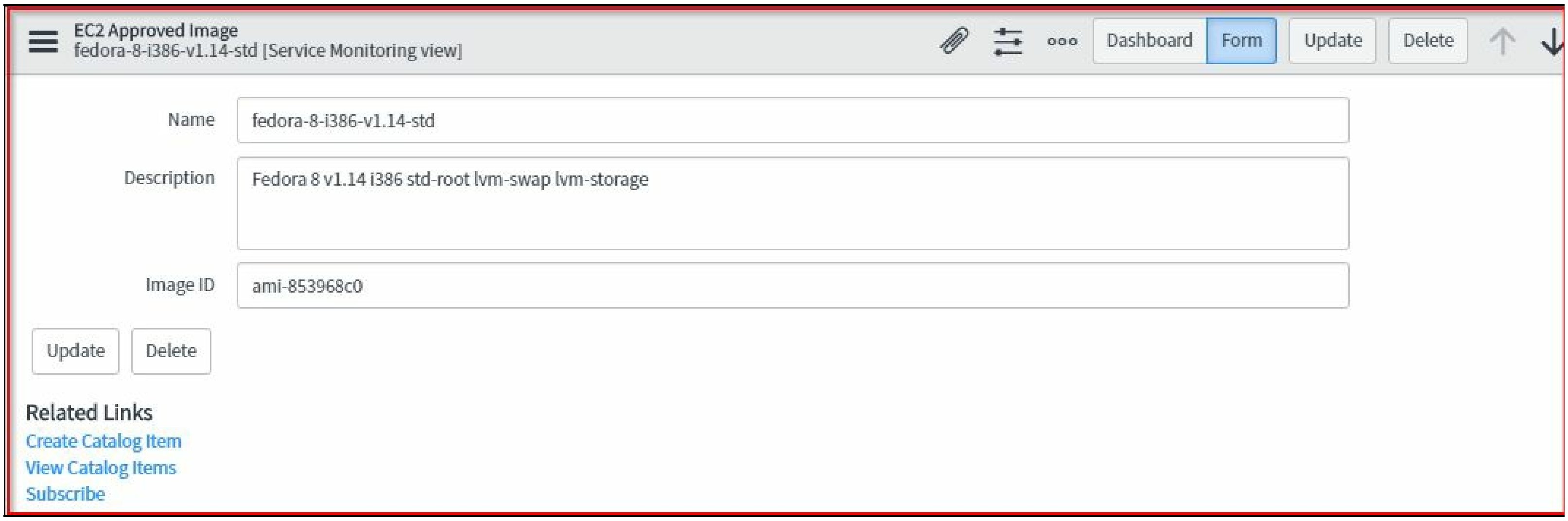
5. Clicking on Approved Images will list all of the approved images, so click on any image and open the record.



Select to create alerts only when the incoming matching events pass over the specified threshold. Once selected, other related values can be specified.

Active	☑
* Threshold metric	
Create Alert Operator	Count
Occurs	1
Over(seconds)	
Close Alert Operator	-- None --

6. Click on an approved image and open the record.

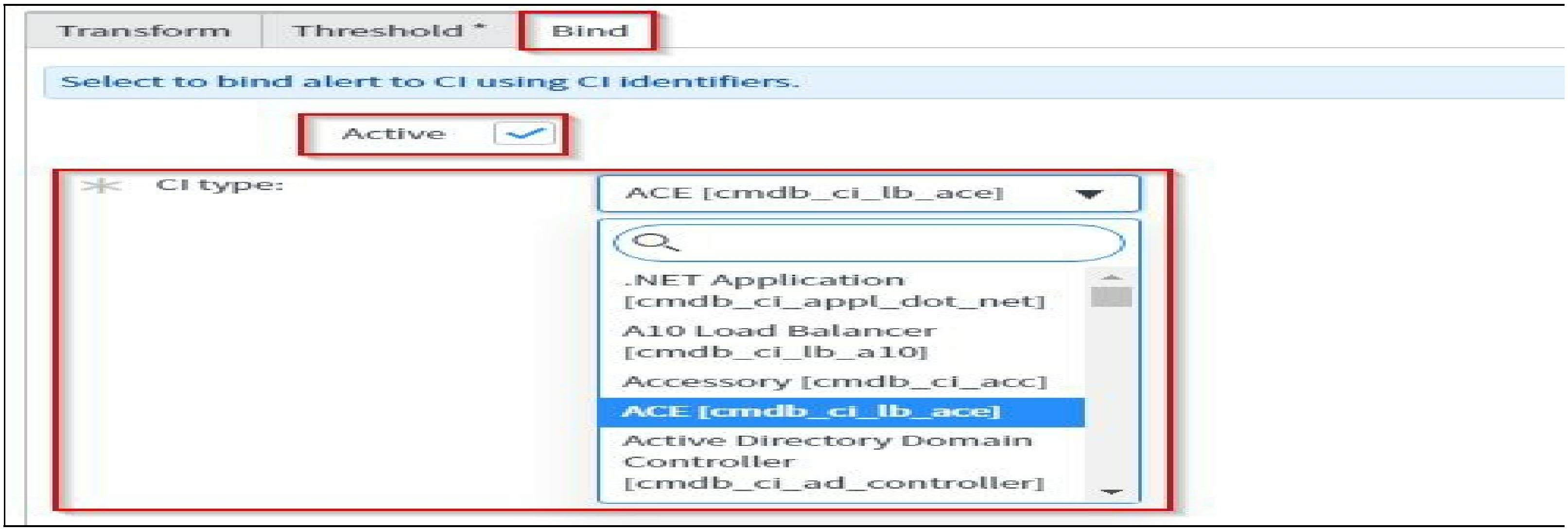


EC2 Approved Image
fedora-8-i386-v1.14-std [Service Monitoring view]

Name	fedora-8-i386-v1.14-std
Description	Fedora 8 v1.14 i386 std-root lvm-swap lvm-storage
Image ID	ami-853968c0

Related Links
Create Catalog Item
View Catalog Items
Subscribe

7. Scroll down to the bottom under, and under Related Links click on Create Catalog Item. Fill in the required information and click on the Update button to save the information.



Transform
Threshold *
Bind

Select to bind alert to CI using CI identifiers.

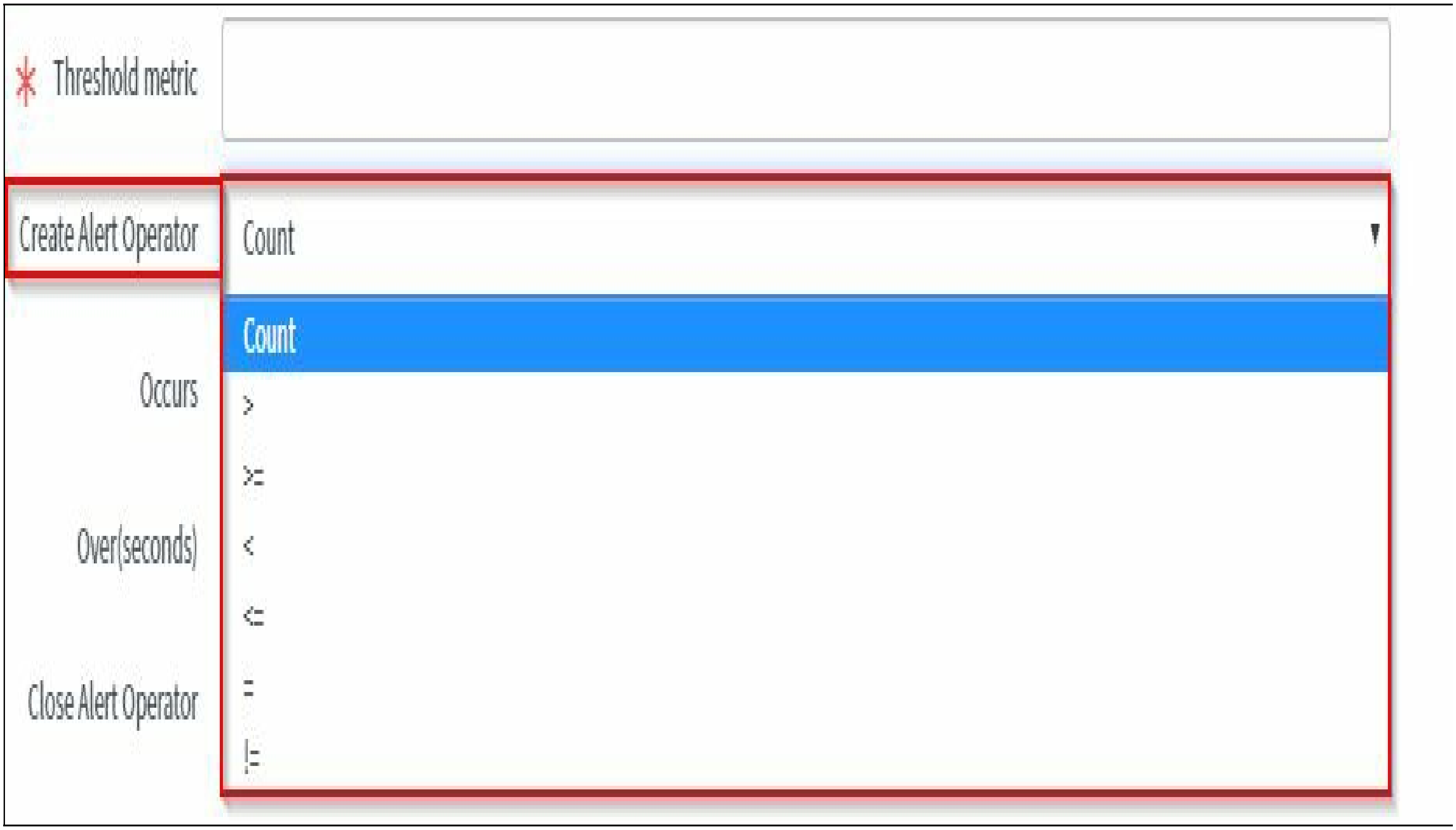
Active ☑

* CI type: ACE [cmdb_ci_lb_ace]

.NET Application [cmdb_ci_appl_dot_net]
A10 Load Balancer [cmdb_ci_lb_a10]
Accessory [cmdb_ci_acc]
ACE [cmdb_ci_lb_ace]
Active Directory Domain Controller [cmdb_ci_ad_controller]

8. After you have enter all the information required, click on the Publish button to publish the

service catalog.



* Threshold metric

Create Alert Operator: Count

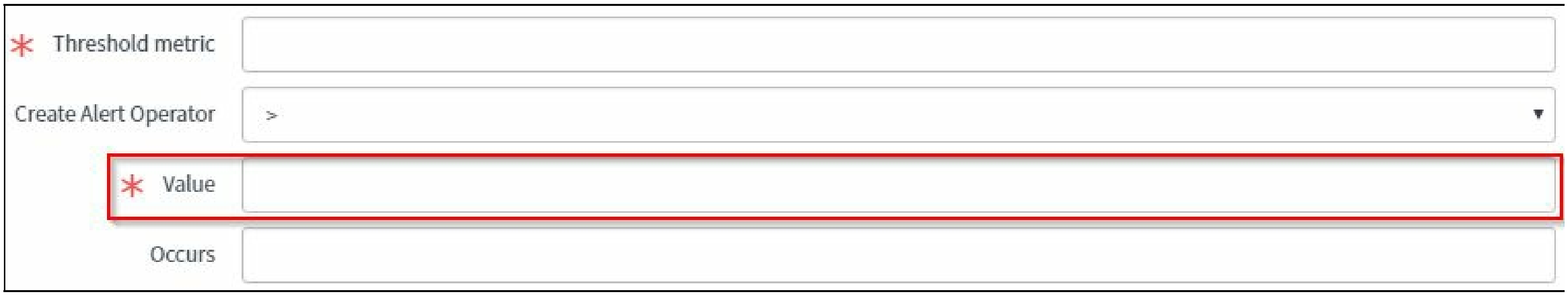
Occurs

Over(seconds)

Close Alert Operator

9. Once the service catalog is published, you can click on the following link to view all the AWS catalogs that have been published.

10. Navigate to Amazon AWS Cloud | Maintain Catalog Items | Virtual Machine Items (EC2) and click on the EC2 Catalog Items that you have created to open the form.



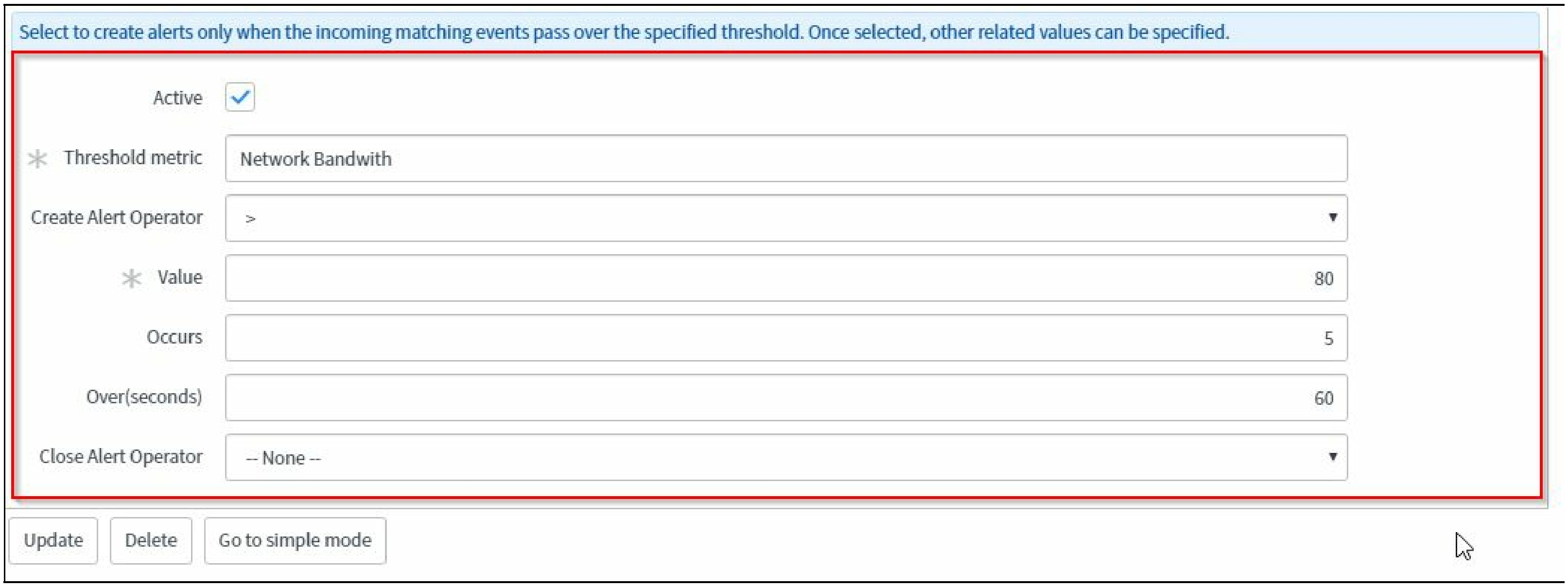
* Threshold metric

Create Alert Operator: >

* Value

Occurs

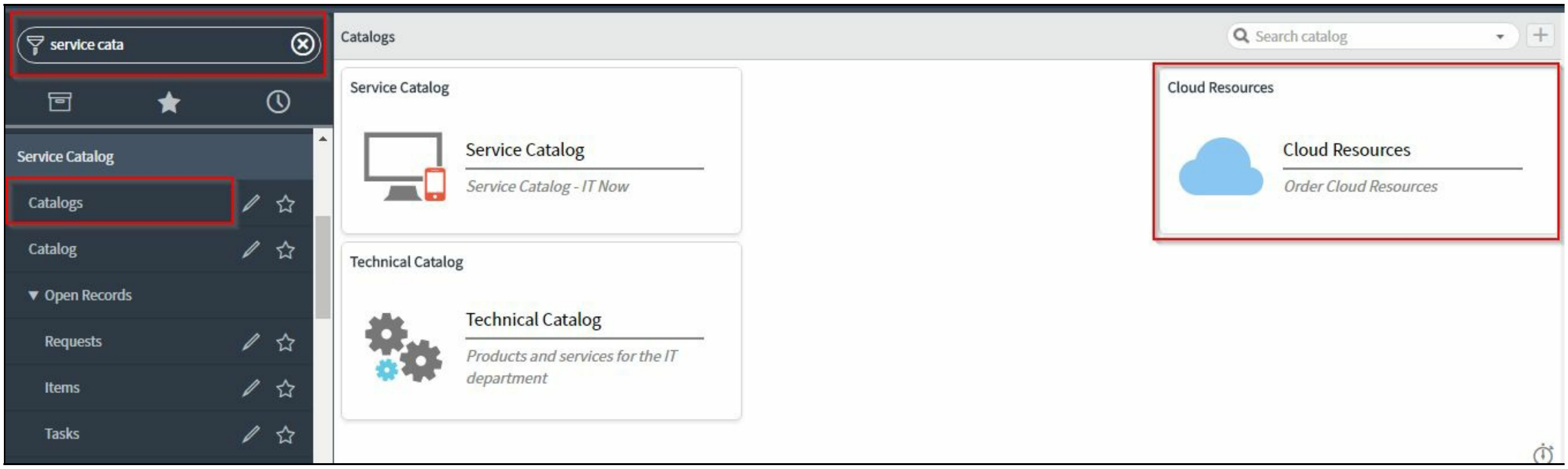
11. You are able to see the filled in information, and you are able to edit any fields that you intend to change. Click on Try It to see how the service catalog looks to the end user who is going to use this service catalog. You can also unpublish this service catalog using the Unpublish button.



Select to create alerts only when the incoming matching events pass over the specified threshold. Once selected, other related values can be specified.

Active	☑
* Threshold metric	Network Bandwith
Create Alert Operator	>
* Value	80
Occurs	5
Over(seconds)	60
Close Alert Operator	-- None --

12. We had published our service catalog under Cloud Resources, we are able to open the published service catalogs by clicking on Service Catalog | Catalogs.



In order to configure other cloud providers including Microsoft Azure and VMWare you will need to activate the plug in and configure the respective fields and options available. Depending on the type of cloud provider you are selecting you will need the appropriate information.

Summary

In this chapter, we had seen how to activate the cloud application, especially focusing on activating the AWS cloud application. We also walked through how to set up the Amazon AWS application and finally we also integrated with the service catalog where people can subscribe for the virtual resources.

Automation Using ServiceNow Orchestration

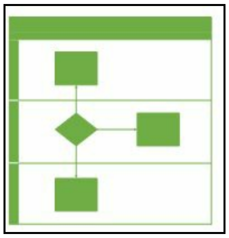
In this chapter, *Automation Using ServiceNow Orchestration*, we will learn about Orchestration capabilities available in the ServiceNow application. We will learn about the Orchestration architecture, setting up Orchestration capabilities and also run through an example before we conclude the chapter.

What is Orchestration?

Imagine school band with all the kids having different musical instruments and playing to play for a song, some kids play drums, some play violin and so on. How does the music teacher make sure the goal is achieved is through tuning the musical instruments that are played by the kids directing them to achieve the required music through the instructions.

ServiceNow Orchestration works in a similar way; there are many different parts involved in getting activities done manually. ServiceNow Orchestration helps to facilitate and bridge the gap by helping to align all pieces involved to automate the required piece of process activity or function. These are achieved through the workflows in the ServiceNow world.

You might have seen or heard about process flows in the real world. Process flows are sets of procedures or activities that are required to be followed based on a set or defined governance framework or standard requirement. These processes are usually translated into the tools to perform these activity. ServiceNow is configured or customized to accommodate defined processes through workflows.



When a process or function or an activity involves an external activity to be automated outside ServiceNow, Orchestration helps to facilitate the automation.

Orchestration prerequisites

The Orchestration plug-in Orchestration (`com.snc.runbook_automation`) must be enabled. This requires a separate subscription to be purchased from ServiceNow. You will need to contact your account representative for more information on the pricing.

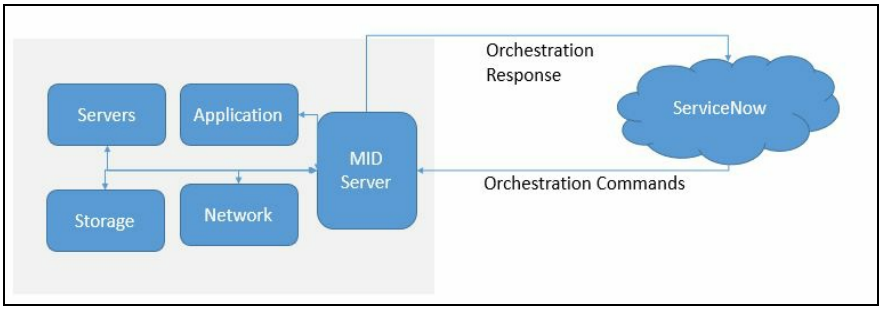
Orchestration capabilities

ServiceNow Orchestration can be leveraged to perform simple to complex automation tasks that are not limited the following:

- **Password reset process**: ServiceNow Orchestration can help to perform the password management, integrating with the required active directory or the infrastructure component.
- **Cloud provisioning**
- **Server reboot**
- **Software asset management**

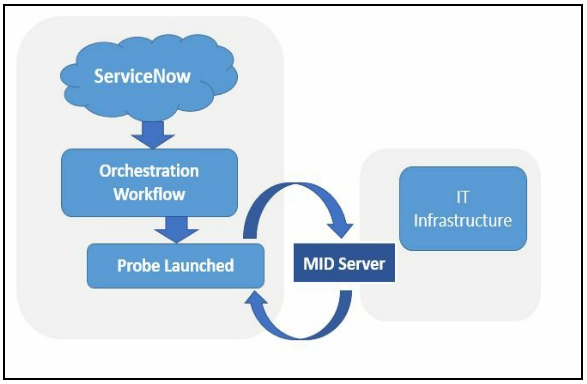
Understanding ServiceNow Orchestration architecture

Management, Instrumentation, and **Discovery Server** (**MID Server**) play a key role in Orchestration activities. ServiceNow, which is on the cloud, talks to the corporate network through the MID Server. The MID Server also helps to facilitate the defined Orchestration activities. Orchestration activities instruct the MID Server to execute Orchestration commands against the target infrastructure component and responses back are sent to the instance.



Orchestration workflow

Orchestration is initiated through the Orchestration workflow. The Orchestration workflow launches a probe and puts the workflows into a pause state. The MID Server executes the probe against the target infrastructure device. Once the probe results are retrieved, the workflow is resumed.



Activities that involve direct web servers do not require the use of Orchestration. Our chapter will be based on the Istanbul release. Let's have a look at the new updates in the release.

Istanbul release notes from http://wiki.servicenow.com.

- Orchestration plug in `com.snc.runbook_automation` now requires a separate subscription; in prior releases these could be activated without separate subscription
- **Credential troubleshooting for activity designer**: A credential debugging feature in the activity designer displays detailed troubleshooting information when an activity cannot authenticate on the target during a test. A tab in the test form displays the target IP address, the credential type, and the details of failed credentials, expressed as a JSON string
- **Software leases for Client Software Distribution (CSD)**: CSD allows users requesting software from the service catalog to define lease start and end dates. Lease end dates are only available for selection if the software is configured for revocation (uninstallation). Users of software deployed by CSD can request a lease extension request, if an end date was defined when the software was ordered. Lease extensions may be subject to approvals
- **Microsoft PowerShell protocol and troubleshooting documentation**: A detailed discussion of the protocols that PowerShell activities use to communicate with Windows hosts is included in the PowerShell activity pack documentation set. Also included are procedures for troubleshooting authentication and access denied errors that prevent PowerShell activities from running commands on a target host.
- **Orchestration runtime plugin**: The Orchestration runtime plugin contains all the Orchestration features required to automate tasks for certain applications without requiring an Orchestration subscription. This plugin provides access to the packs and data tabs in the workflow editor, which gives users access to custom activities for their applications and allows them to reuse data from the databus.

- **System Center Configuration Manager (SCCM) GET activity filter**: A MID Server script filters the payloads from all `GET` activities built with the SCCM provider template and returns only specific attributes for the applications on the SCCM server. This filter reduces the size of the payload, while providing the most desirable application data.
- **ActivityLogger API**: A system property allows activity creators to configure debugging for the preprocessing and postprocessing scripts in activity provider templates. The resulting error messages are displayed in log entries in workflow contexts.
- **MID Server service account for Microsoft PowerShell**: You can force activities built with the PowerShell activity template to use the credentials of the MID Server service. When the MID Server service account is specified, the activity does not try any other credentials and does not allow the use of credential tags.
- **MID Server selection**: Configure a MID Server that Orchestration automatically selects for an activity based on capabilities, the IP addresses of target devices, and the application that the MID Server is allowed to use

Exploring different Orchestration applications: Orchestration and PowerShell probes

Orchestration in ServiceNow extends the workflow editor with extended capabilities that include

- Activity packs
- Activity designer
- Scoped applications
- Databus

There are a number of Orchestration plugins that are available for purchase that include the following:

Orchestration	`com.snc.runbook_automation`	Plugin to enable Orchestration in ServiceNow
Orchestration - Active directory	`com.snc.Orchestration.asset_lease_management`	Plugin to provide software lease features
Orchestration - Azure active directory	`com.snc.Orchestration.azure.ad`	Supports azure active directory management by installing Azure active directory pack
Orchestration - Client software distribution	`com.snc.Orchestration.client_sf_distribution`	Supports integration with software distribution tools and integration with the service catalogs
Orchestration - Exchange	`com.snc.Orchestration.exchange`	Helps to manage Microsoft exchange mail by installing the exchange activity pack
Orchestration F5 network management	`com.snc.Orchestration.f5`	Helps to configure the network elements associated with the F5 load balancer using the F5 network management activity pack
Orchestration - Infoblox DDI activity pack	`com.snc.Orchestration.infoblox`	Helps to control and automate the administration of window machine and applications by installing the PowerShell activity pack
Orchestration -	`com.snc.Orchestration.probe`	Helps to run probes by installing the probe activity

Probe		pack
Orchestration - Runtime	`com.snc.runbook_automation.runtime`	Enables the applications within ServiceNow to use the data of the Orchestration with the workflow.

The last plugin does not require Orchestration subscription. However, the other plugins do require subscription.

These are some of the key plugins available to install the required activity packs; there are other activity packs available which are not mentioned preceding, including packs for SSH, SFTP file transfer, SCCM, and workday Orchestration.

Orchestration can be used in automating several user cases to automate a process, activity, or function. Some of the automation pieces include:

- Spinning a virtual server
- Integrating with the third party cloud provider and spinning up servers
- The ability to interact with any system web services
- The ability to interact with any password resets, active directory user provisioning

There are even more multiple cases that Orchestration can be leveraged, covering the Orchestration topic in this book we will cover one of the key Orchestration use case which is the password management Orchestration interacting with the active directory .

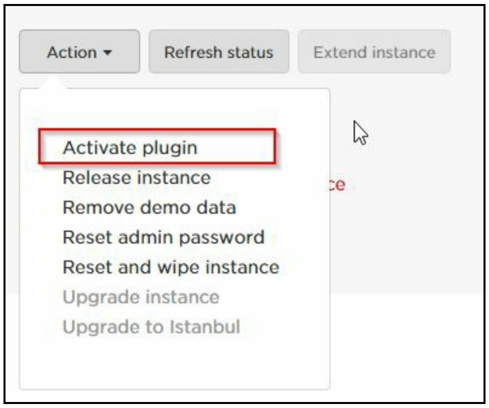
For us to work on this example, which involves interacting with the active directory, here are the prerequisites:

- You should have subscribed to the Orchestration
- Enabled the Orchestration plugin
- Enabled the Active directory activity pack

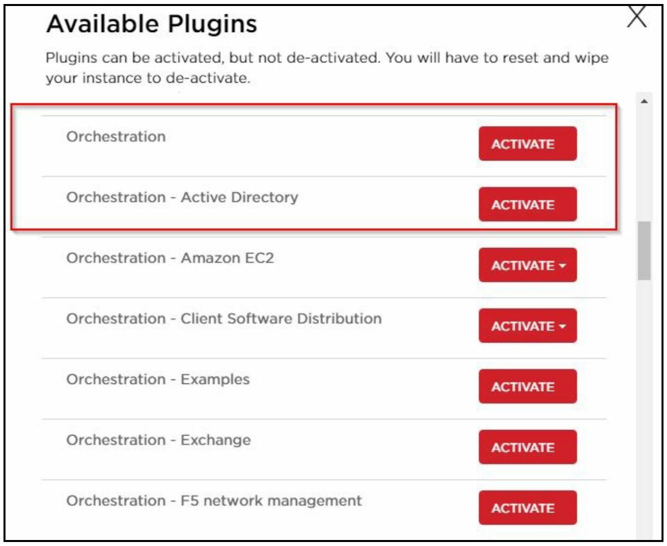
Activating the plugin from a developer instance

Follow these steps to activate the Orchestration plugin required to walk through our example.

1. Log on to your instance management.
2. Click on action and then select Activate plugin.



3. Now you will find a list of subscription-required plugins that you can activate.
4. You will need to activate the Orchestration plugin and also the Orchestration - Active directory plugin.

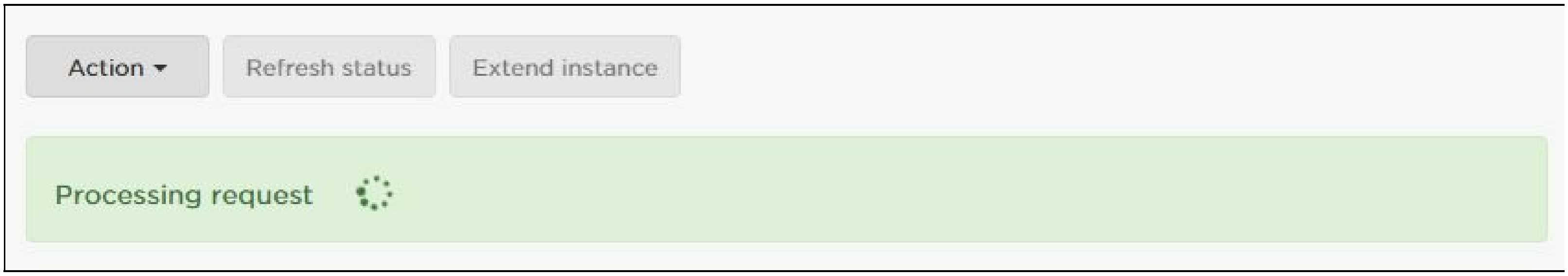


Available Plugins

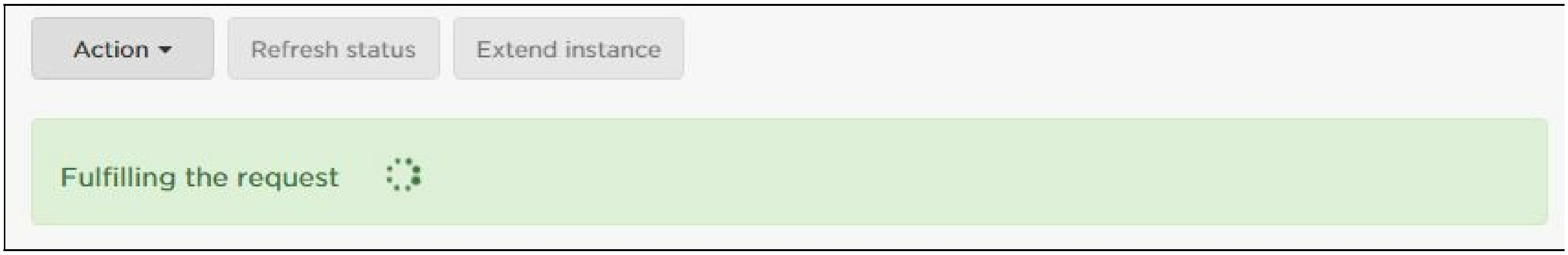
Plugins can be activated, but not de-activated. You will have to reset and wipe your instance to de-activate.

Orchestration	ACTIVATE
Orchestration - Active Directory	ACTIVATE
Orchestration - Amazon EC2	ACTIVATE ▾
Orchestration - Client Software Distribution	ACTIVATE ▾
Orchestration - Examples	ACTIVATE
Orchestration - Exchange	ACTIVATE
Orchestration - F5 network management	ACTIVATE

5. Click on Activate next to the Orchestration plugin. You will see a series of prompts before the plug in gets installed.



Processing request



Fulfilling the request

Once the plug in installs you will either receive an email, if the installation is taking a long time, or you will receive confirmation on the screen.

You can also activate the required plug in from the Hi portal, where you have control of the schedule dictating when you want the plugin to be installed.

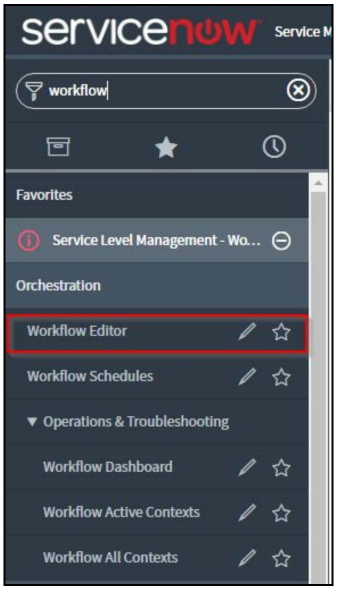
Active directory Orchestration

In this example we will see how to leverage the active directory activity pack to perform basic Orchestration activities in managing the active directory user management.

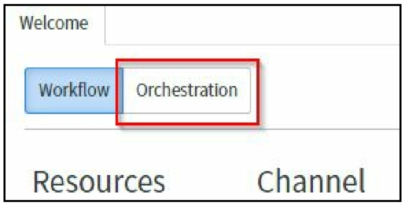
Active directory activity pack can orchestrate to management the users and the groups with in the active directory. With the help of this activity pack, the password reset can be managed, and we can also manage the active directory, including creating, updating, resetting, disabling and removing active directory accounts and associated users. In our example, we will walk through how to create a user in the AD.

1. First step: to carry out any Orchestration activities, the MID Server should be ready. In the earlier chapters we have covered on the configurations of the MID Server, and you can follow the steps to install and setup your MID Server.

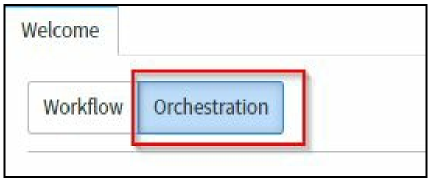
   Search for workflow in the application navigator, and then click on the Workflow Editor under the application called Orchestration.



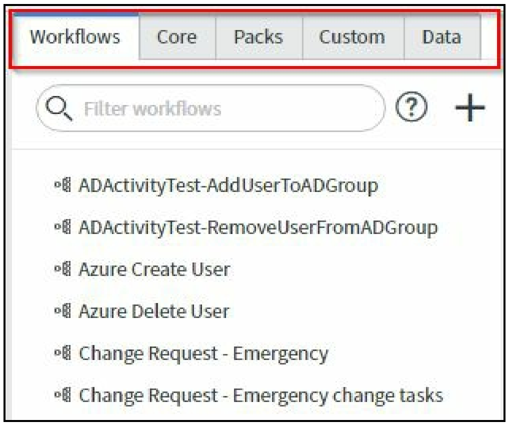
2. Since the Orchestration extended the workflow with in ServiceNow, you will see, on the left, two tabs which are Workflow and Orchestration.



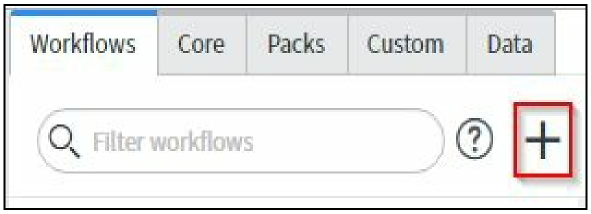
3. Click on Orchestration.



4. On the right panel of the Workflows editor you will find different options including the canned activity packs.

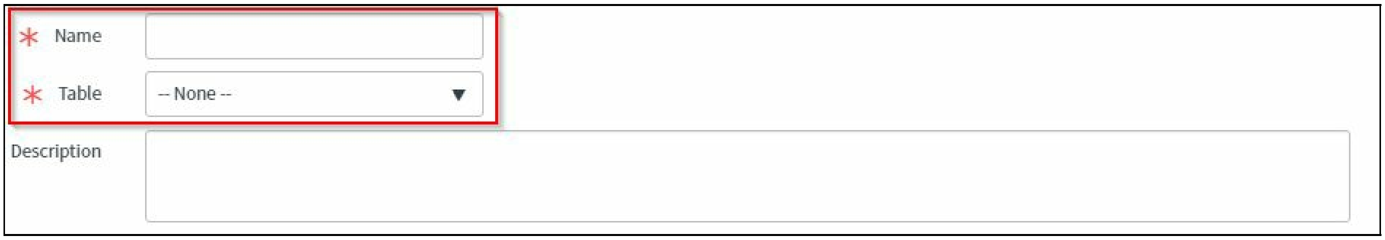

Workflows
Core
Packs
Custom
Data
Filter workflows
?
+
ADActivityTest-AddUserToADGroup
ADActivityTest-RemoveUserFromADGroup
Azure Create User
Azure Delete User
Change Request - Emergency
Change Request - Emergency change tasks

5. Click on the + symbol that is used to create a new workflow; in our example we will go ahead and create a new workflow and leverage the active directory activity pack.



6. A window will pop up in the workflow editor and you will have the option to enter values in the required fields.

7. You will now need to fill in the mandatory fields which is Name, and select the Table. Go ahead and fill in the following:
   - Name: AD interaction
   - Table: Global [global] (This is the table you want the workflow to run on, and you select the Global table as you want the workflow to run on all tables)

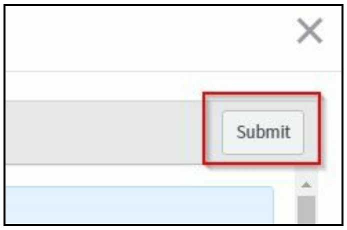


* Name

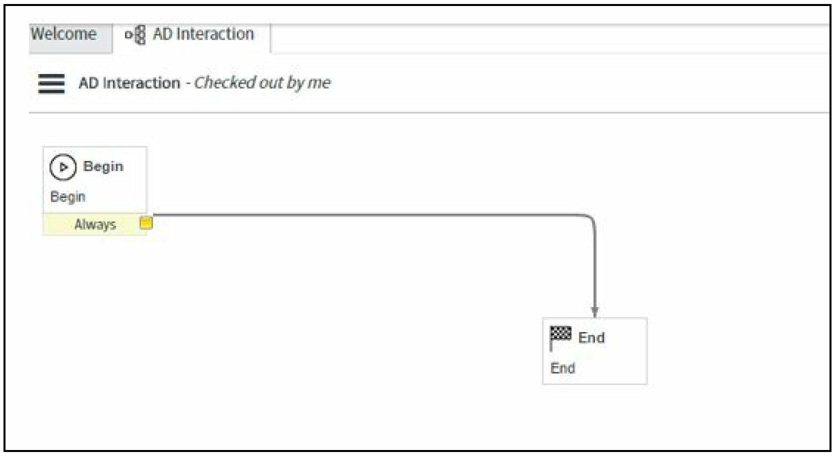
* Table -- None --

Description

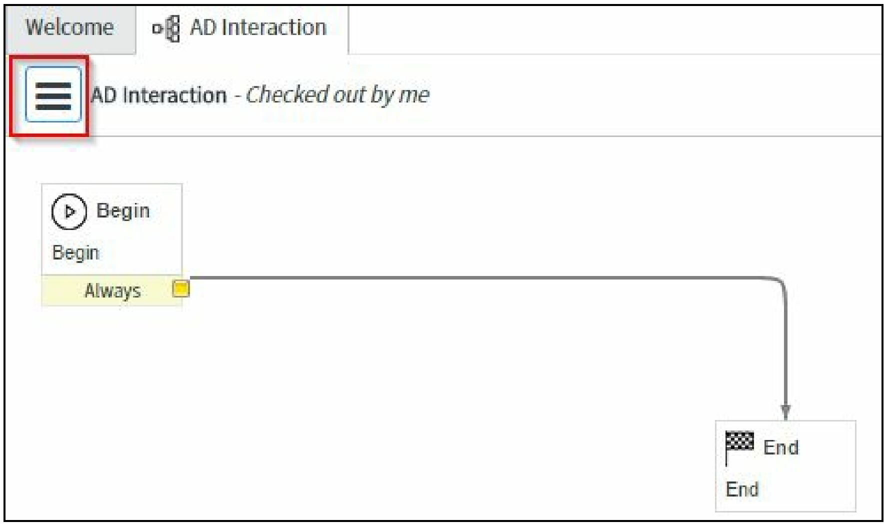
8. Once you enter the required information, click on the Submit button.



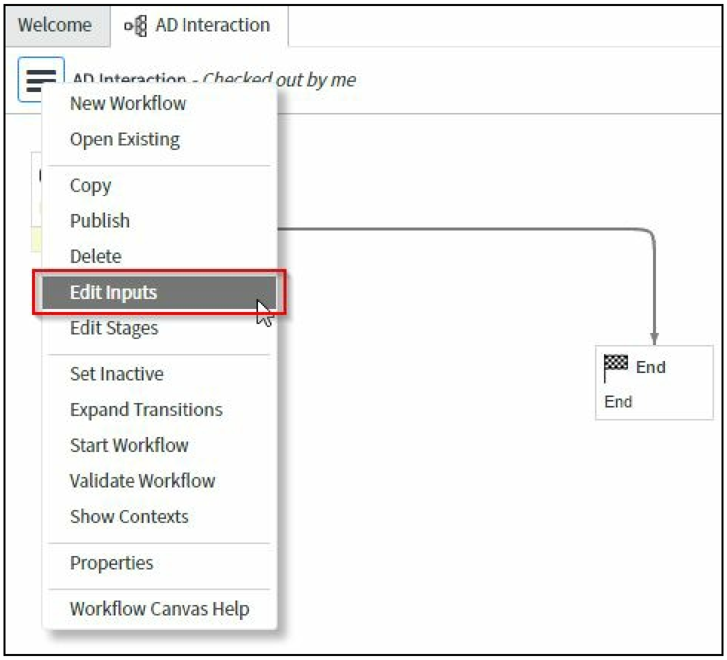
9. After you submit, the workflow editor opens up with the required workflow to be created with the basic steps.



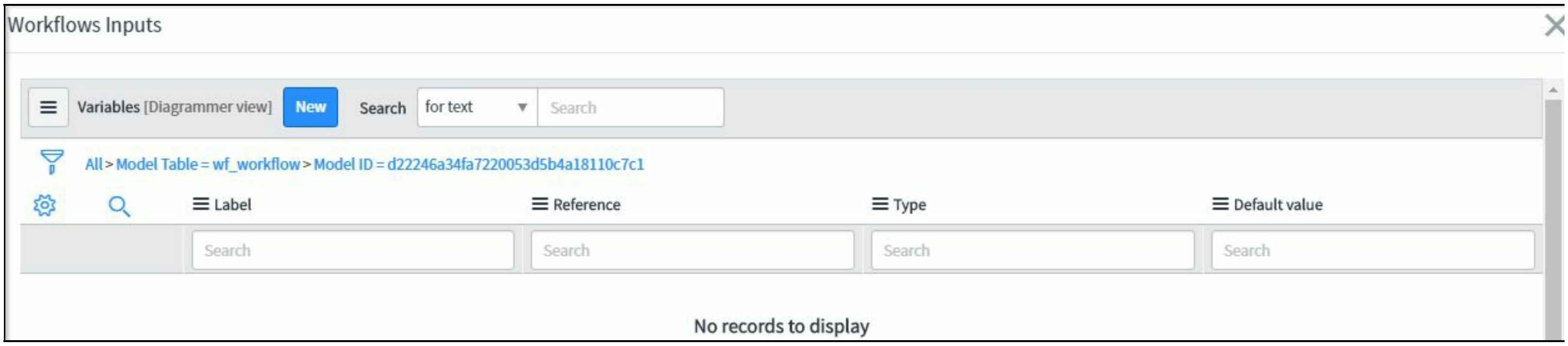
Now click on the icon next to the name of the workflow.



10. Now click on the Edit Inputs from the menu.



11. Clicking on the Edit Inputs will open up a window that will pop up to enter the required variables.


Workflows Inputs

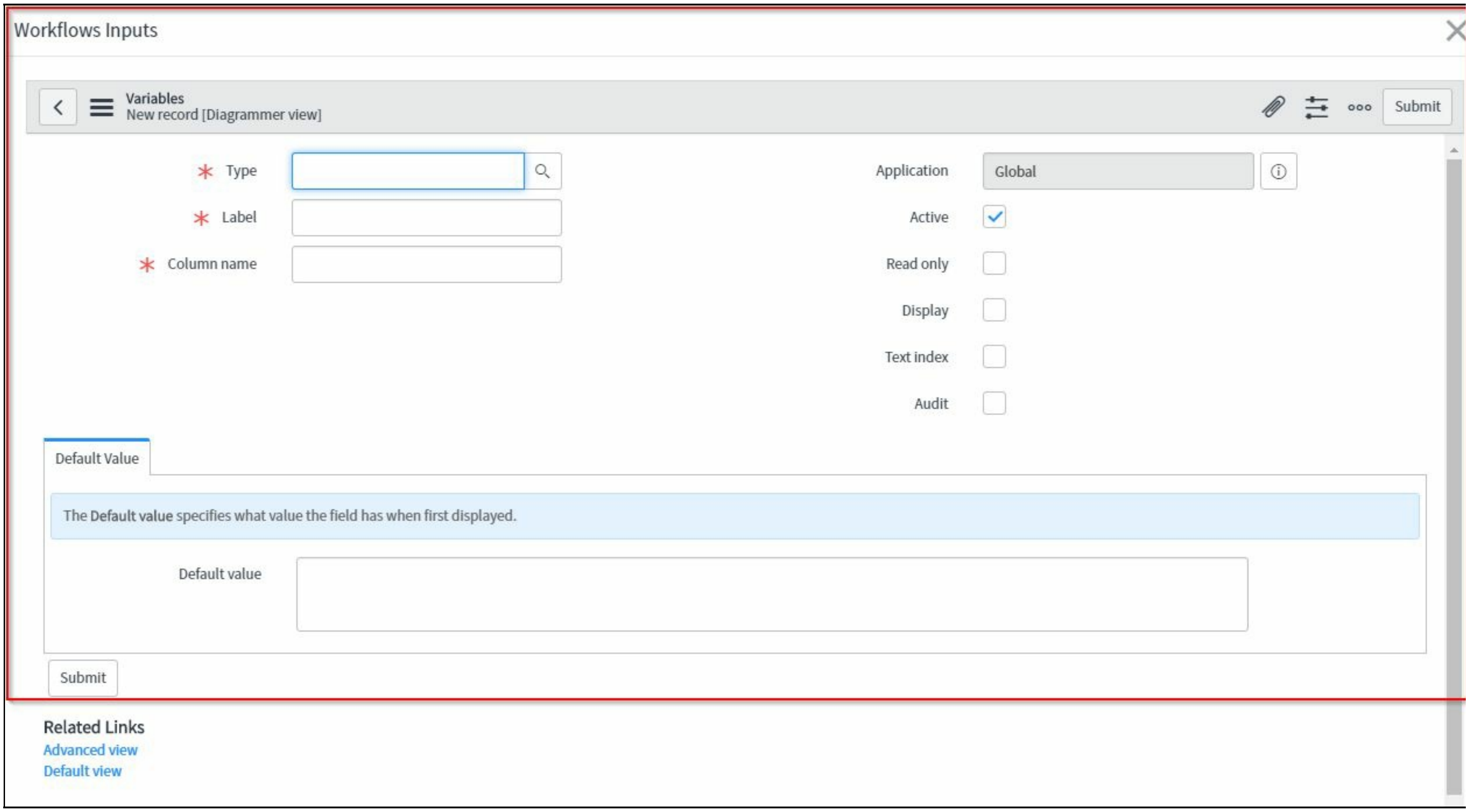
Variables [Diagrammer view] New Search for text Search

All > Model Table = wf_workflow > Model ID = d22246a34fa7220053d5b4a18110c7c1

Label	Reference	Type	Default value
Search	Search	Search	Search

No records to display

A window appears as follows:


Workflows Inputs

Variables
New record [Diagrammer view]

* Type

* Label

* Column name

Application: Global

Active ☑

Read only □

Display □

Text index □

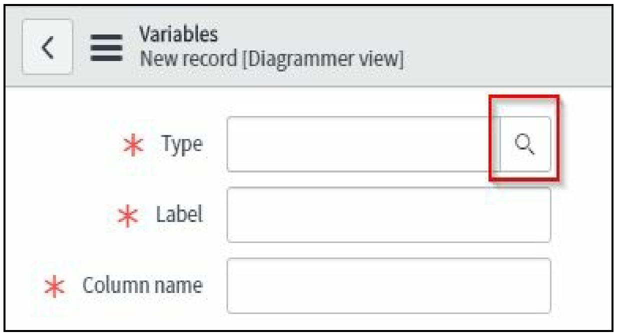
Audit □

Default Value

The Default value specifies what value the field has when first displayed.

Default value

12. Now let's enter the variables; click on the magnifying glass icon next to the type field.

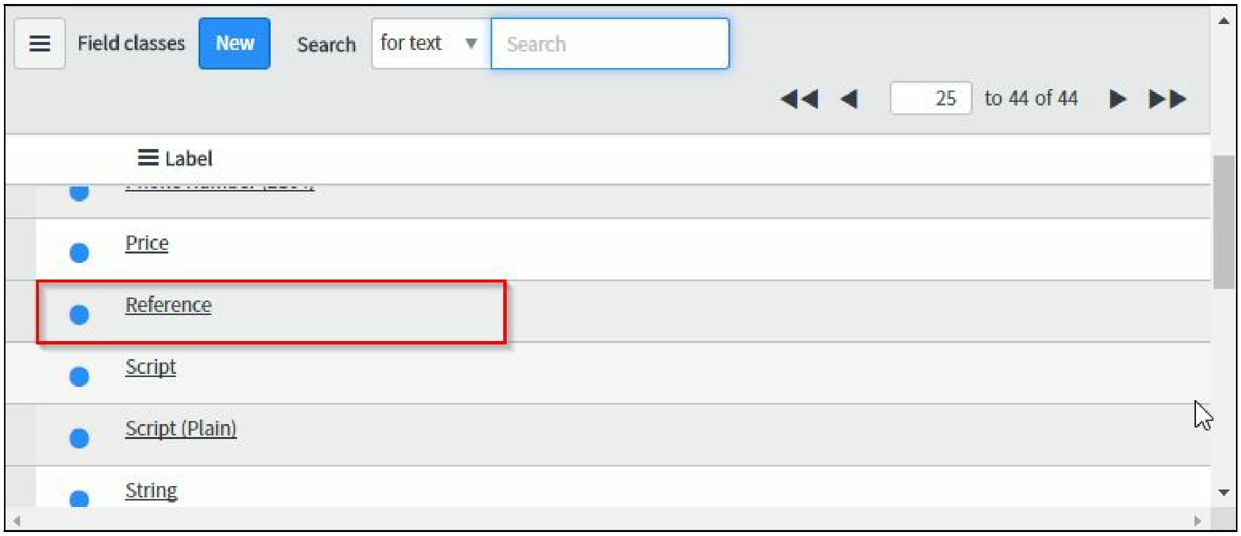

Variables
New record [Diagrammer view]

* Type

* Label

* Column name

Clicking on the magnifying glass opens up a popup window to open the list of variable types; from the list of variable types, select Reference variable.

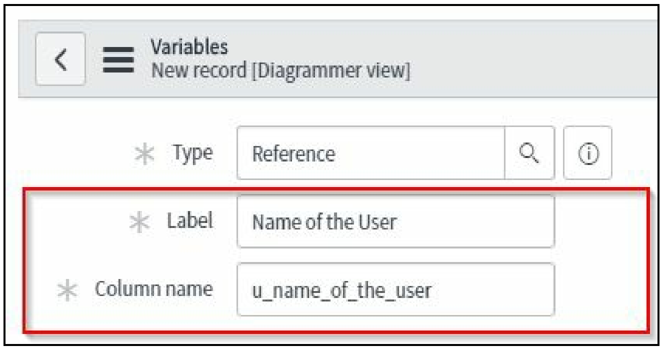


Label
Price
Reference
Script
Script (Plain)
String

13. Now type in the label and column as in the following; these are examples and you can provide any label you require.
    - Label: `Name of the User`

    Usually the column name gets auto populated automatically; the column name can be overridden with what you need it to be.

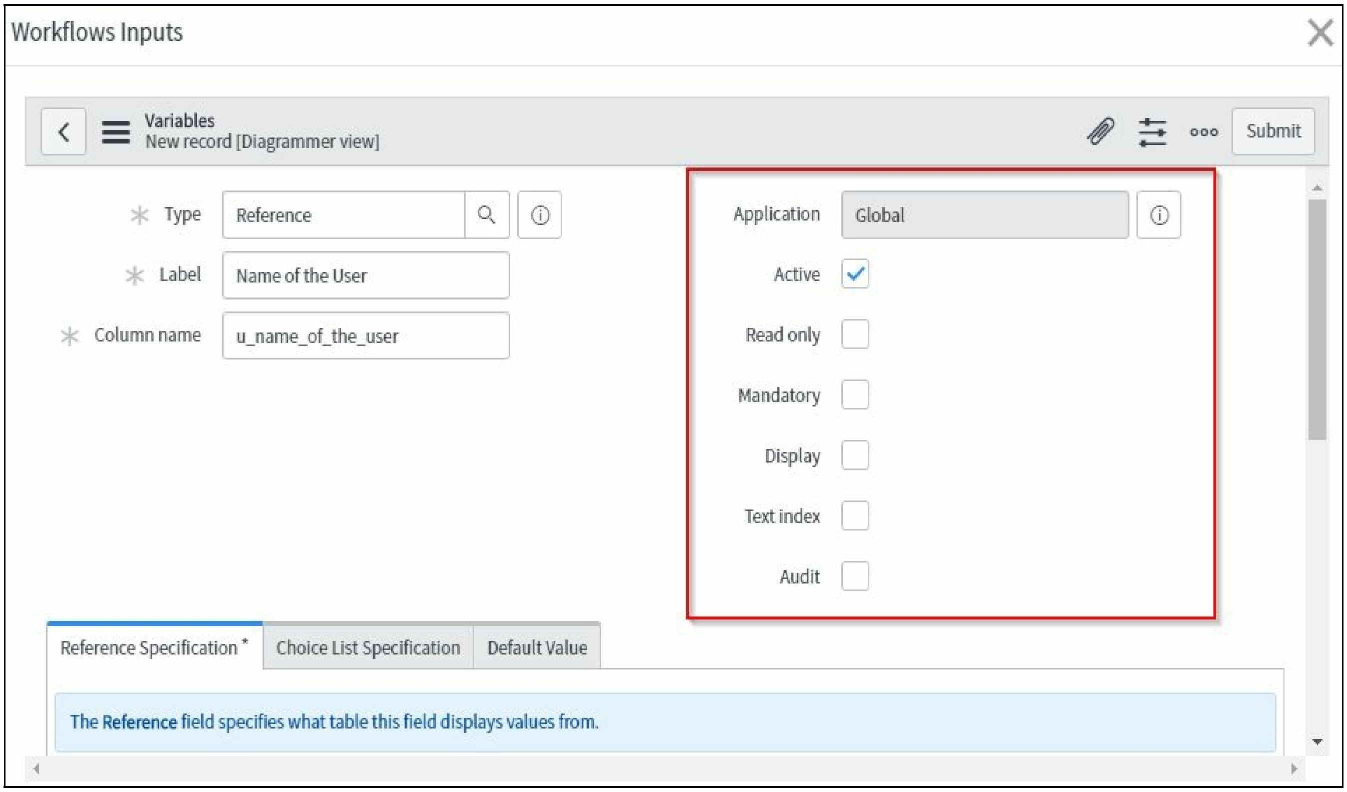
    - Column name: `u_name_of_the_user`



Variables
New record [Diagrammer view]

* Type: Reference
* Label: Name of the User
* Column name: u_name_of_the_user

There are additional attributes that can be set for the workflow inputs which are highlighted as following:



Workflows Inputs

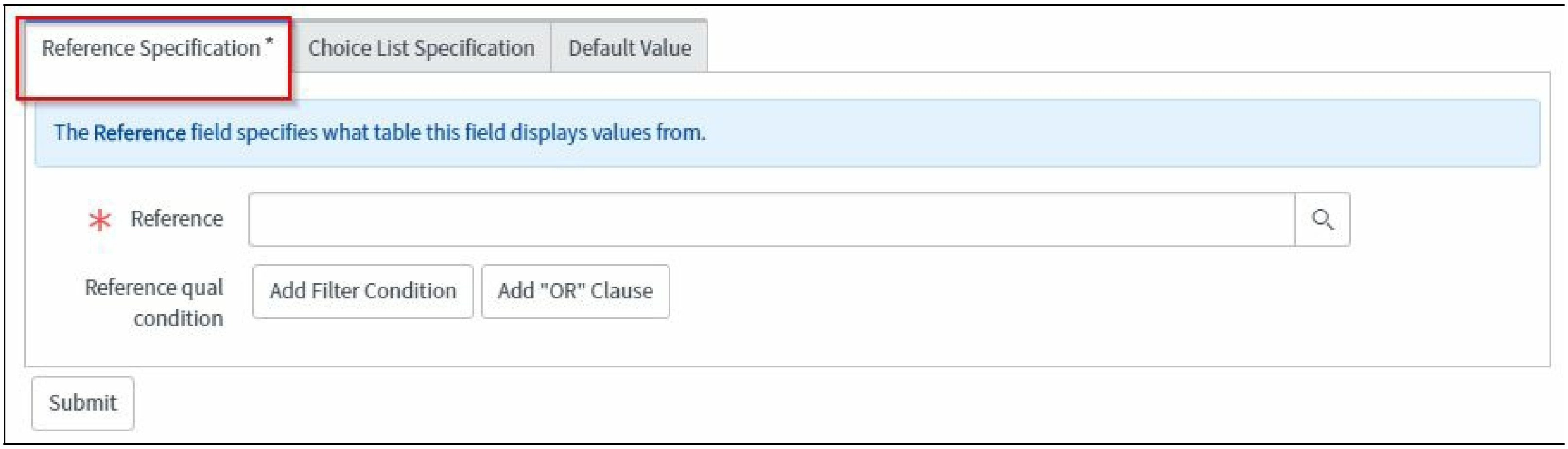
Variables
New record [Diagrammer view]

* Type: Reference
* Label: Name of the User
* Column name: u_name_of_the_user

Application: Global
Active ☑
Read only □
Mandatory □
Display □
Text index □
Audit □

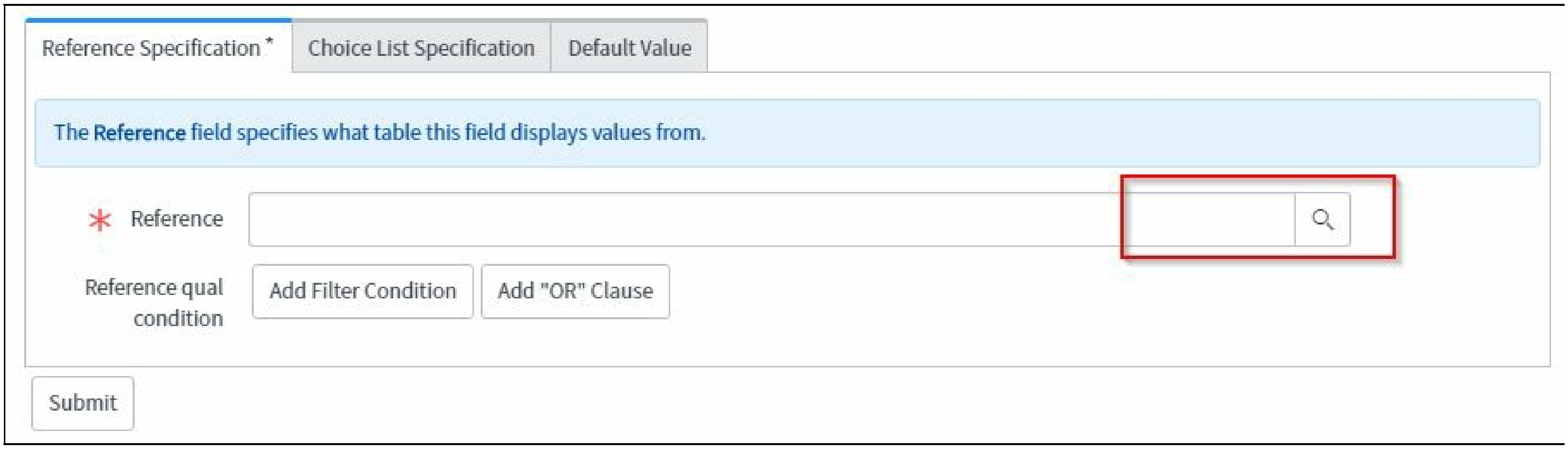
The Reference field specifies what table this field displays values from.

14. At the bottom of the window, you will find a tab called Reference Specification; click on the Reference Specification tab.



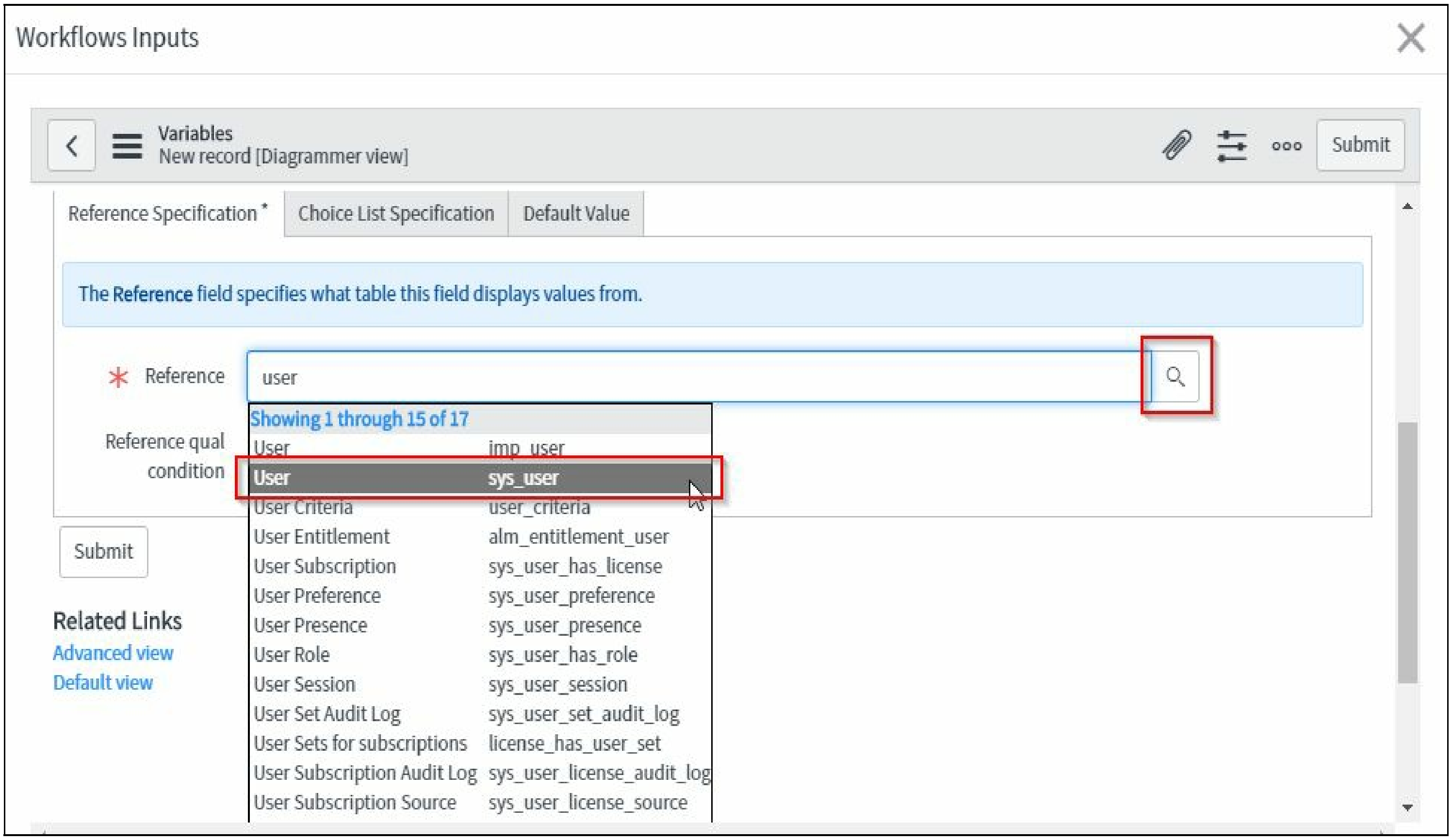
The Reference field specifies what table this field displays values from.

15. Now complete the required mandatory field which is the Reference field. Click on the magnifying glass icon next to the Reference field.



The Reference field specifies what table this field displays values from.

A pop-up window will open up with the list of reference values; select User and click Submit.



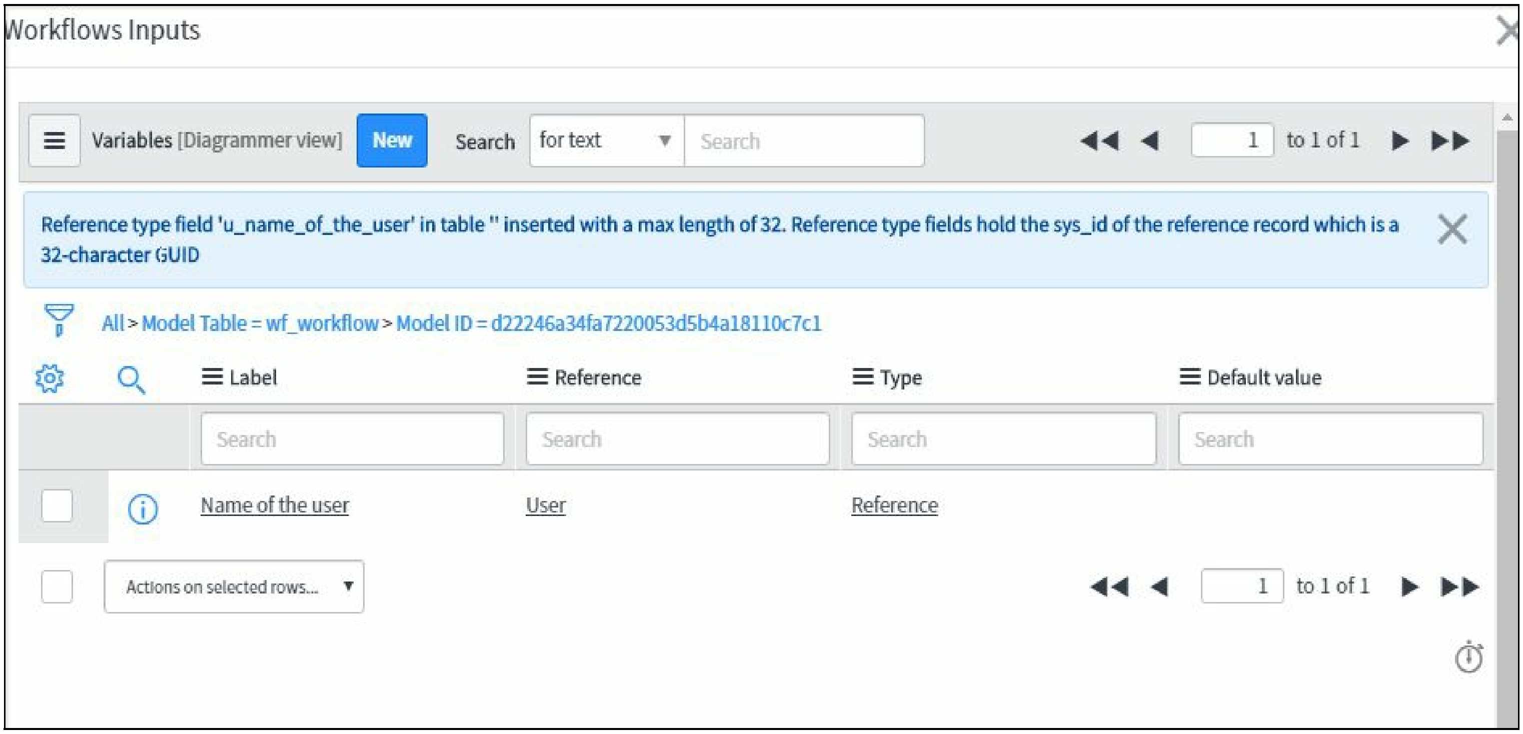
The Reference field specifies what table this field displays values from.

Reference: user

Showing 1 through 15 of 17

User	imp_user
User	sys_user
User Criteria	user_criteria
User Entitlement	alm_entitlement_user
User Subscription	sys_user_has_license
User Preference	sys_user_preference
User Presence	sys_user_presence
User Role	sys_user_has_role
User Session	sys_user_session
User Set Audit Log	sys_user_set_audit_log
User Sets for subscriptions	license_has_user_set
User Subscription Audit Log	sys_user_license_audit_log
User Subscription Source	sys_user_license_source

You will get a confirmation after you submit as shown in the following:

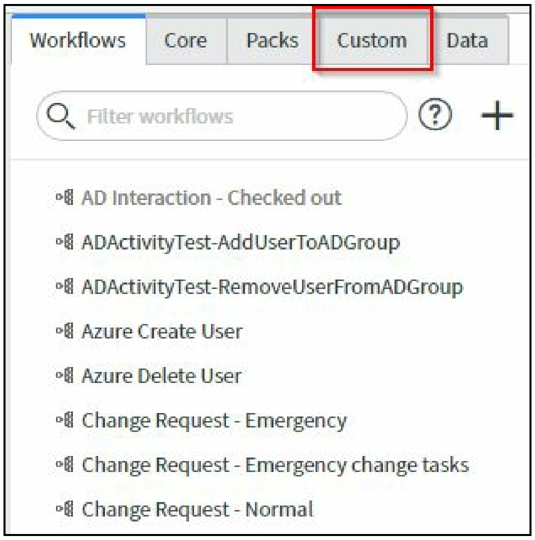


Reference type field 'u_name_of_the_user' in table '' inserted with a max length of 32. Reference type fields hold the sys_id of the reference record which is a 32-character GUID

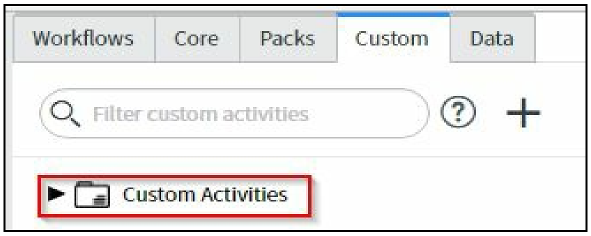
All > Model Table = wf_workflow > Model ID = d22246a34fa7220053d5b4a18110c7c1

Label	Reference	Type	Default value
Name of the user	User	Reference	

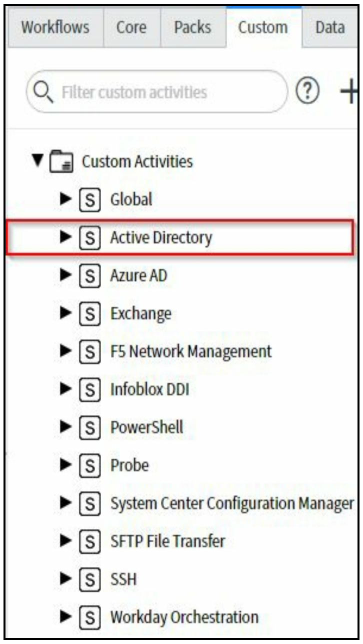
16. Next click on the Custom tab on the left workflow editor window.


Workflows
Core
Packs
Custom
Data
Filter workflows
AD Interaction - Checked out
ADActivityTest-AddUserToADGroup
ADActivityTest-RemoveUserFromADGroup
Azure Create User
Azure Delete User
Change Request - Emergency
Change Request - Emergency change tasks
Change Request - Normal

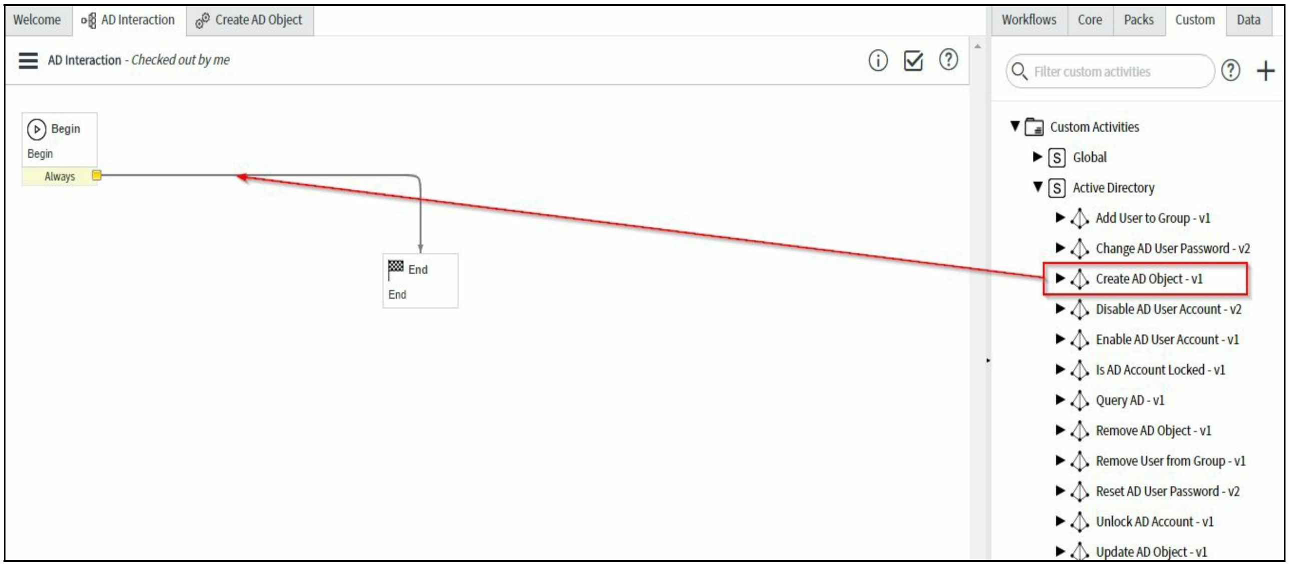
Under the Custom tab, click on Custom Activities which will expand a list of available custom activity packages.



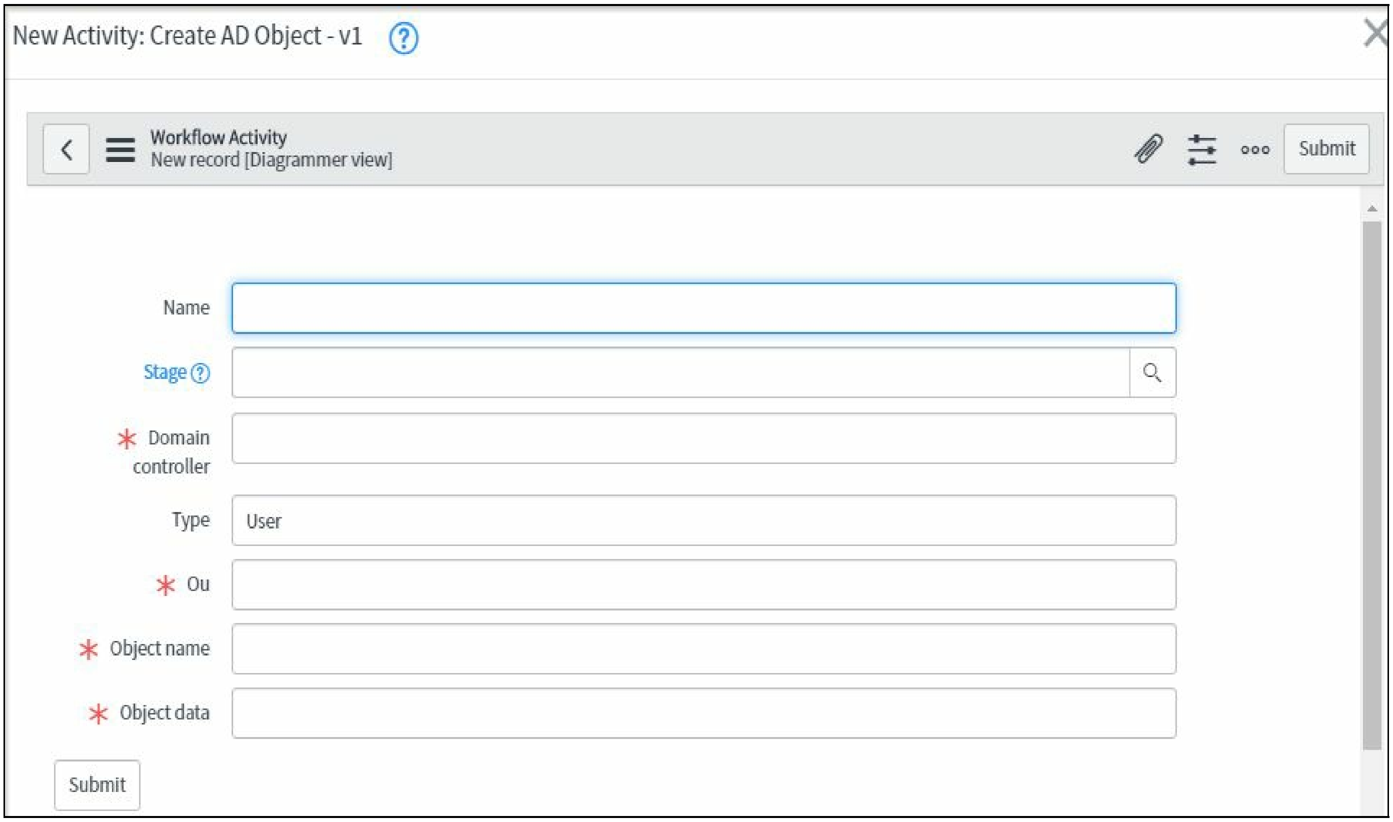
Under Custom Activitities now click on Active Directory activity package.



17. Now drag the Create AD Object and place it between the beginning and end of the workflow. The Create AD Object is needed for the workflow to be able to create an object in the AD.



As soon as you drag and drop the Create AD Object between Begin and End, a small pop up window opens up for you to enter the parameters in the required field.


New Activity: Create AD Object - v1

Workflow Activity
New record [Diagrammer view]

Name

Stage

* Domain controller

Type: User

* Ou

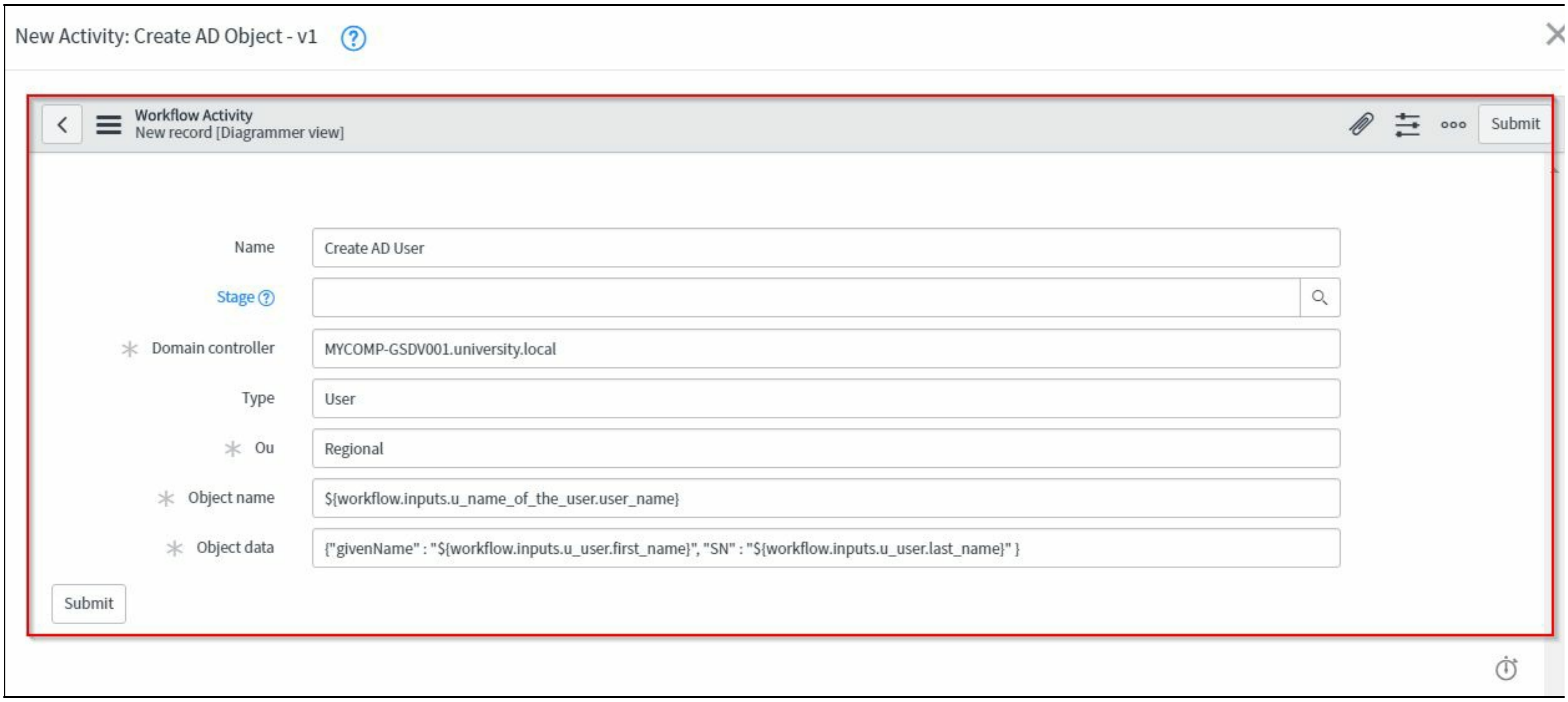
* Object name

* Object data

Fill in the required mandatory fields:

- Name: You can provide any meaningful name, for example--Create AD User**.**

- Domain Controller: You will have this when you do LDAP integration; in this book we will not be covering the LDAP integration side. A domain controller is the one that responds to security authentication requests. Here you will provide the name of the domain controller server. For example--MYCOMP-GSDV001.university.local. This is an example of the domain controller name; this domain controller will not work, so you will need to contact your server or the network administrator for the domain controller for testing purposes, and provide the domain controller here.
- Ou: **Organizational Unit** (**OU**) is a container within the active directory domain which can hold users, groups and computers. You will need to provide the OU where the new user will be created, for example--Regional
- Object name: These come as an input from the user or the actual user name that needs to be created in the active directory. In our example let's give the object name value as ${workflow.inputs.u_name_of_the_user.user_name}.
- Object data: Here you will need to provide the first name and the last name of the user for whom the active directory account is going to be created. Provide the following in the object data field {"givenName" : "${workflow.inputs.u_user.first_name}", "SN" : "${workflow.inputs.u_user.last_name}" }. The 'givenName' and 'SN' are attribute names in AD.



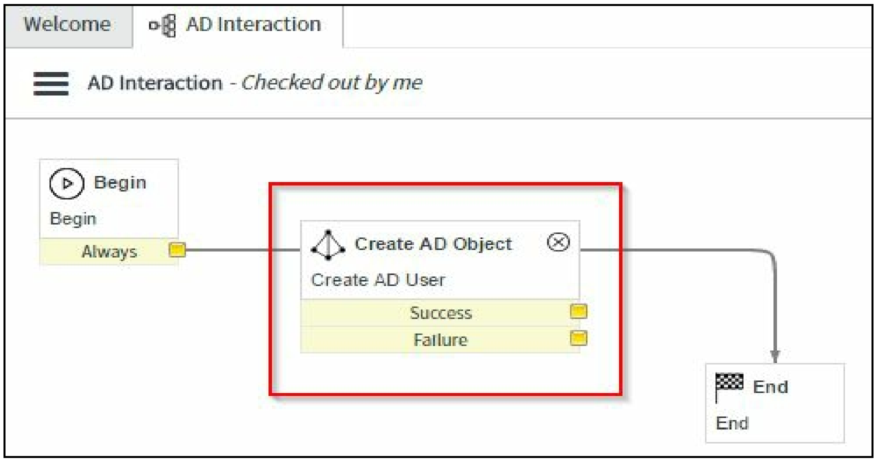
New Activity: Create AD Object - v1

Workflow Activity
New record [Diagrammer view]

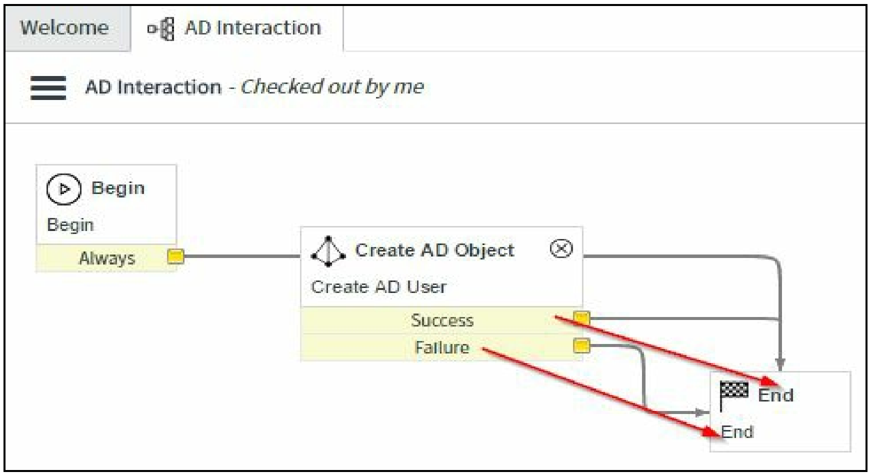
Name	Create AD User
Stage	
* Domain controller	MYCOMP-GSDV001.university.local
Type	User
* Ou	Regional
* Object name	${workflow.inputs.u_name_of_the_user.user_name}
* Object data	{"givenName" : "${workflow.inputs.u_user.first_name}", "SN" : "${workflow.inputs.u_user.last_name}" }

Now click on the Submit button to create the new activity.

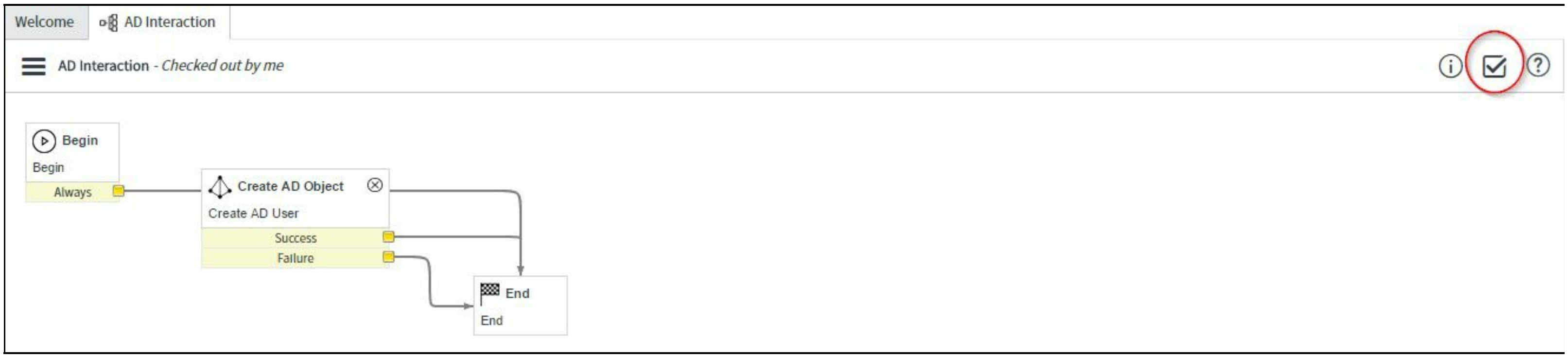
The newly created activity will appear on the workflow editor.



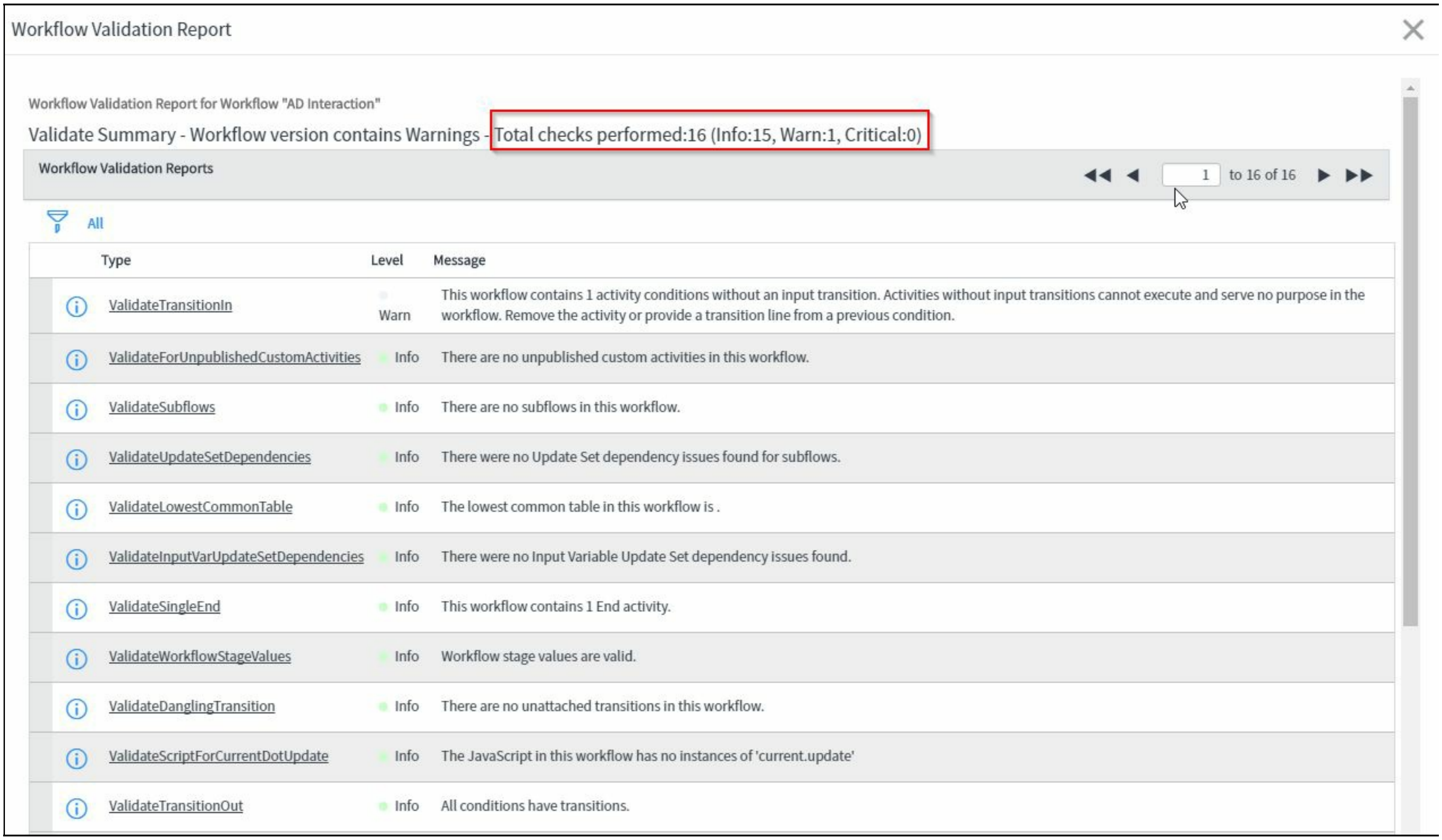
18. Depending on whether the workflow step succeeds or fails, the workflow continues on the success/fail path, and, in our case, we will have them both go to the end state. Now click on the yellow output checkbox of the newly created activity Create AD User; then click and drag the yellow checkbox to join with the End activity box.



19. Now click on the validate icon to check and correct for any issues with the created workflow. The goal is to check and see if the workflow is executing without any errors.



After the workflow is validated you will be able to see all the warnings and issues associated with this workflow.



Workflow Validation Report

Workflow Validation Report for Workflow "AD Interaction"

Validate Summary - Workflow version contains Warnings - Total checks performed:16 (Info:15, Warn:1, Critical:0)

Workflow Validation Reports

Type	Level	Message
ValidateTransitionIn	Warn	This workflow contains 1 activity conditions without an input transition. Activities without input transitions cannot execute and serve no purpose in the workflow. Remove the activity or provide a transition line from a previous condition.
ValidateForUnpublishedCustomActivities	Info	There are no unpublished custom activities in this workflow.
ValidateSubflows	Info	There are no subflows in this workflow.
ValidateUpdateSetDependencies	Info	There were no Update Set dependency issues found for subflows.
ValidateLowestCommonTable	Info	The lowest common table in this workflow is .
ValidateInputVarUpdateSetDependencies	Info	There were no Input Variable Update Set dependency issues found.
ValidateSingleEnd	Info	This workflow contains 1 End activity.
ValidateWorkflowStageValues	Info	Workflow stage values are valid.
ValidateDanglingTransition	Info	There are no unattached transitions in this workflow.
ValidateScriptForCurrentDotUpdate	Info	The JavaScript in this workflow has no instances of 'current.update'
ValidateTransitionOut	Info	All conditions have transitions.

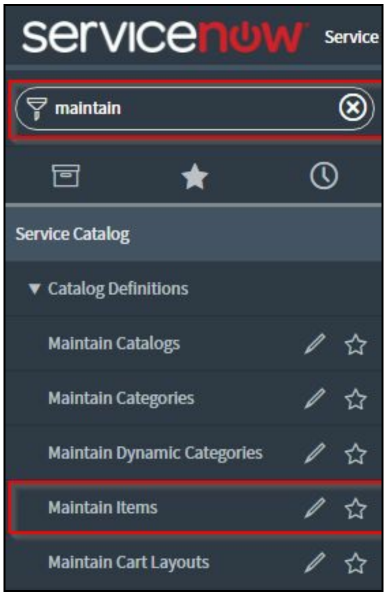
This shows that you have configured a basic Orchestration workflow to create an active directory user. Its scope can be expanded to check if an active directory user exists before creating the user, and also update the user instead of creating and failing.

Now that we have created the Orchestration workflow, we will need to attach the workflow where required.

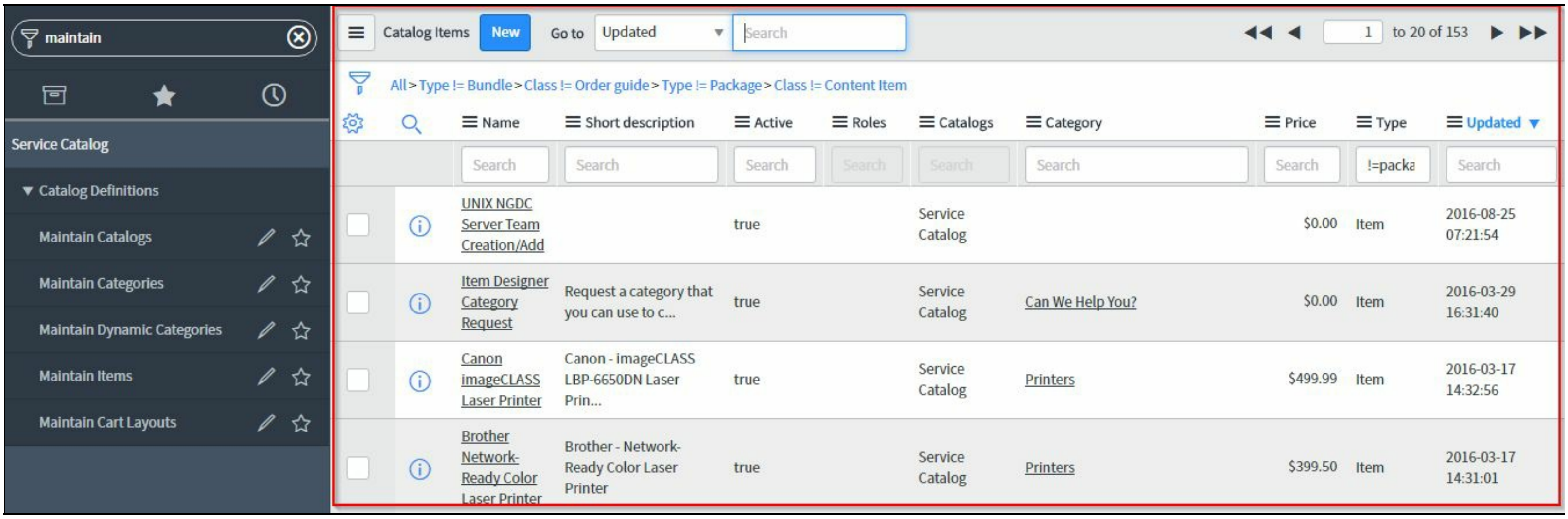
Creating a service catalog using Orchestration workflow

Let's see how to create a simple service catalog and attach the newly created Orchestration workflow to create an active directory user.

1. Search and click on Maintain Items from the application navigator link.



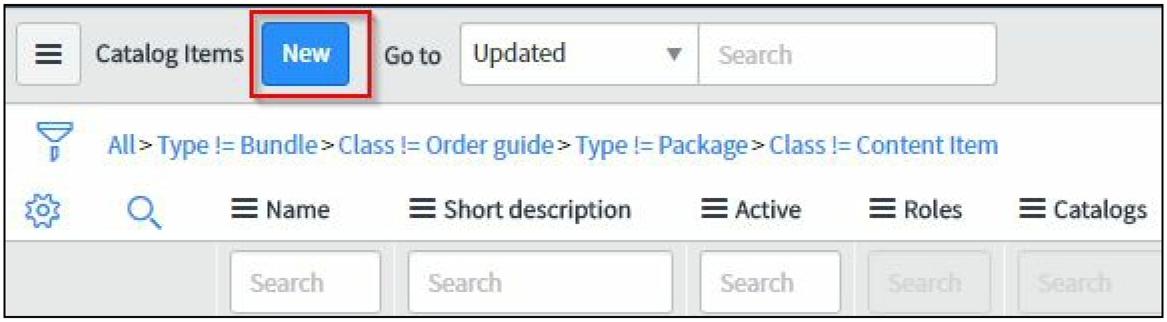
This will open up a list of all the catalog items in the content pane as shown in the following:



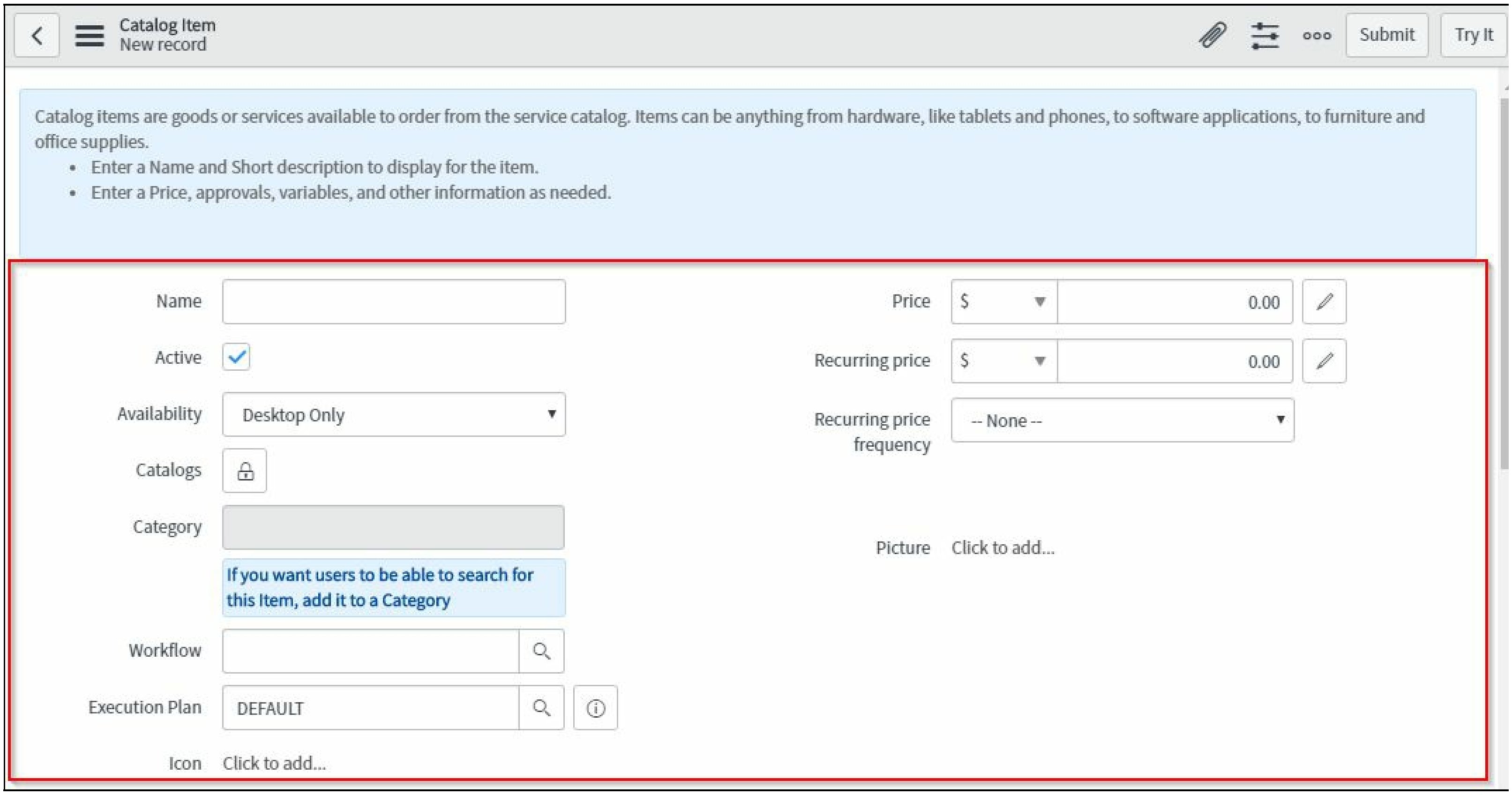
All > Type != Bundle > Class != Order guide > Type != Package > Class != Content Item

Name	Short description	Active	Roles	Catalogs	Category	Price	Type	Updated
Search	Search	Search	Search	Search	Search	Search	!=packa	Search
UNIX NGDC Server Team Creation/Add		true		Service Catalog		$0.00	Item	2016-08-25 07:21:54
Item Designer Category Request	Request a category that you can use to c...	true		Service Catalog	Can We Help You?	$0.00	Item	2016-03-29 16:31:40
Canon imageCLASS Laser Printer	Canon - imageCLASS LBP-6650DN Laser Prin...	true		Service Catalog	Printers	$499.99	Item	2016-03-17 14:32:56
Brother Network-Ready Color Laser Printer	Brother - Network-Ready Color Laser Printer	true		Service Catalog	Printers	$399.50	Item	2016-03-17 14:31:01

2. Click on the New button to create a new catalog item.



A new catalog form will be created.

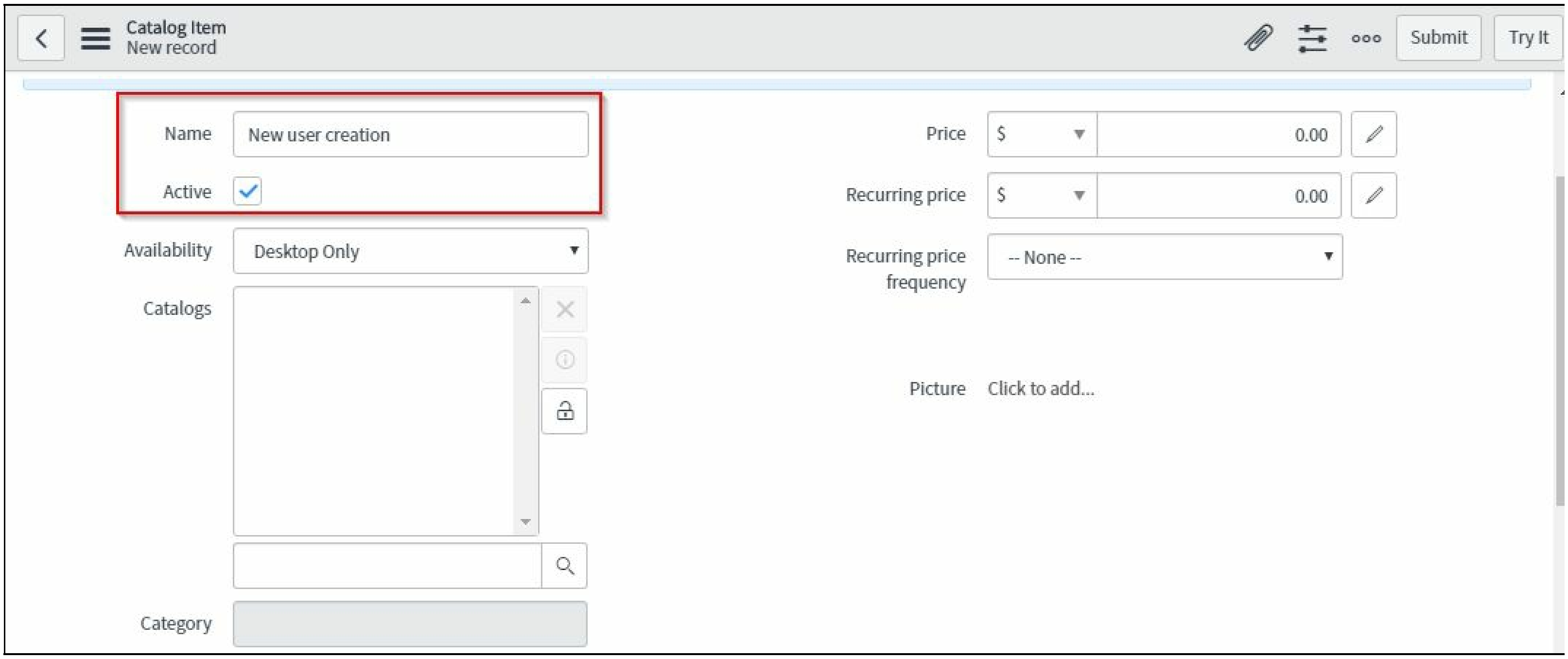


Catalog items are goods or services available to order from the service catalog. Items can be anything from hardware, like tablets and phones, to software applications, to furniture and office supplies.

- Enter a Name and Short description to display for the item.
- Enter a Price, approvals, variables, and other information as needed.

Name		Price	$ 0.00
Active	☑	Recurring price	$ 0.00
Availability	Desktop Only	Recurring price frequency	-- None --
Catalogs			
Category		Picture	Click to add...
	If you want users to be able to search for this Item, add it to a Category		
Workflow			
Execution Plan	DEFAULT		
Icon	Click to add...		

3. Fill in the new catalog item creation form. We can use the following example:
    - Name: New user creation
    - Active: Checked



Catalog Item
New record

Name: New user creation

Active ☑

Availability: Desktop Only

Catalogs

Category

Price: $ 0.00

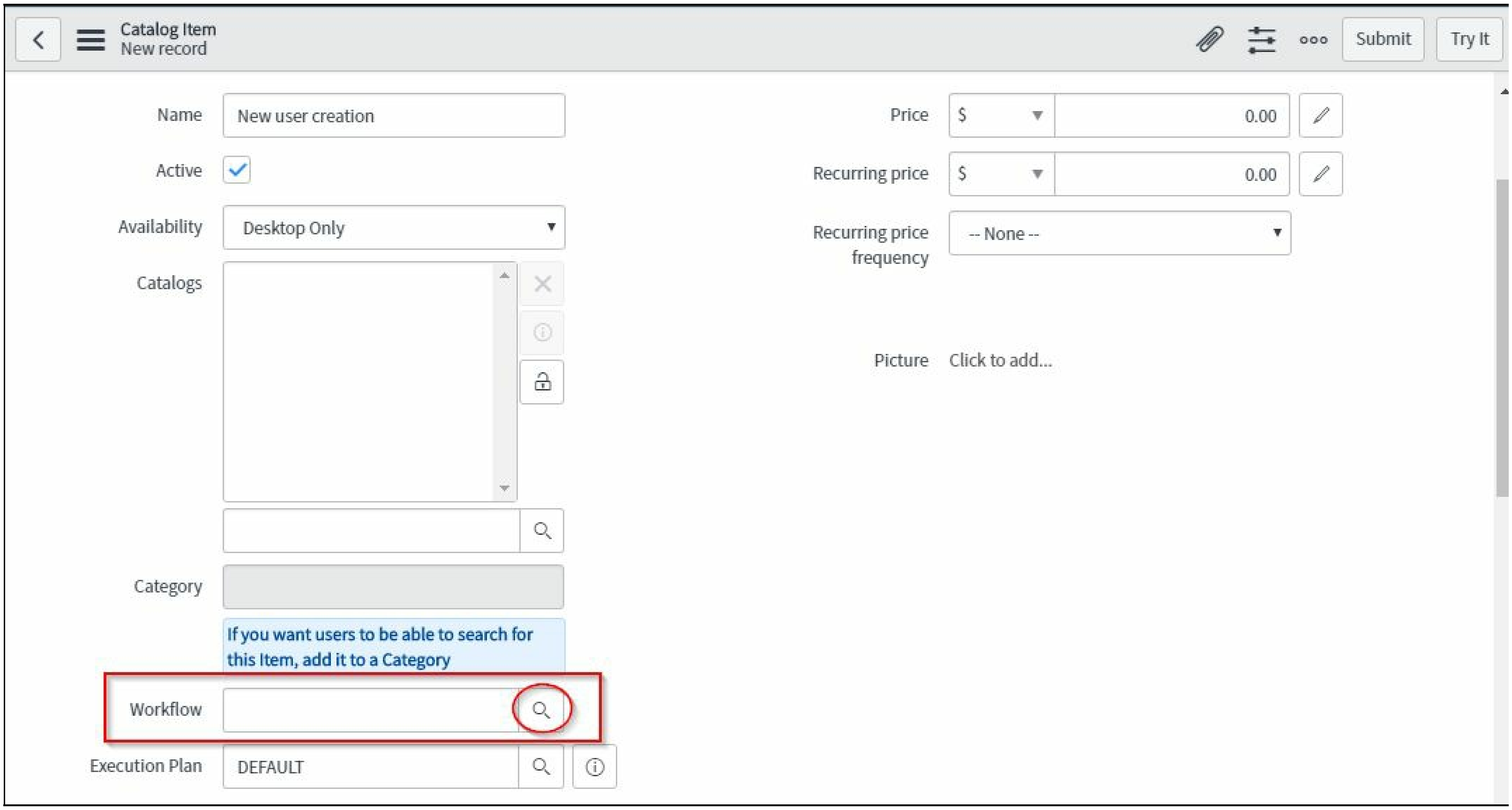
Recurring price: $ 0.00

Recurring price frequency: -- None --

Picture: Click to add...

You can enter other information as required. Now let's see how to attach the workflow to the catalog item.

4. On the workflow field, click on the magnifying glass icon.



Catalog Item
New record

Name: New user creation

Active ☑

Availability: Desktop Only

Catalogs

Category

If you want users to be able to search for this Item, add it to a Category

Workflow

Execution Plan: DEFAULT

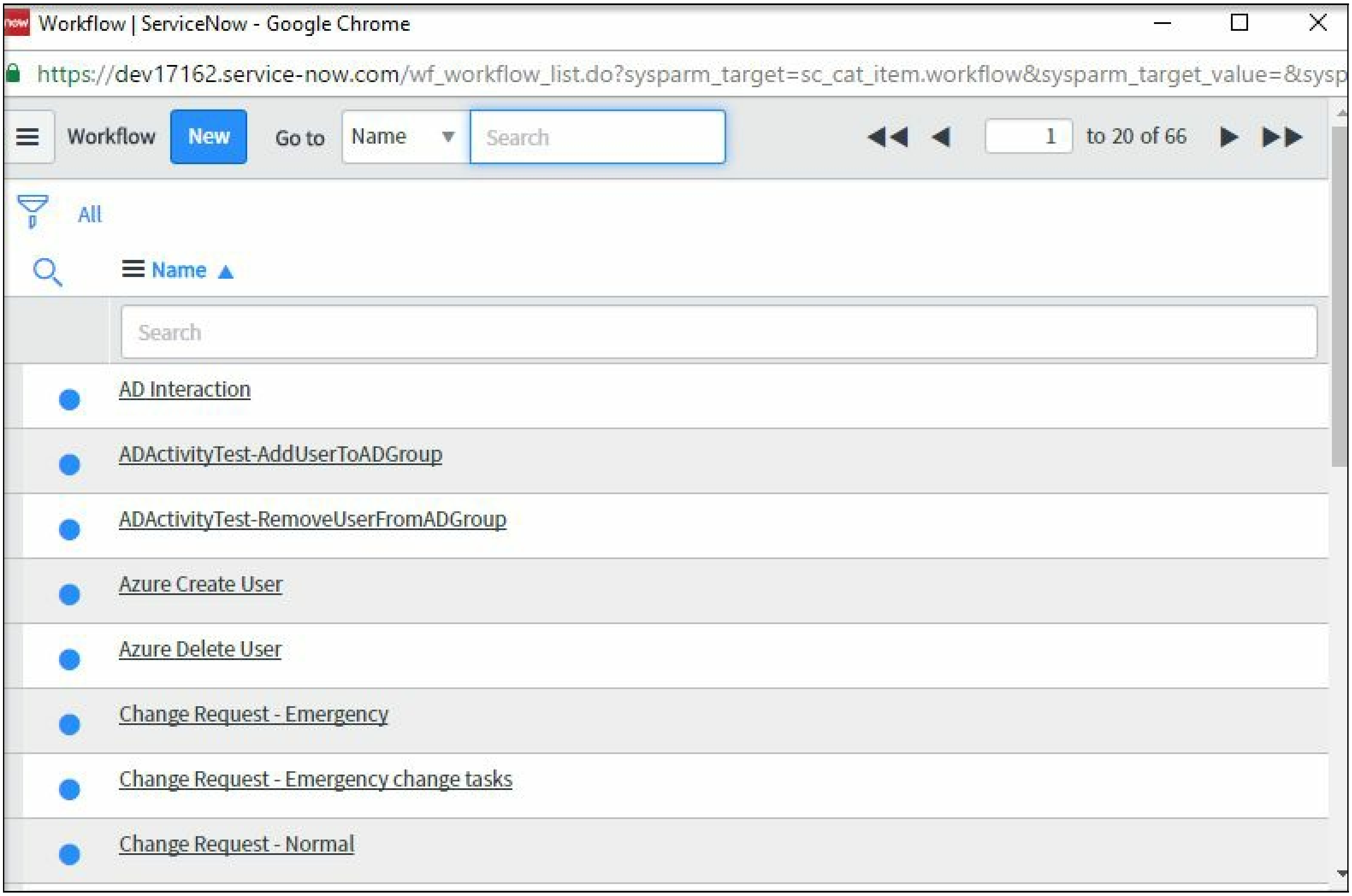
Price: $ 0.00

Recurring price: $ 0.00

Recurring price frequency: -- None --

Picture: Click to add...

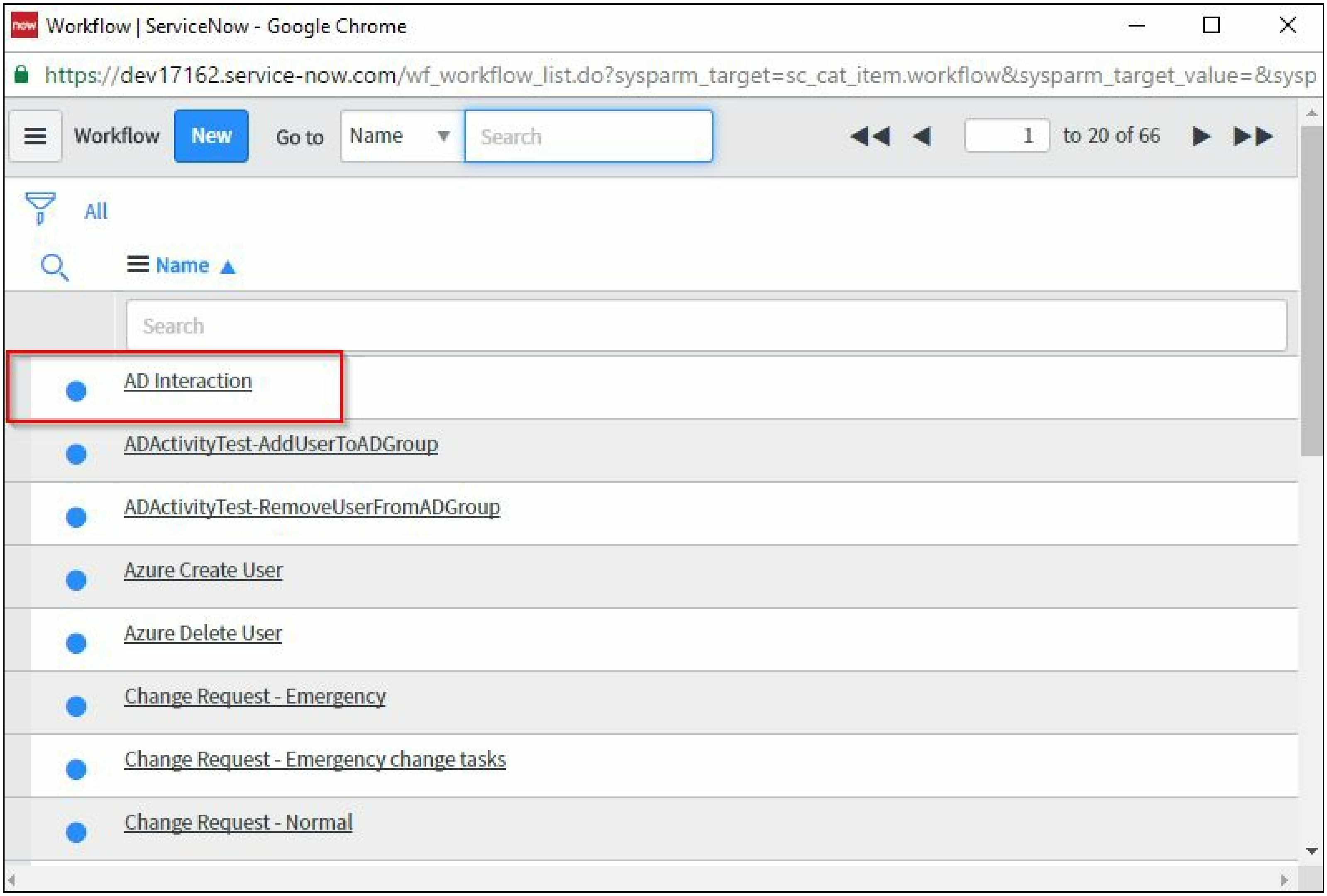
5. Clicking on the magnifying glass will bring up a list of available workflows.



https://dev17162.service-now.com/wf_workflow_list.do?sysparm_target=sc_cat_item.workflow&sysparm_target_value=&sysp

	Name ▲
●	AD Interaction
●	ADActivityTest-AddUserToADGroup
●	ADActivityTest-RemoveUserFromADGroup
●	Azure Create User
●	Azure Delete User
●	Change Request - Emergency
●	Change Request - Emergency change tasks
●	Change Request - Normal

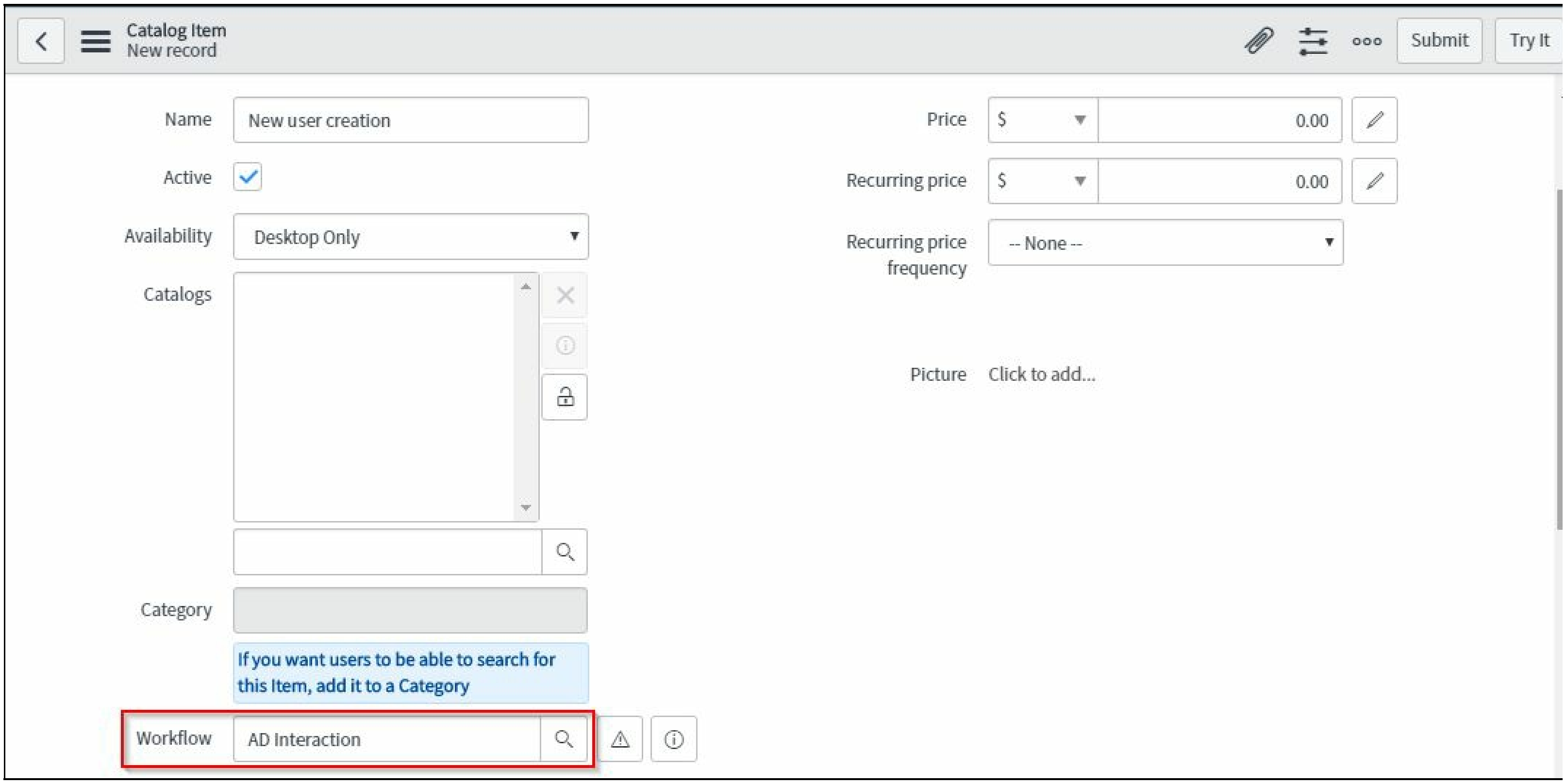
6. Now select the Orchestration workflow that we had newly created called AD Interaction.



https://dev17162.service-now.com/wf_workflow_list.do?sysparm_target=sc_cat_item.workflow&sysparm_target_value=&sysp

- AD Interaction
- ADActivityTest-AddUserToADGroup
- ADActivityTest-RemoveUserFromADGroup
- Azure Create User
- Azure Delete User
- Change Request - Emergency
- Change Request - Emergency change tasks
- Change Request - Normal

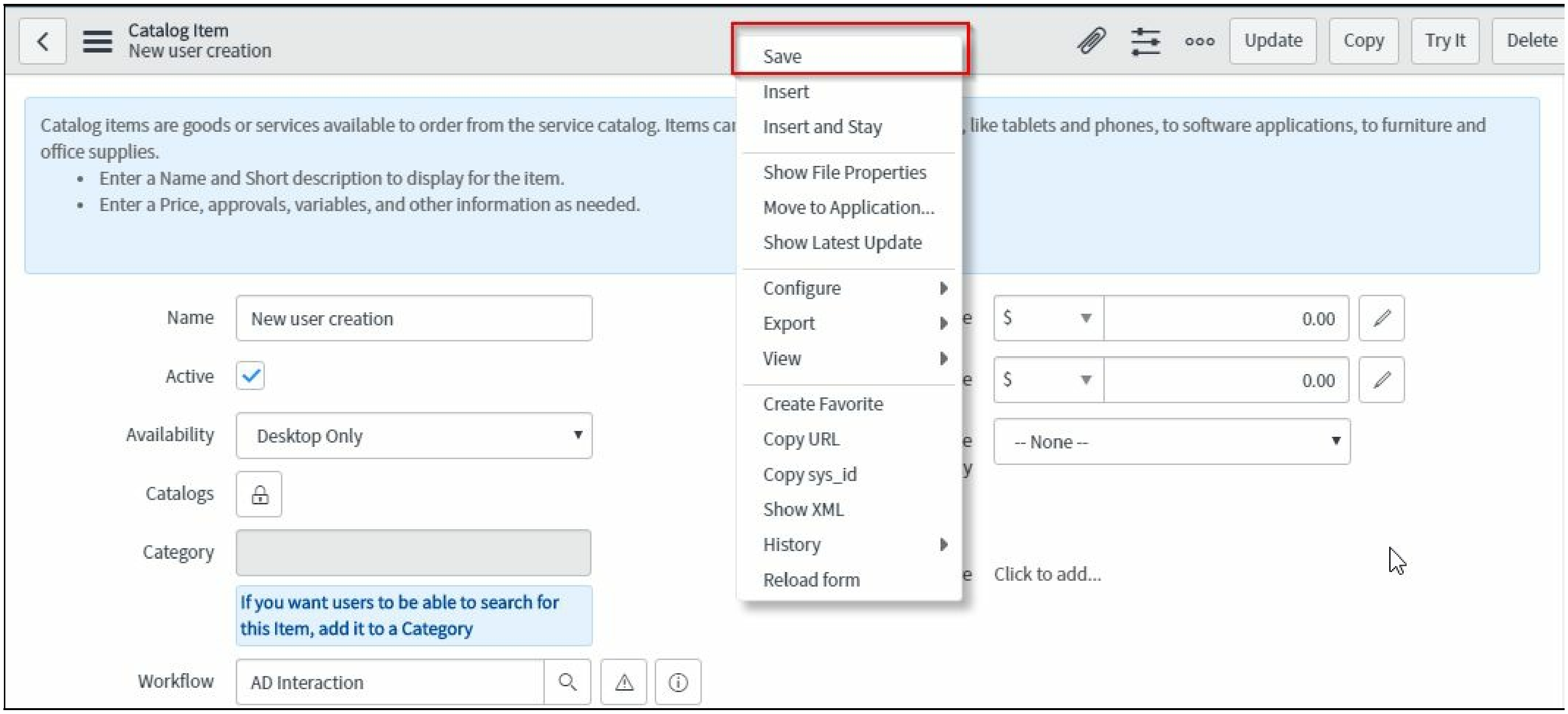
7. By selecting AD Interaction you will be able to attach the AD Interaction Orchestration workflow to the catalog item.



Name	New user creation	Price	$ 0.00
Active	☑	Recurring price	$ 0.00
Availability	Desktop Only	Recurring price frequency	-- None --
Category			
Workflow	AD Interaction		

If you want users to be able to search for this Item, add it to a Category

Now right-click on the header and clickSave.



Catalog items are goods or services available to order from the service catalog. Items car , like tablets and phones, to software applications, to furniture and office supplies.

- Enter a Name and Short description to display for the item.
- Enter a Price, approvals, variables, and other information as needed.

Name: New user creation

Active: ☑

Availability: Desktop Only

Catalogs

Category

If you want users to be able to search for this Item, add it to a Category

Workflow: AD Interaction

$ 0.00

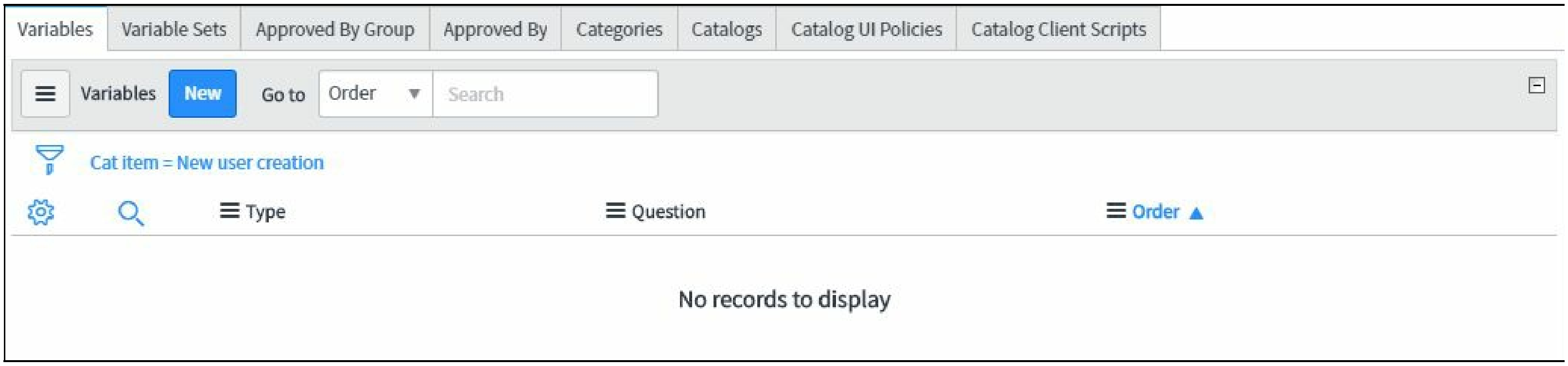
$ 0.00

-- None --

Click to add...

You will find different related lists, and a tab called Variables will appear. Clicking on New, you will be able to create new variables for the catalog item.

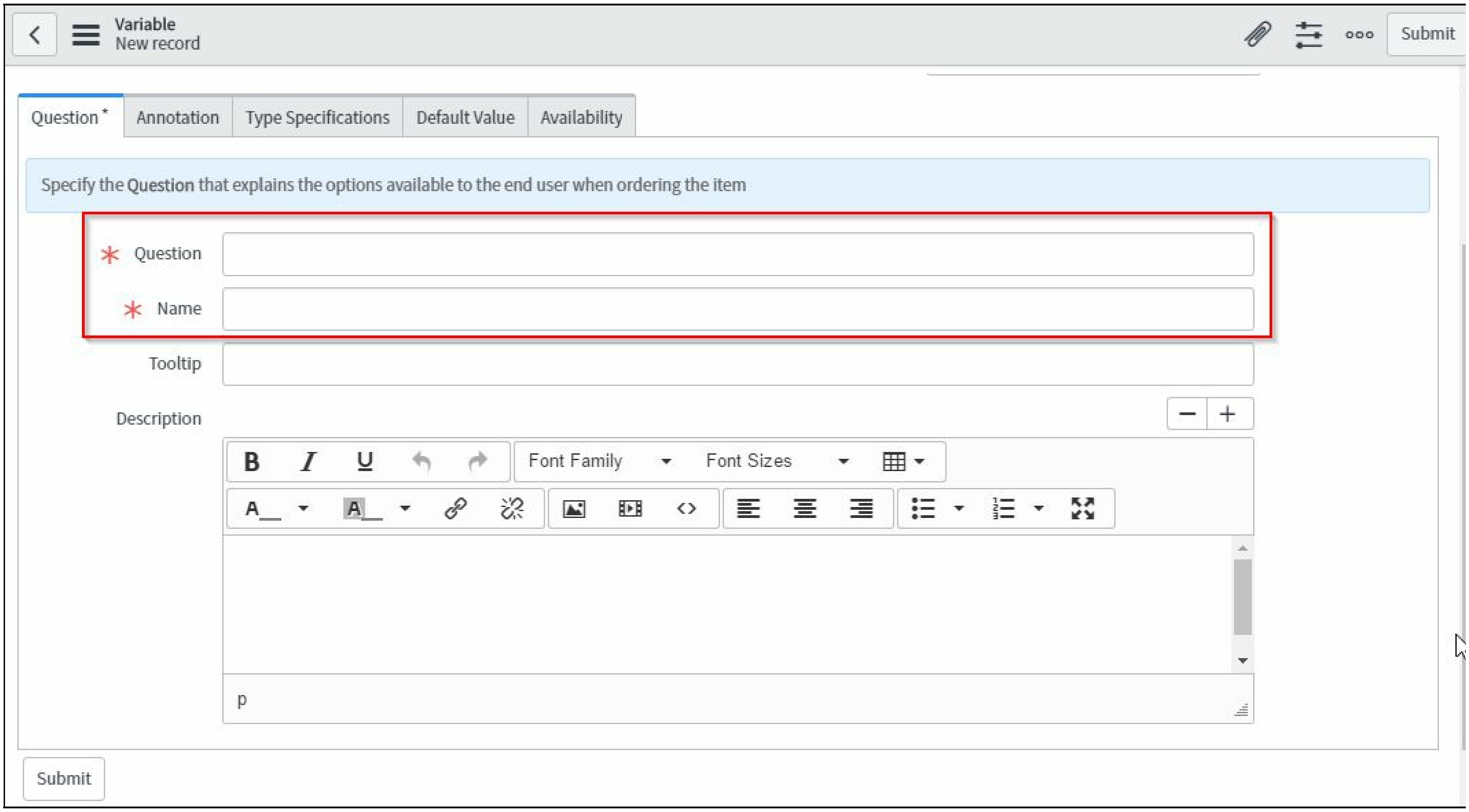
8. Now click on the New button



Cat item = New user creation

No records to display

Now, lets create three variables to request username, first name and last name from the user.

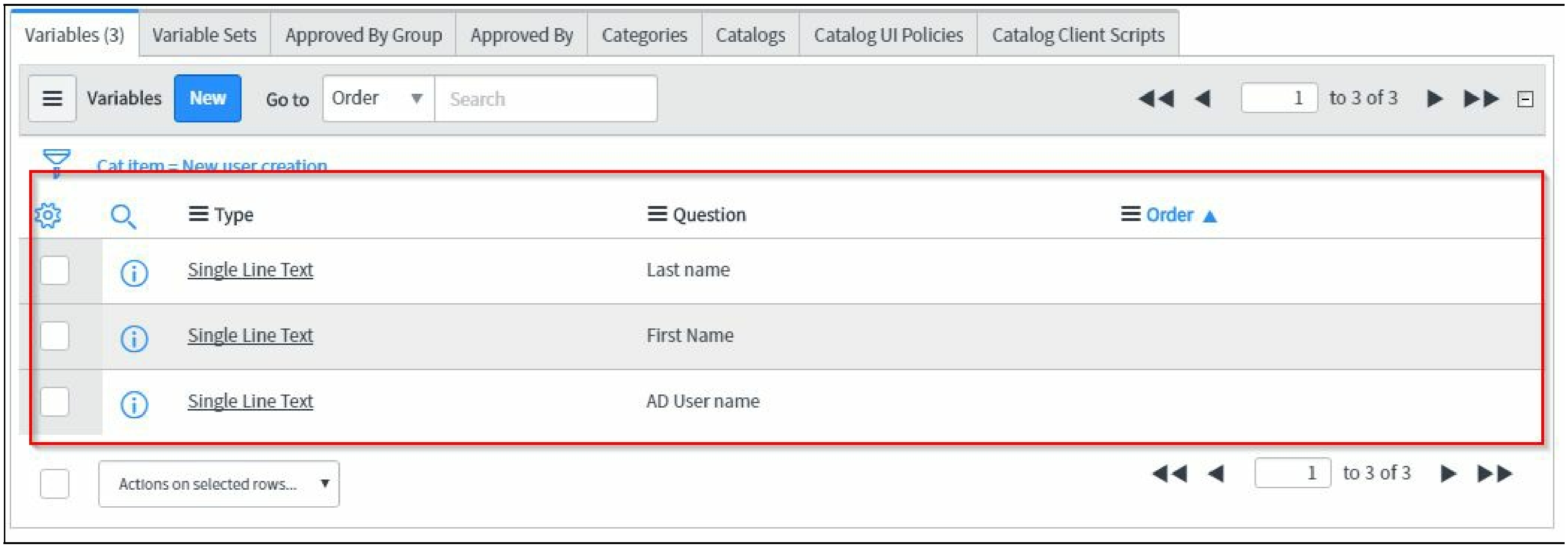


Specify the **Question** that explains the options available to the end user when ordering the item

* Question	
* Name	
Tooltip	
Description	

Create the following variables:

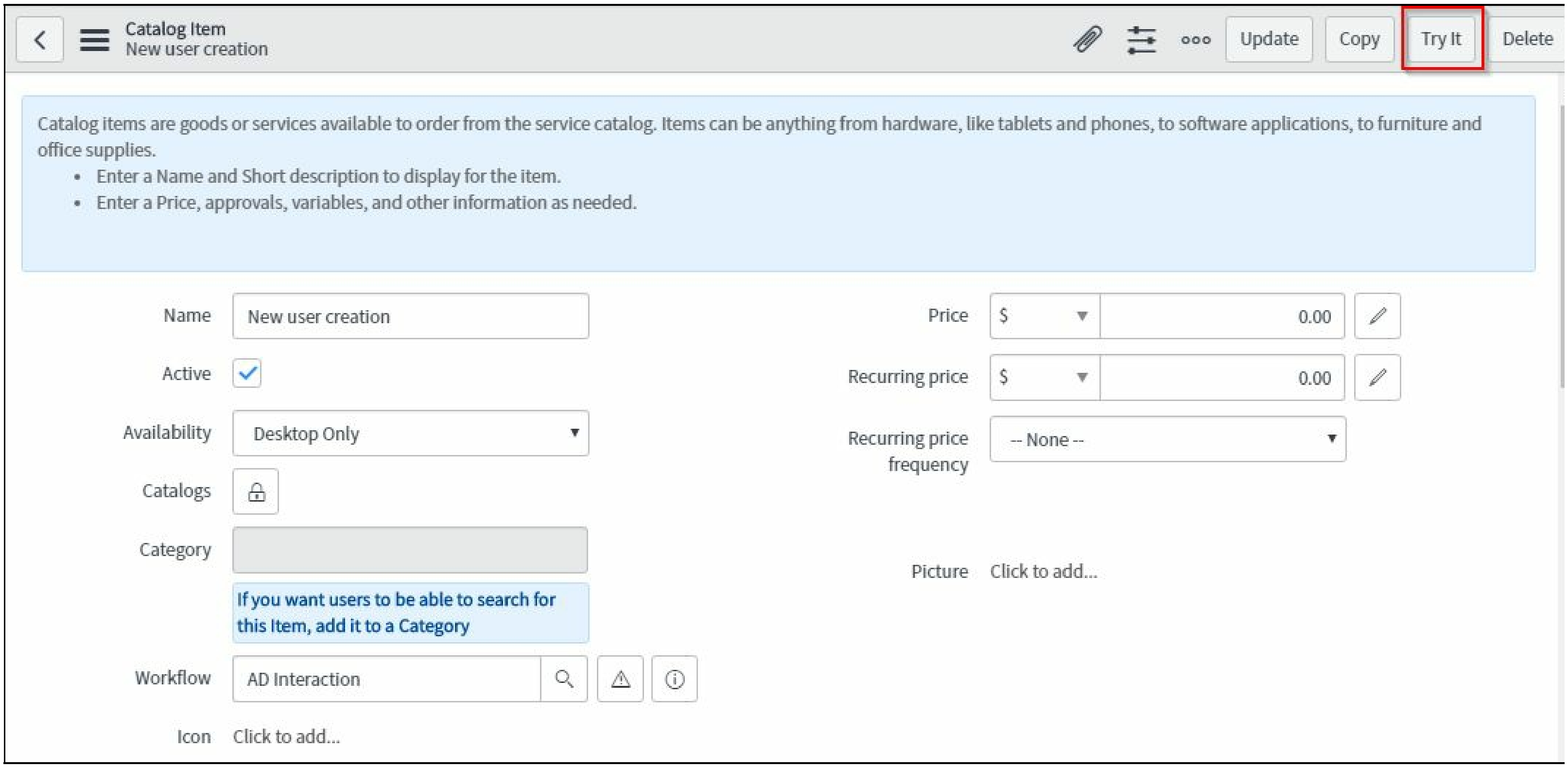
- `user_name`
- `first_name`
- `last_name`



Cat item = New user creation

Type	Question	Order ▲
Single Line Text	Last name	
Single Line Text	First Name	
Single Line Text	AD User name	

9. Click on the Try It button to test the catalog item.



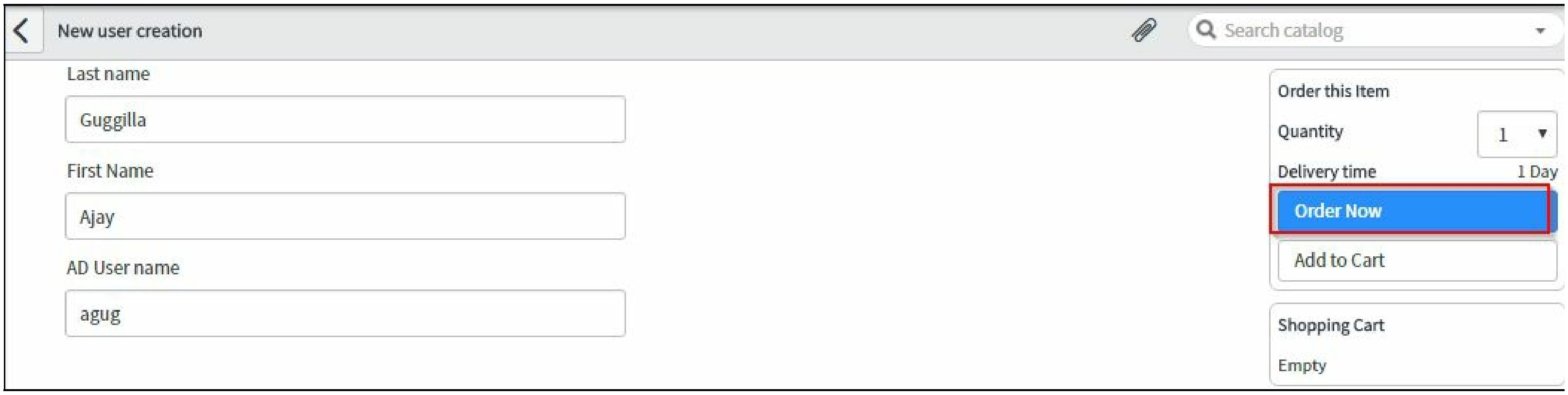
Catalog items are goods or services available to order from the service catalog. Items can be anything from hardware, like tablets and phones, to software applications, to furniture and office supplies.

- Enter a Name and Short description to display for the item.
- Enter a Price, approvals, variables, and other information as needed.

Name	New user creation	Price	$ 0.00
Active	☑	Recurring price	$ 0.00
Availability	Desktop Only	Recurring price frequency	-- None --
Catalogs			
Category	If you want users to be able to search for this Item, add it to a Category	Picture	Click to add...
Workflow	AD Interaction		
Icon	Click to add...		

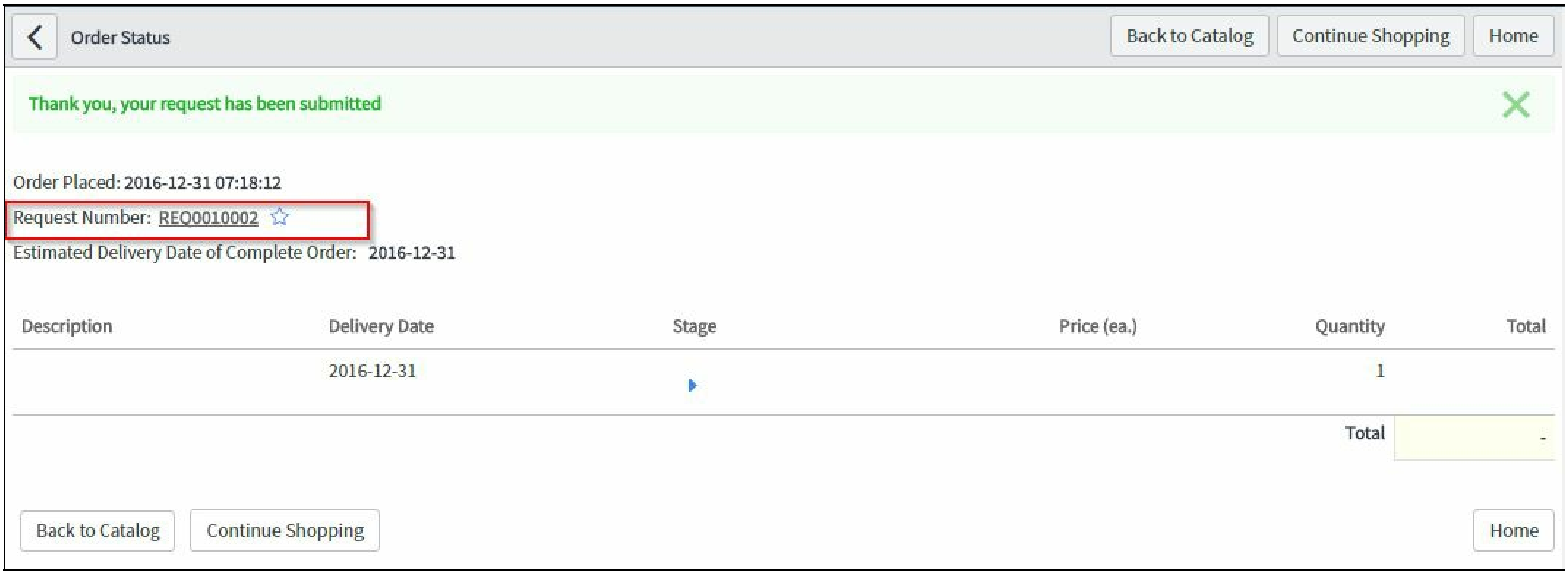
Clicking on the Try It button will open up our newly-created catalog called New user creation.

10. Enter the values on the form and click on Order Now button.



Last name	Guggilla
First Name	Ajay
AD User name	agug
Quantity	1
Delivery time	1 Day

Once you click the Order Now button, you will see a confirmation screen with the request number.



Thank you, your request has been submitted

Order Placed: 2016-12-31 07:18:12
Request Number: REQ0010002
Estimated Delivery Date of Complete Order: 2016-12-31

Description	Delivery Date	Stage	Price (ea.)	Quantity	Total
	2016-12-31	▸		1	
				Total	-

Depending on how you had set the service catalog, the Orchestration flow at this point would have run and created an active directory user, if there was no user already present.

Summary

In this chapter, we learnt about Orchestration: what is Orchestration, Orchestration architecture overview, available plugins, and how to use the Orchestration plugin. We also ran through an example of how to orchestrate an active directory. In our next chapter, we will learn more about setting up and exploring the event management application.

Exploring Service Mapping

In this chapter, we will learn about service mapping. Service mapping helps to generate business service maps, which helps us to understand the relationship between the business and other underlying infrastructure components. In this chapter we will learn about:

- **Service mapping architecture**: How the service mapping works
- **Activating service mapping plugin**: Configuring and activating the service mapping plugin
- **How to user service maps**: Using service maps and also changing some parameters
- **Customizing service mapping pattern**: How to change the parameters of service maps on the high level

Service mapping architecture

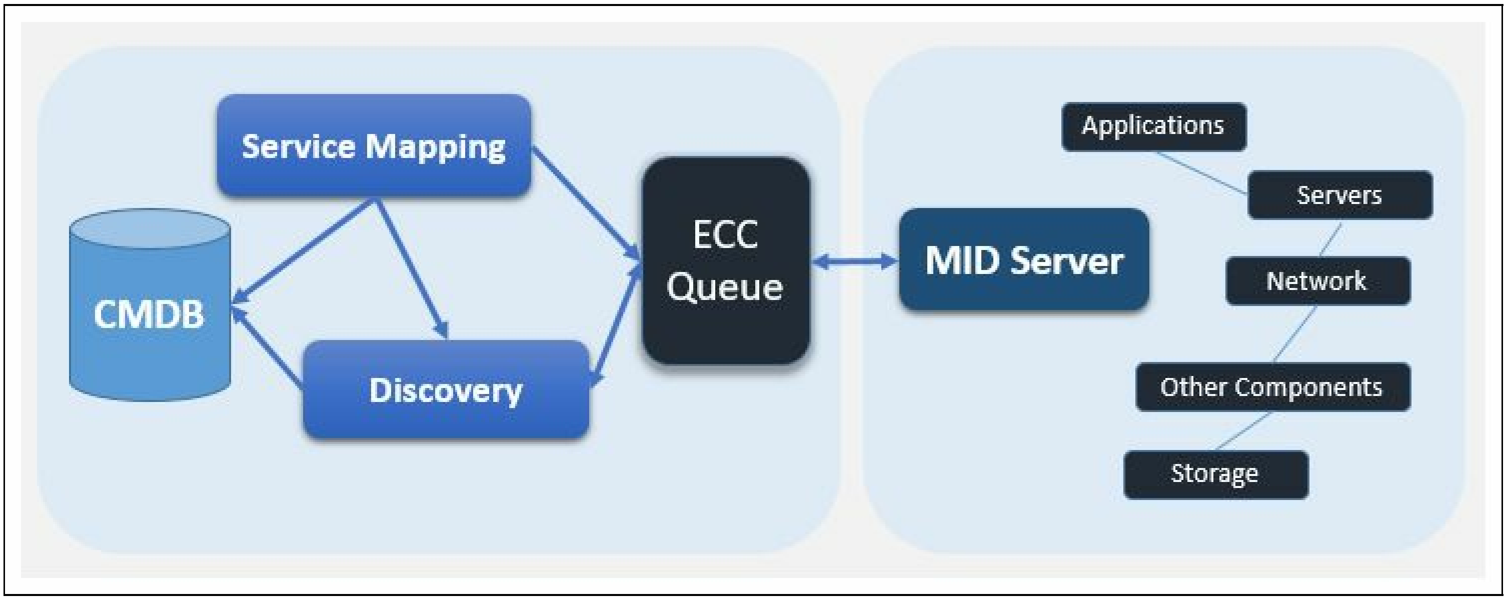
Imagine a small to large corporation which has a large to small infrastructure where the volume of infrastructure components are huge supported by Cloud solutions, servers, network equipment, storage devices, and so on. It is important for IT to understand the relationship between these infrastructure components that support critical business services. It is important for the business to keep the underlying infrastructure all the time. Image a world where, if any onsite shopping site or a banking website goes down for few minutes, there is a huge loss. So, it is important to understand the impact to business that which IT elements support these components.

Service mapping helps to discover all business service in the organization and create a detailed relationship map of the configuration items and the business services. We have been talking about business services for a while. Let's see what is a business service and see how we create business service maps.

The following are the steps in the process:

1. Create an entry point manually (In Istanbul, we can also import entry points from either a CSV-file or select entry points from already discovered load balancers. These functions are in the **Service Map Planner**).
2. Service mapping checks the configuration item hosting the application is identified.
3. CMDB verification for the discovered configuration items that exist.
4. The host is detected by discovery when No CI record found in CMDB.
5. Discovery places an **External Communication Channel** (**ECC**) request.
6. Use the MID Server to run the probe on the host and discover open ports.
7. Host port information is sent back to ECC queue by MID Server.
8. Discovery receives the host port information from ECC.
9. Discovery creates an entry in the CMDB.
10. Use service mapping to check for the entry created by discovery in the CMDB.
11. Use service mapping to discover the application running on the host.
12. Service mapping creates an application discovery request for the detected host.
13. Service mapping adds an application discovery request to the ECC queue.
14. Use the MID Server to execute the identification sections of the patterns with the matching entry point types.
15. The MID Server discovers a CI if the identification section is fully executed with all required attributed populated.
16. The MID Server runs the connectivity section identifying outgoing connections.
17. The MID Server updates the ECC queue with the information discovered.
18. Service mapping check ECC queue for the information posted by MID Server.
19. Service mapping writes information to CMDB.
20. Service mapping adds the CI to the business service map.
21. Service mapping initiates a discovery request to discover connected CI.

22. Service mapping completes when there are no outbound connections.



Service mapping supports different operating systems and applications. You will need to customize the discovery pattern to include any other application that the service mapping does not support.

Operating systems supported by service mapping

An operating system that is supported by service mapping means that the platform comes with a pattern for this operating system, but it may require customization to be able to be compatible with your environment.

AIX	HP-UX
Linux	Solaris
Windows	

Applications supported by service mapping

An application that is supported by service mapping means that the platform comes with a pattern for this application, but it may require customization to be able to be compatible with your environment. Common customized patterns are: using customized config-files instead of the default ones, renaming config files instead of using the default name, and using customized tags in config-files instead of using the default tags.

ABAP SAP Central Services (**ASCS**)	Active Directory Domain Controller
ApacheTomcat / WAR / Web Server	App TNS service
BIG-IP **Global Traffic Manager** (**GTM**) F5	BIG-IP **Local Traffic Manager** (**LTM**) F5
BMCCTRL-M Enterprise Manager / CTRL-M GatewayBMC **IT Asset Management** (**ITAM**)	CA identity manager provisioning server
CiscoACE Command Line Interface (on Cisco CSM) / CallManager / **Global Site Selector** (**GSS**)	Connect-IT service
CitrixDelivery Controller / Netscaler	DataPower
JRun WAR Inc	EMC Documentum Docbase
	Generic

FormEngine	application
GlassFish Server	HAProxy
HP service manager application server	HP service manager index
HP service manager knowledge base	IBM J2EE EAR
IBM WebSphereMessage Broker / Application Server / Message Broker Flow / MQ / MQ Queue / Portal	Jboss module
IBMCTRL-M Server / CICS Transaction Gateway CTG / **Customer Information Control System** (**CICS**) / DB2	RabbitMQ
MicrosoftExchange CAS / Dynamic CRM / BizTalk Orchestration / BizTalk Server / Exchange BackEnd Server / Exchange FrontEnd Server / FAST Search Server / Exchange Hub Transport Server / Exchange mailbox / **Internet Information Services** (**IIS**) / Information Services (IIS) Virtual Directory / **Message Queuing** (**MSMQ**) / .NET commands / SharePoint / SQL Database / Cluster MGM Node / MySQL Server	Nginx
OracleAdvanced Queue Queue/ Concurrent Server/ Database/ Discoverer Engine/ Discoverer UI/ E-Business Suite/ Form UI/ Fulfillment Server/ HTTP Server/ iAS Web Module/ Metric Client/ Metric Server Net Listener/ OACORE Server/ OAFM Server/ Process Manager/ Report Server/ Tnslsnr Engine/ Tuxedo/ Tuxedo Portal/ WebLogic Module/ WebLogic Server (version 10.3)/ WebLogic On-demand Router/Load Balancer	PostgreSQL Database
SAP BO BOXI ScheduleRouter / Business Objects CMS Server / Central Instance / Central Services (SCS) / **Evaluated Receipt Settlement** (**ERS**) / HANA Database / Java Cluster / NetWeaver Dialog Instance	SuniPlanet Web Server / Directory/ JES
SQLServer Analysis Services (**SSAS**)/ **Server Integration Services** (**SSIS**) Job / Server	Sybase

Integration Services (SSIS)	
TibcoActiveMatrix BusinessWorks/ ActiveMatrix BusinessWorks Process/ EMS Queue/ **Enterprise Message Service** (**EMS**)	Symantec Enterprise Vault

What is a business service?

Business is the core activity or a purpose forming an organization. There are certain offerings that the business has to offer, and there are multiple components that support the business, including IT. These does not produce a tangible commodity. This is called a **business service**.

For example, a website might be a core business service that is important and supporting a critical business function. These websites are supported by multiple infrastructure components including servers, network components, and so on.

It is important to understand business services for us to be able to proceed with service mapping. Business services are going to be core for service mapping where the service mapping will reference the business service that is defined to

Activating the service mapping plugin

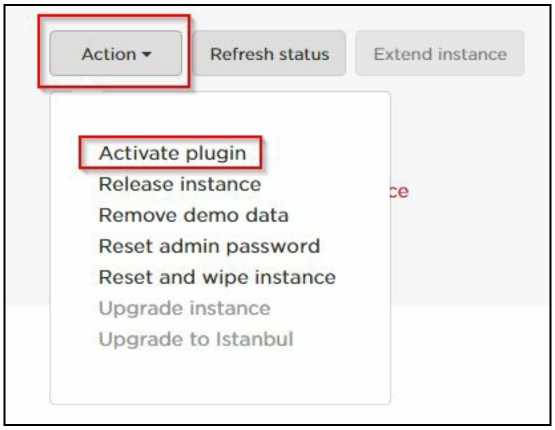
Service mapping is a separate subscription that needs to be purchased and activated by the ServiceNow professional services team.

We have the following plugins that we can activate in Service Mapping:

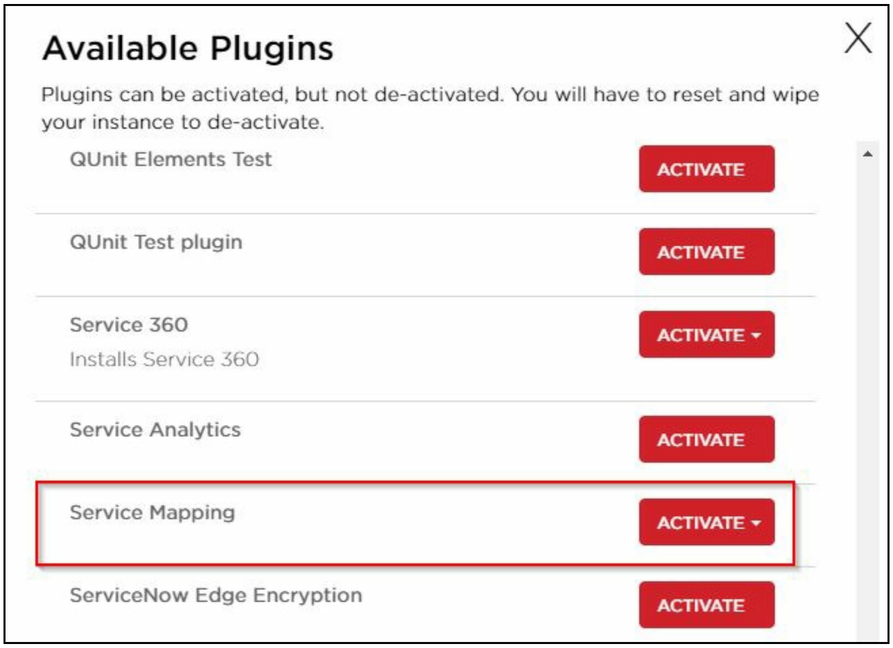
- Event management
- Service mapping core
- IP-based discovery
- Pattern designer
- Service watch suite commons

We can following the steps give below in order to activate a service mapping plugin:

1. **Activating from high portal**: Follow the steps to activate the service mapping from the high portal.
    1. Click on Service Catalog.
    2. Click Request Plugin Activation and fill in the request information.
2. **Activate plugin from ServiceNow demo instance**:
    1. Log in to your demo instance and click on Activate plugin.



    2. Search for the Service Mapping plugin and click on Activate.



Available Plugins

Plugins can be activated, but not de-activated. You will have to reset and wipe your instance to de-activate.

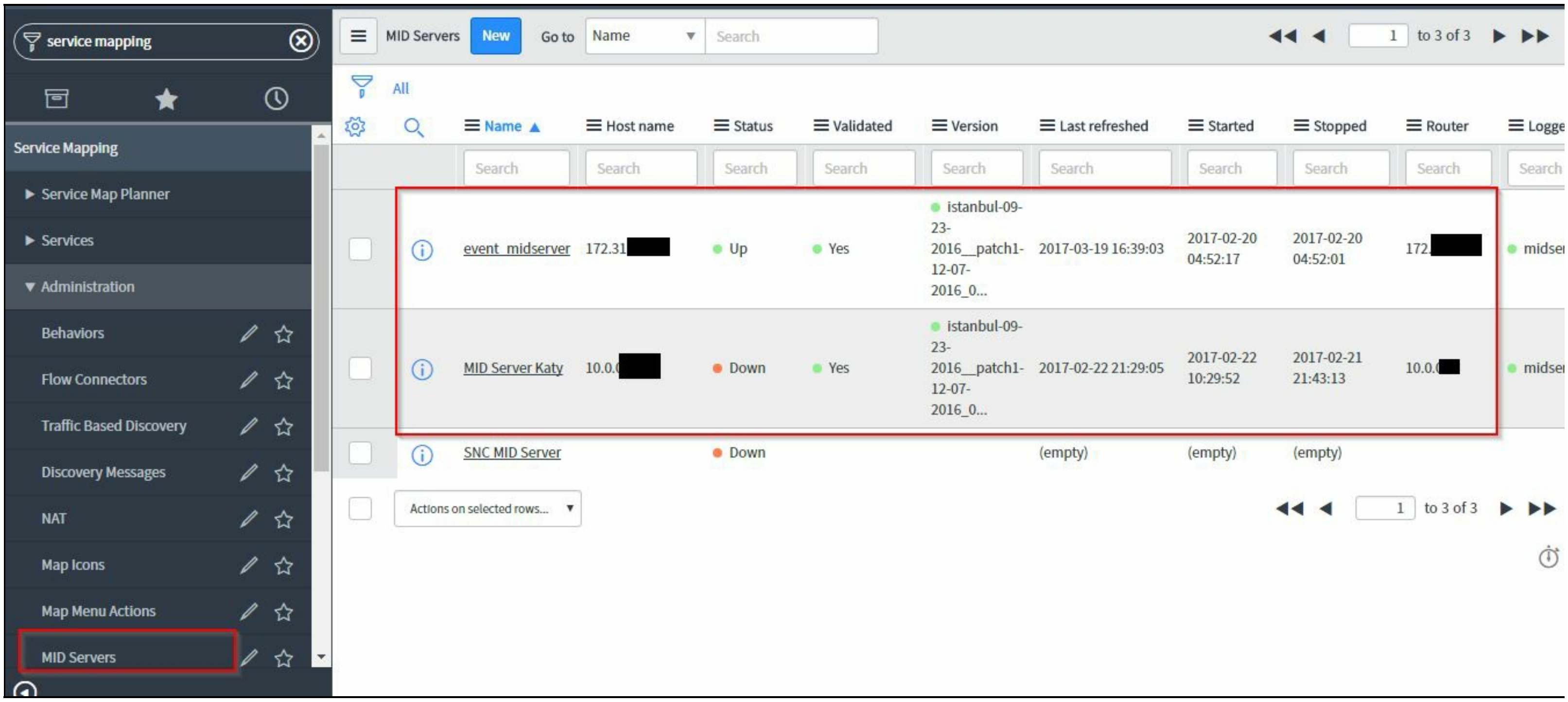
How to use service maps

In this section we will learn more about how to use service maps and getting started.

MID Server setup

MID Servers are located in enterprise private networks; these facilitate communication between different infrastructure components. The number of MID Servers required depends on the size of the infrastructure.

The next step is not make sure we have the MID Server available for our service mapping. That service mapping is putting one more prerequisites on the MID Server, compared to disocvery–service mapping requires .NET Framework 3.5 on the MID Server. Discovery requires .NET framework 4.0, so you will need them both on the MID Servers to be able to run Service Mapping. Follow the steps described in the Chapter 2, *MID Server Essentials*, to install and setup the MID Server. To see the list of MID Servers setup. Type `service mapping` on the application navigator . This will list all the MID Servers that are configured and installed. Navigate to Service Mapping | Administration | MID Servers and here you will see all the list of MID Servers that are configured already.

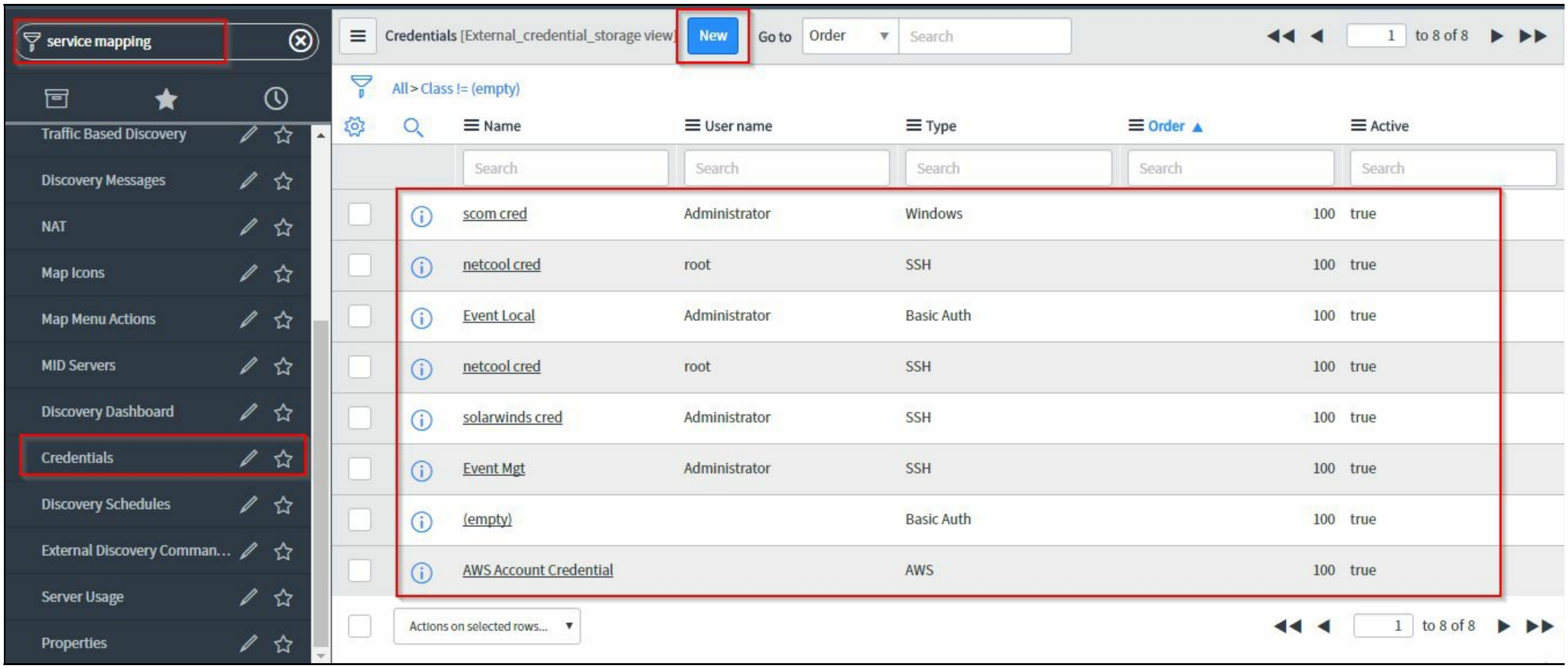


Name ▲	Host name	Status	Validated	Version	Last refreshed	Started	Stopped	Router	Logge
event_midserver	172.31[redacted]	● Up	● Yes	● istanbul-09-23-2016__patch1-12-07-2016_0...	2017-03-19 16:39:03	2017-02-20 04:52:17	2017-02-20 04:52:01	172.[redacted]	● midse
MID Server Katy	10.0.[redacted]	● Down	● Yes	● istanbul-09-23-2016__patch1-12-07-2016_0...	2017-02-22 21:29:05	2017-02-22 10:29:52	2017-02-21 21:43:13	10.0.[redacted]	● midse
SNC MID Server		● Down			(empty)	(empty)	(empty)		

Service mapping credentials

Now we need to make sure the right credentials are setup for the service mapping.

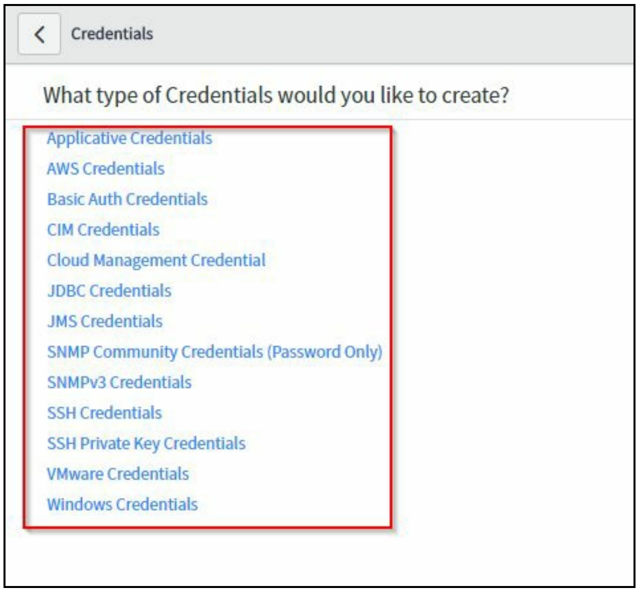
1. To access the credentials, navigate to Service Mapping | Administration | Credentials to bring up list of all the existing credentials. Click on New to create a new credential for the service mapping.



Name	User name	Type	Order ▲	Active
scom cred	Administrator	Windows	100	true
netcool cred	root	SSH	100	true
Event Local	Administrator	Basic Auth	100	true
netcool cred	root	SSH	100	true
solarwinds cred	Administrator	SSH	100	true
Event Mgt	Administrator	SSH	100	true
(empty)		Basic Auth	100	true
AWS Account Credential		AWS	100	true

2. Clicking on New, you will see the list of credential you would like to create, it is the Applicative Credentials that are specific to service mapping (The platform credentials you need to discovery as well). The Applicative Credentials are the credentials you need to get the permissions you need to map specific application, for example you need specific permissions to IBM WebSphere message queue to be able to map a service including this application. These credentials are used within the pattern.

   Depending on your needs, select the right type of credential given following:

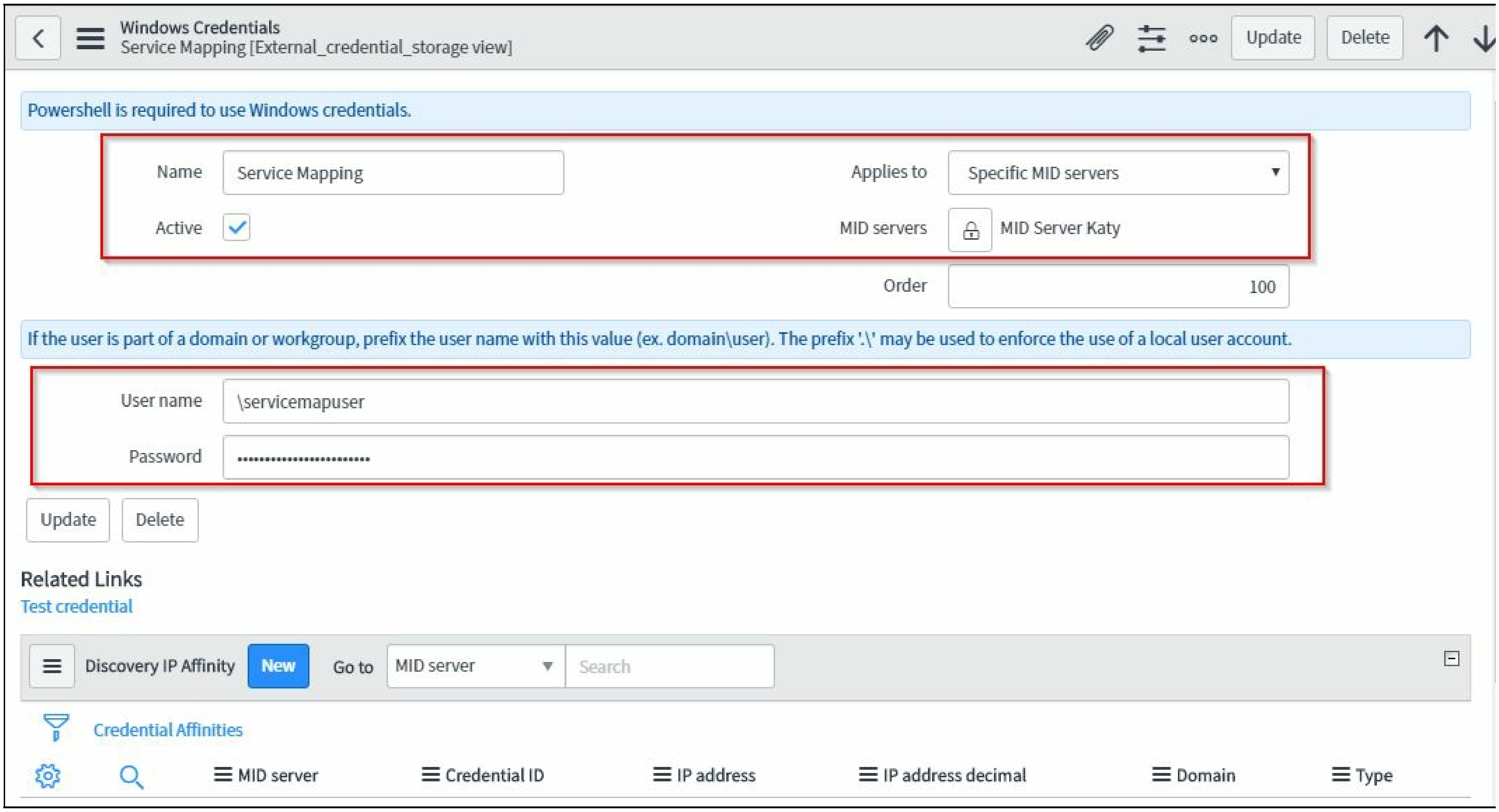


Credentials

What type of Credentials would you like to create?

- Applicative Credentials
- AWS Credentials
- Basic Auth Credentials
- CIM Credentials
- Cloud Management Credential
- JDBC Credentials
- JMS Credentials
- SNMP Community Credentials (Password Only)
- SNMPv3 Credentials
- SSH Credentials
- SSH Private Key Credentials
- VMware Credentials
- Windows Credentials

3. Click on Windows Credentials and fill in the required information:
    - Name: A meaningful name for the credential.
    - Applies to: Here you can specify that the credential should be applied to a specific MID Server or all MID Servers. This is important to specify in case you are using multiple MID Servers for multiple purposes. In some cases there might be MID Servers used for event management, discovery and so on.
    - User name: Specify the credentials user name and the password.
4. Click on Update to save the information. There is a related link Test credential to make sure you have given the right credentials.



Windows Credentials
Service Mapping [External_credential_storage view]

Powershell is required to use Windows credentials.

Name	Service Mapping
Applies to	Specific MID servers
Active	☑
MID servers	MID Server Katy
Order	100

If the user is part of a domain or workgroup, prefix the user name with this value (ex. domain\user). The prefix '.\' may be used to enforce the use of a local user account.

User name	\servicemapuser
Password	••••••••••••••••••••••••

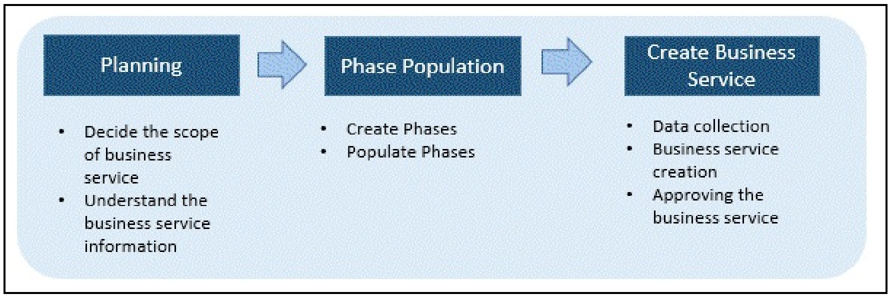
Related Links
Test credential

Business service population

The next step is to start working on creating the business services. Before we start doing that, we need to understand different planning phases we go through to create the business services.
In an organization, there might be huge business services which might need to be consolidated into the ServiceNow environment. Here are the steps that we need to do take:

- Creating empty phases
- Populating the phases
- Creating business service

The important steps are planning, phase population, and creating business service.



Planning

- Decide the scope of business service
- Understand the business service information

Phase Population

- Create Phases
- Populate Phases

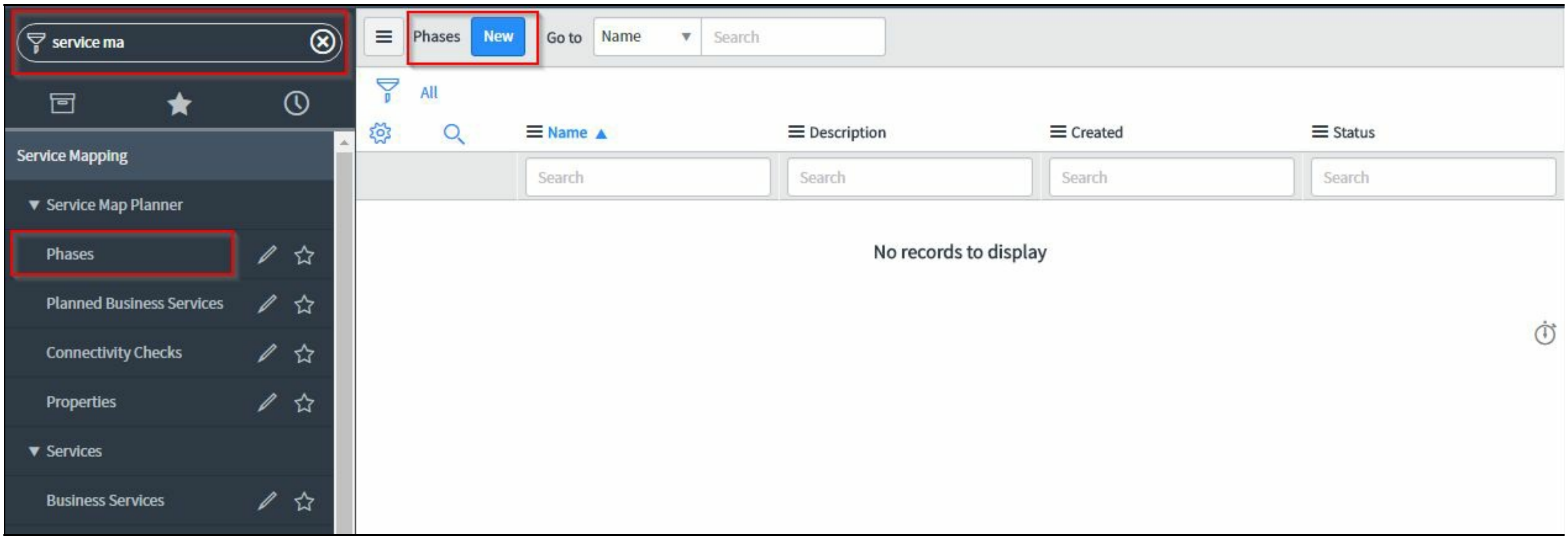
Create Business Service

- Data collection
- Business service creation
- Approving the business service

Phases are nothing but groups that the business services can be bucketed into. There are various dimensions that you can group the business services based certain criteria, such as region, by type by business critical, and so on.

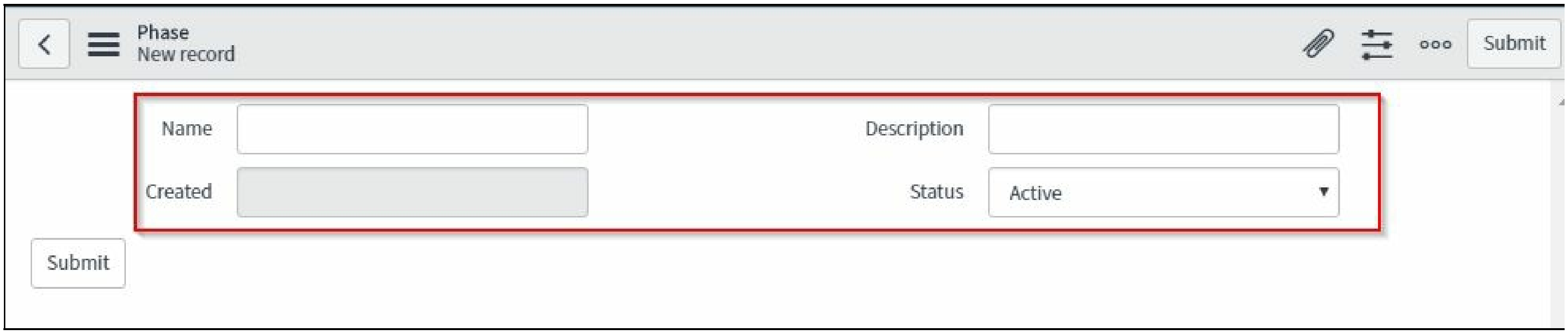
Following are the steps to create phases in the service mapping application:

1. From the application navigator type `service mapping` and navigate to Service Mapping | Service Map Planner | Phases.
2. Any existing phases are going to show up on the content pane. If you are going to create a new phase click on New button to create a new phase.



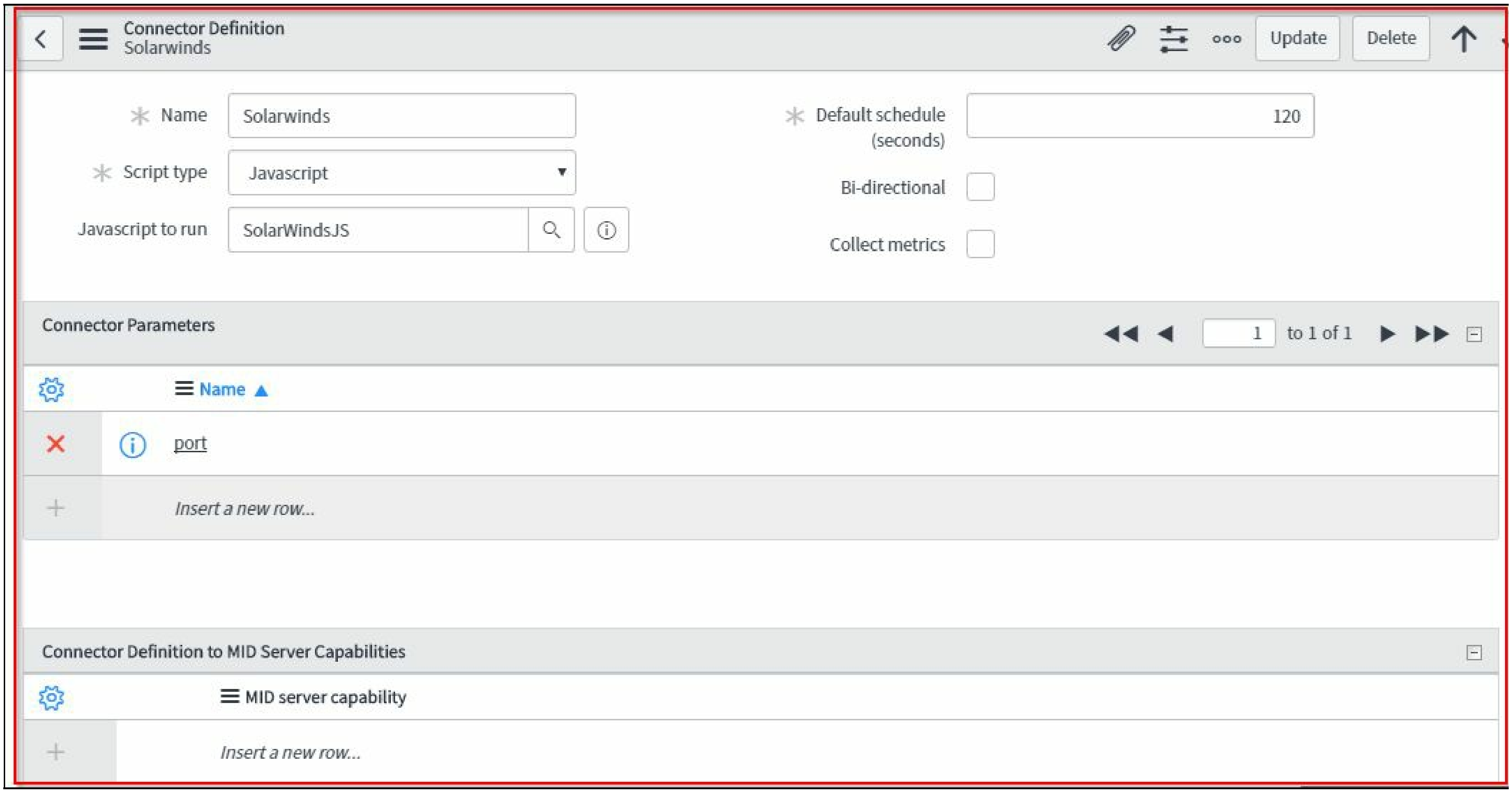
No records to display

3. Clicking on New button opens a form; fill in the required information:
   - Name: The name of the phase
   - Description: A description of the phase
   - Status: The status of the phase



Name:
Description:
Created:
Status: Active

4. Right-click on the header and click on Save to bring up additional options on the relation list to create the business service from the created phase. To create a business service from the created phase, follow these steps:
   1. Navigate to the Business Service Planning related list tab.
   2. Click on New button to create a business service from the scratch.
   3. You also have option to import the business services from a comma separated file that might been prepared already.



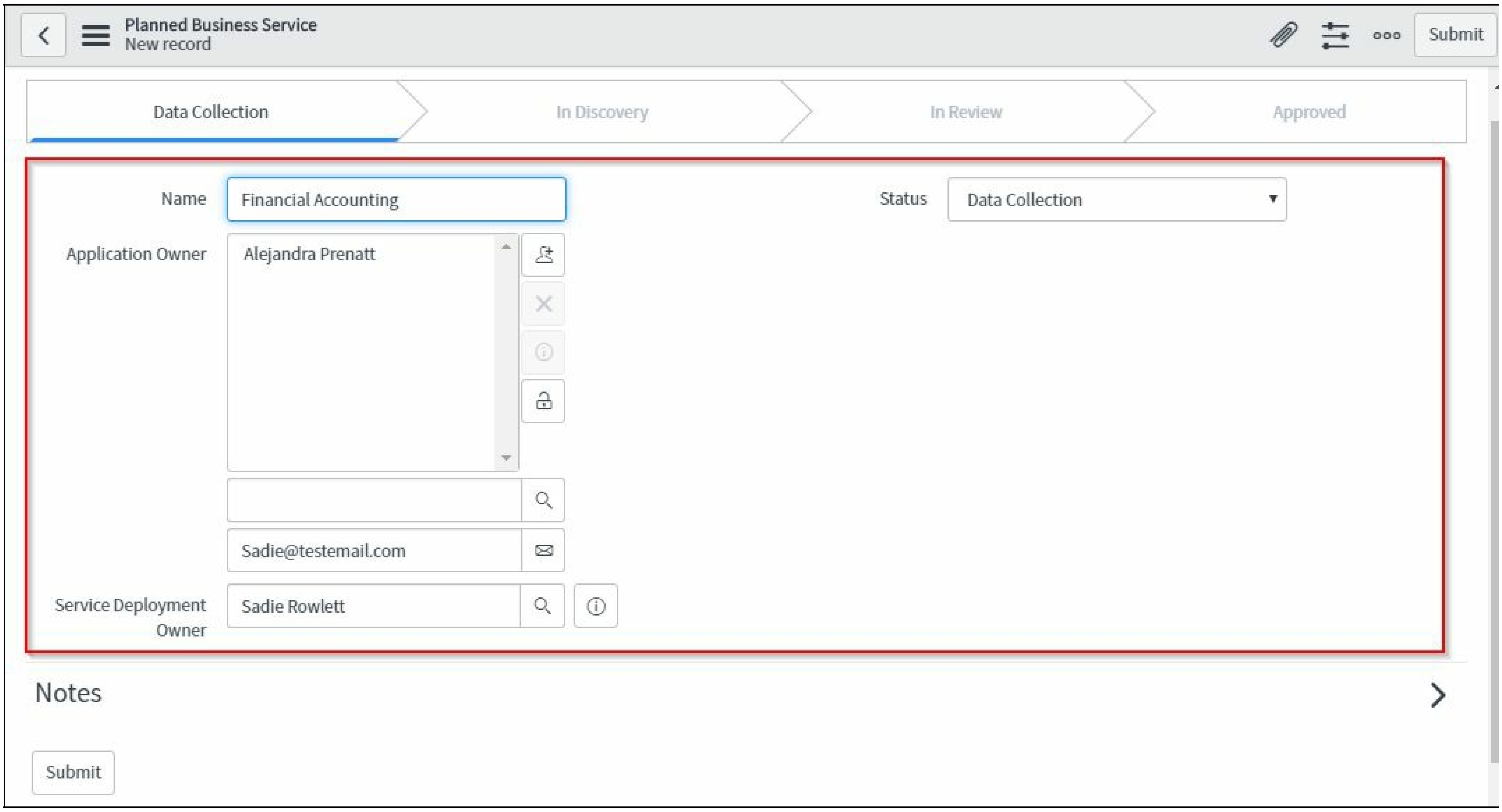
* Name: Solarwinds
* Script type: Javascript
Javascript to run: SolarWindsJS
* Default schedule (seconds): 120
Bi-directional: □
Collect metrics: □

Connector Parameters

5. There are different ways you can create business service:
   1. **Import from CSV**: The information about the business service is captured already in the form of comma separated files. Clicking on Import from CSV button you are able to import the created CSV file.

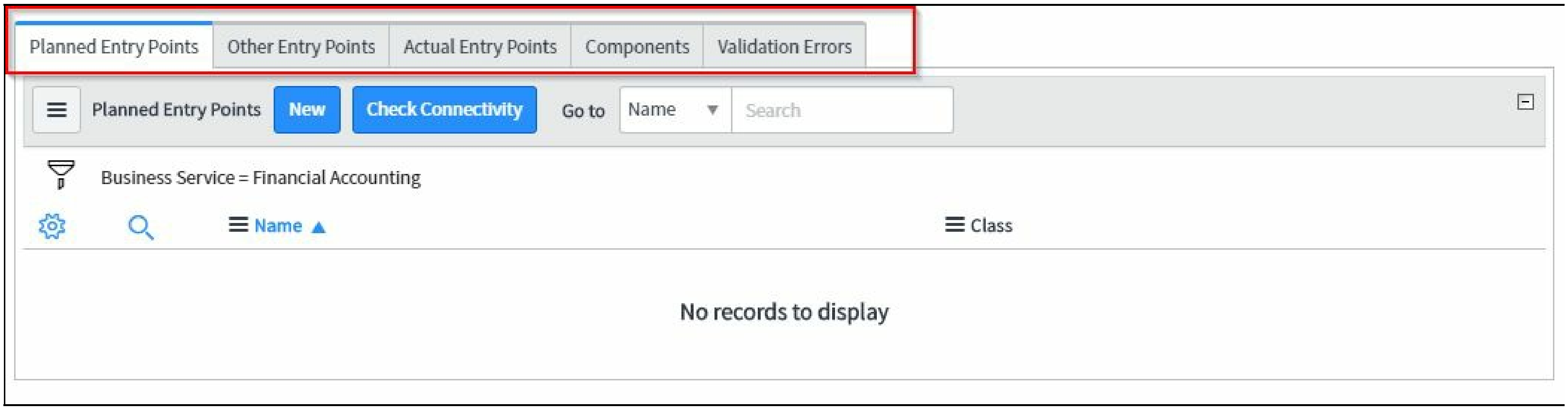
2. **Import from load balancer** : If there is no business information available, service mapping can extract information from load balancers and transform them into planned business services. This will give you a list of entry points from the load balancers and you can pick the entry points from the list.

6. To create a New button, click on New button that brings up a form to enter the business service information manually.
   - Name: A meaningful name for the business service
   - Application Owner: A person who is familiar with mapping the business server and understands the infrastructure and application. This is the person that will get the notification when you hit the send for review button.
   - Service Deployment Owner: The person responsible for modifying the business service.



Name	Financial Accounting
Status	Data Collection
Application Owner	Alejandra Prenatt
	Sadie@testemail.com
Service Deployment Owner	Sadie Rowlett

7. Right-click on the header and click Save. Once you click Save there are additional options available on the related list as shown following.



Business Service = Financial Accounting

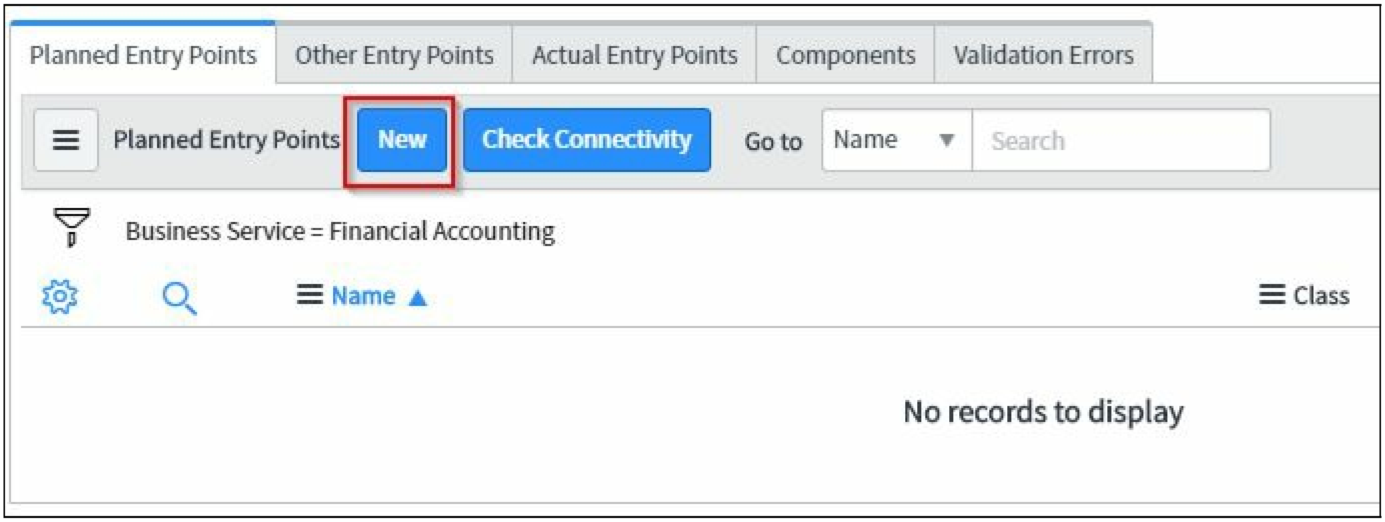
No records to display

The application owner needs to test that the service mapping can connect to the devices to make the business service. This step is used to verify if the service mapping is able to connect to the given hosts. Property of a connection is often referred to as entry points. Service mapping starts the mapping from the entry point to check the connectivity of hosts connected to the specified entry points.

When a test is run the service mapping checks the corresponding record in the `CMDB_CI` for information on credential for the IP address that is specified.

We can create a planned entry point through the following steps:

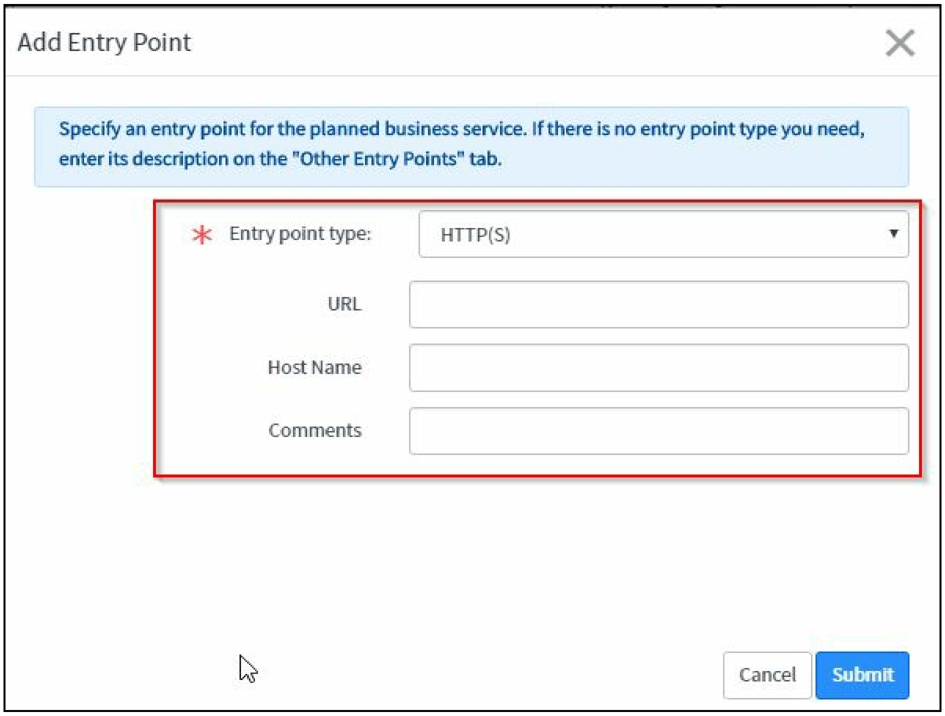
1. Click on the New button.



Business Service = Financial Accounting

No records to display

2. Clicking on the New button brings up a window to enter the entry point. Fill in the required information for the entry point.
   - Entry point type: You have different options to select the type of entry point
   - URL: If applicable URL for the entry point
   - Host Name: Name of the cost for the entry point



Specify an entry point for the planned business service. If there is no entry point type you need, enter its description on the "Other Entry Points" tab.

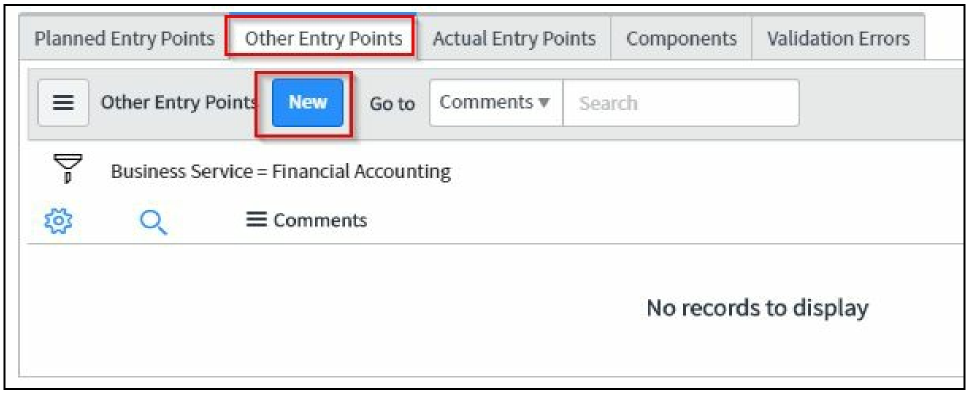
* Entry point type: HTTP(S)

URL

Host Name

Comments

3. In the Planned Entry Points you enter the entry points to the service. All entry points you state in this section will be transferred to the Actual Entry Points once you have clicked the Create and Discover button. In the Other Entry Points section you state entry points that may be of interest during the mapping (entry points to the database used maybe). The entry points stated here will not be part of the Actual Entry Points once you have clicked the Create and Discover button. If there is not an entry point type available, you can click on the tab Other Entry Points as shown following:

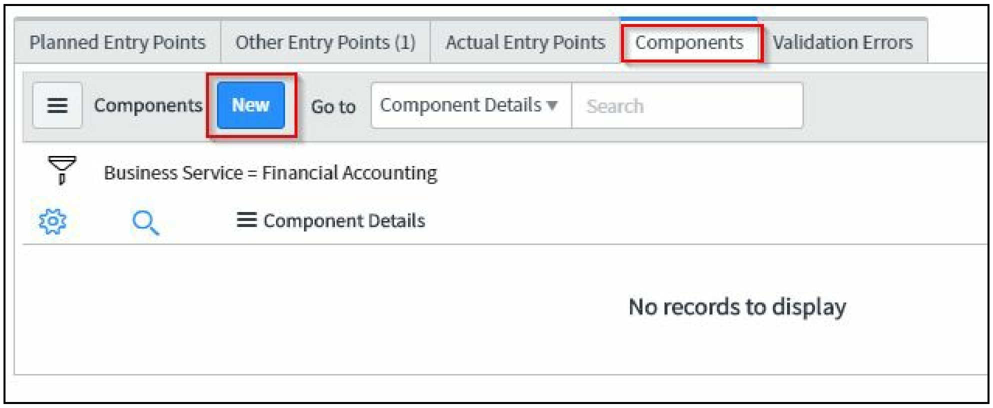


Business Service = Financial Accounting

No records to display

4. Use the Components tab to provide more information about the business service. To add a component, click on New and fill in required information.

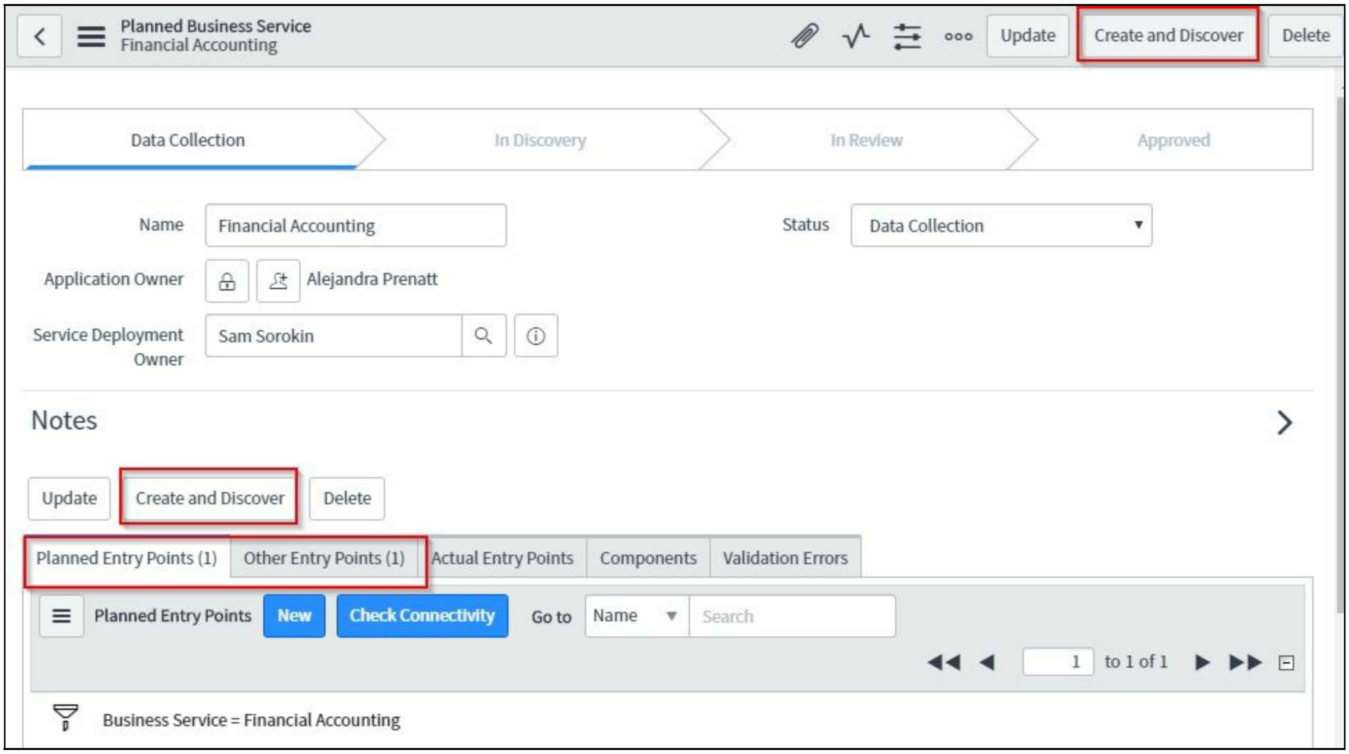
You should add one entry per component and the info about each component. For example, Apache web service version 5, IP `10.10.10.10` *listening on port* `8080`*, and so on. Everything you state here is for reference during the actual mapping, to help you know what components should be part of the service, and to let you know when you hit success with the mapping. It does not have any actual impact on the mapping*



Business Service = Financial Accounting

No records to display

5. Once you have the entry points defined, the Create and Discover button is enabled.



Name: Financial Accounting

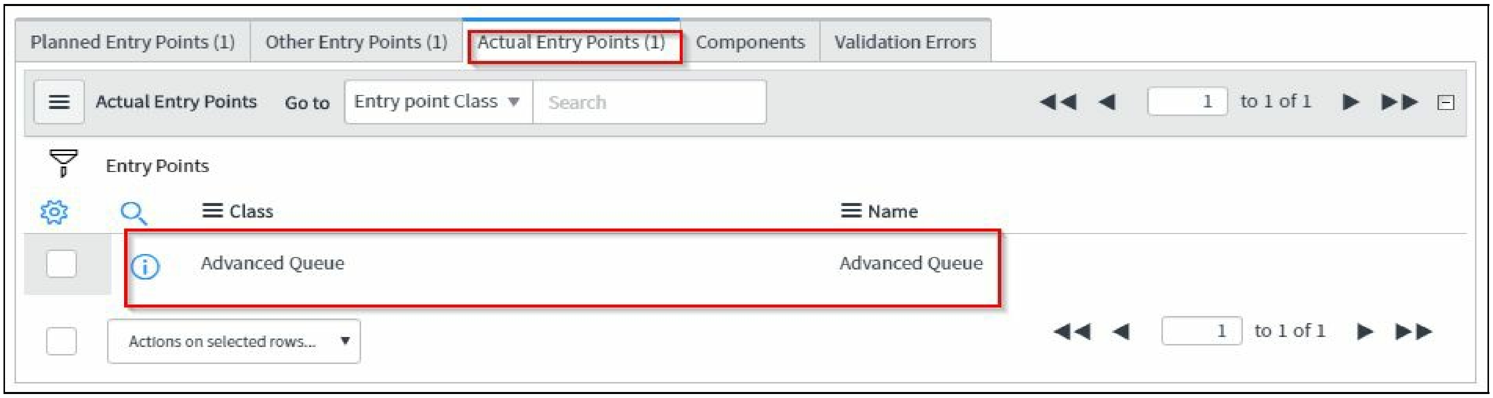
Status: Data Collection

Application Owner: Alejandra Prenatt

Service Deployment Owner: Sam Sorokin

Business Service = Financial Accounting

6. After you click on the Create and Discover button. You will notice in the tab Actual Entry Points that the classes are populated. If there are any errors, they will appear on the Validation Errors tab. Any validation errors need to be resolved before proceeding to the next step.



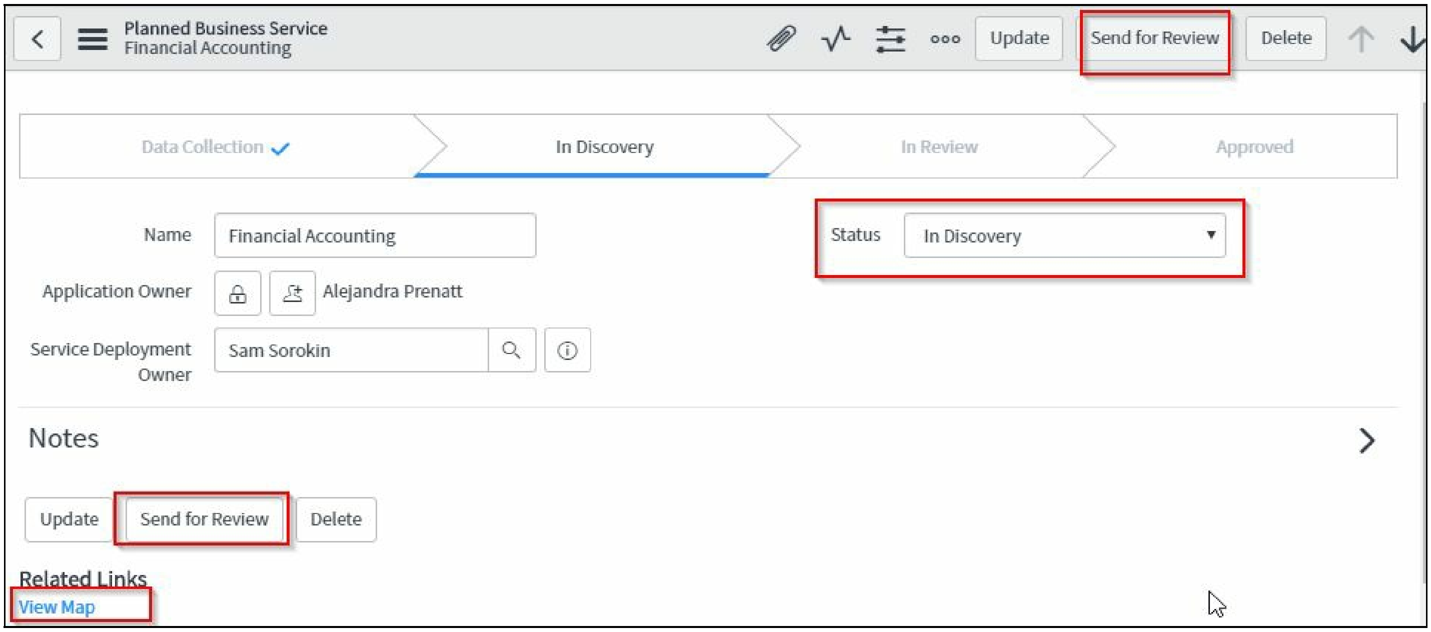
Class	Name
Advanced Queue	Advanced Queue

7. A related link called View Map appears, where you are able to view the business service map with the starting entry point that was defined. Now the business service is ready to be sent for review.

Before sending it to review you need to fix any errors shown on the map, and you should compare the findings with what is stated in the Components tab. If all components listed in the Components tab part of the map, In that case you can send it to review.

8. Click on Send for Review button to send the business service and its map for review.

A notification is sent to the the person stated in the Application Owner field, stating that they need to review a business service map.



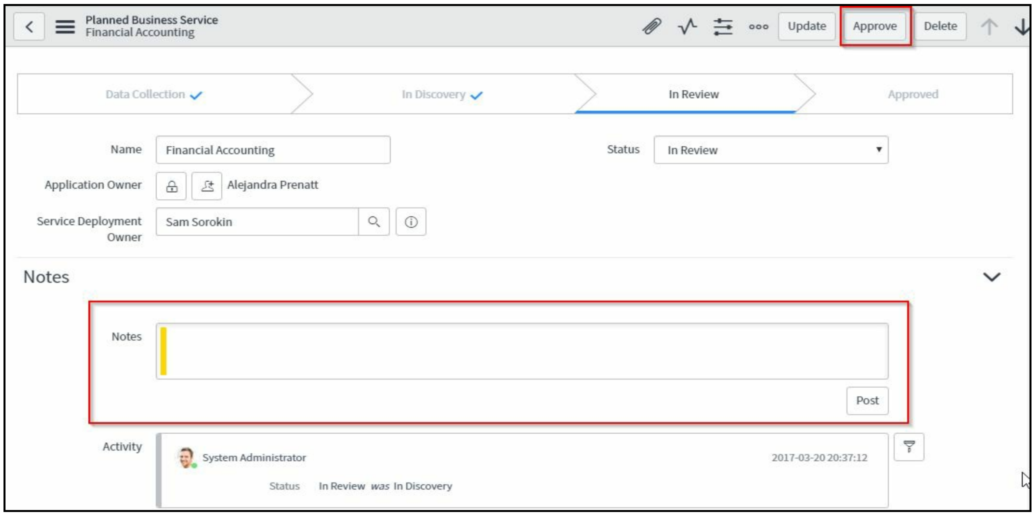
Name: Financial Accounting

Application Owner: Alejandra Prenatt

Service Deployment Owner: Sam Sorokin

Status: In Discovery

9. Now the business service that is planned is now under In Review state. When the map is in review state there is an activity log and notes fields that appears to post any comments. Click on Approve button.



Name: Financial Accounting

Application Owner: Alejandra Prenatt

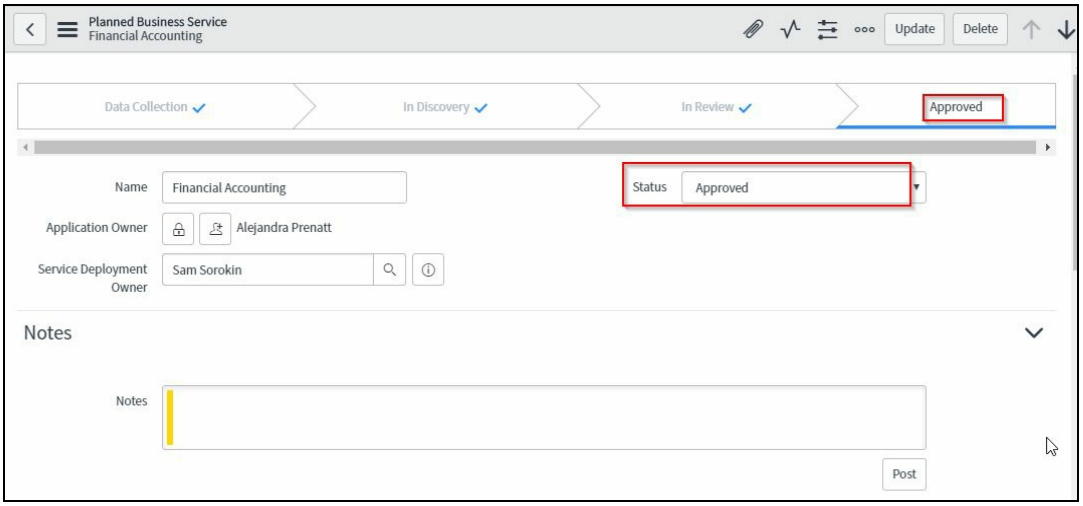
Service Deployment Owner: Sam Sorokin

Status: In Review

System Administrator 2017-03-20 20:37:12

Status In Review *was* In Discovery

10. Once the Planned Business Service is approved, the status becomes approved and the life cycle of the planned business service is complete. After it is approved, don't forget to move the status of the business service to Operational to make if part of the discovery schedule for the service maps.



Name: Financial Accounting

Status: Approved

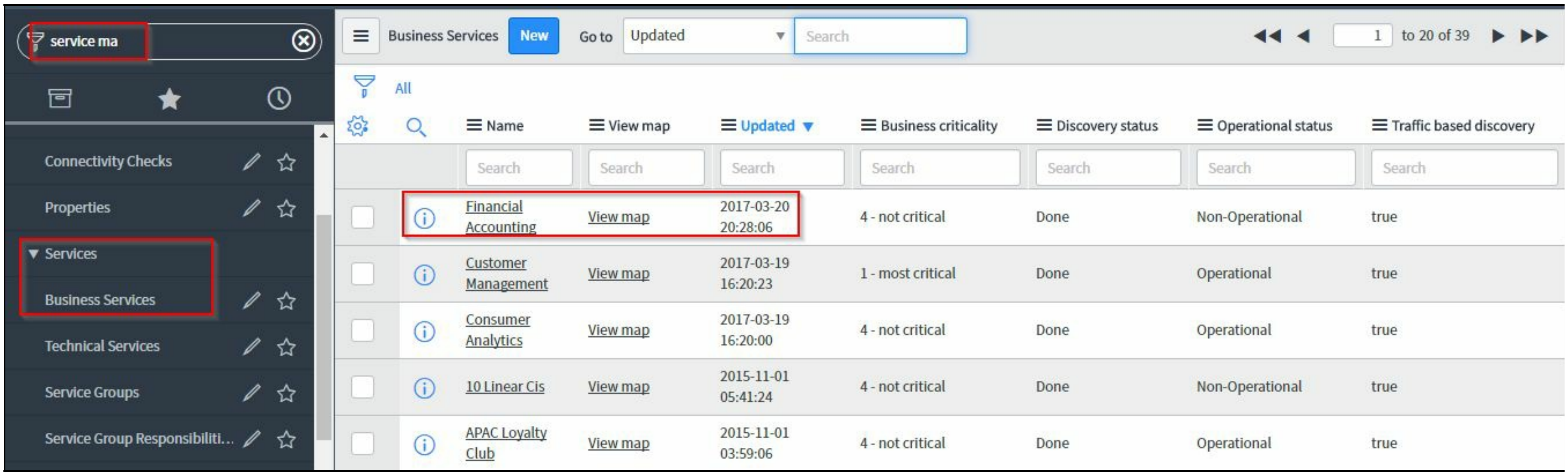
Application Owner: Alejandra Prenatt

Service Deployment Owner: Sam Sorokin

Notes:

Customizing service mapping

In this topic we will see how to customize a an existing service map. To view the business service that we just created and its map, type service map from the application navigator, navigate to Service Mapping | Services | Business Services to list all the business services. Search for the business service that we just created. There is a column called View map, clicking on that we are able to view the business service map



Name	View map	Updated	Business criticality	Discovery status	Operational status	Traffic based discovery
Financial Accounting	View map	2017-03-20 20:28:06	4 - not critical	Done	Non-Operational	true
Customer Management	View map	2017-03-19 16:20:23	1 - most critical	Done	Operational	true
Consumer Analytics	View map	2017-03-19 16:20:00	4 - not critical	Done	Operational	true
10 Linear Cis	View map	2015-11-01 05:41:24	4 - not critical	Done	Non-Operational	true
APAC Loyalty Club	View map	2015-11-01 03:59:06	4 - not critical	Done	Operational	true

Service mapping traffic based discovery

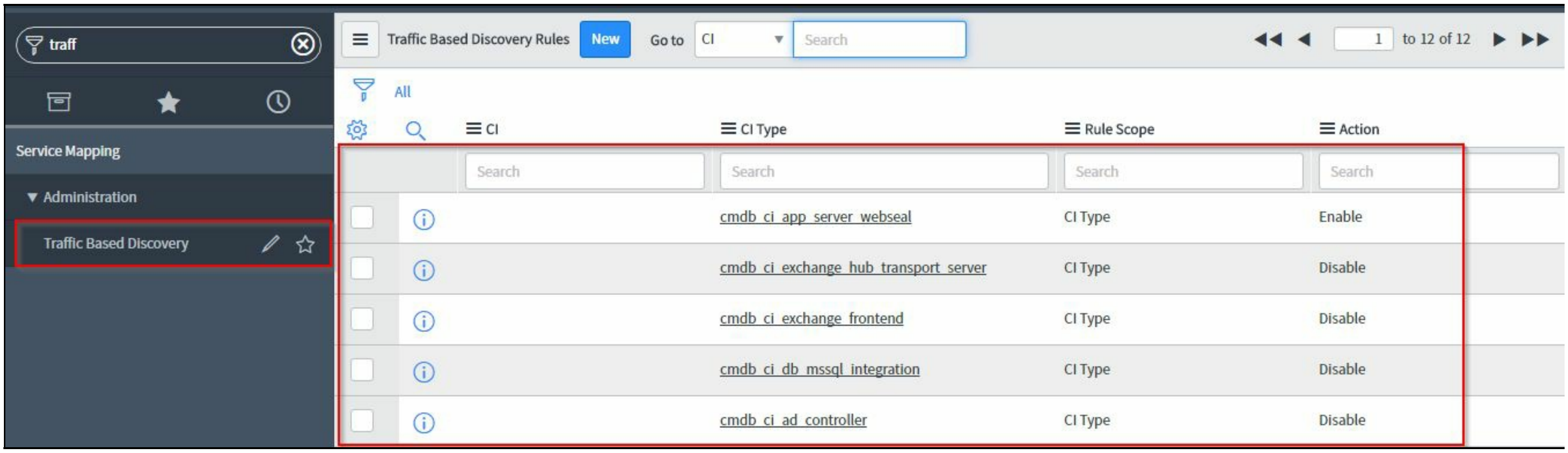
The traditional method and majority of the data is gathered by service mapping using the patterns. The patterns are most of the time reading configuration files. There is another method to discover CI using traffic connections between CI's which is termed as **traffic based discovery**.

Traffic based discovery will create all TCP connections that the CI has, regardless if it is part of the business service or not. The configuration base discovery will only capture connections that is part of the service.
Inbound and outbound connections are discovered using the *netstat* and *Isof* protocol and comments.
Traffic based discovery can be enabled at different levels

- **Service mapping level**: Traffic based discovery is enabled by default
- **Business service level**: Traffic based discovery can be enabled at a business service level
- **CI level**: Discovery rule can be created to exclude or include a specific CI type for traffic based discovery.

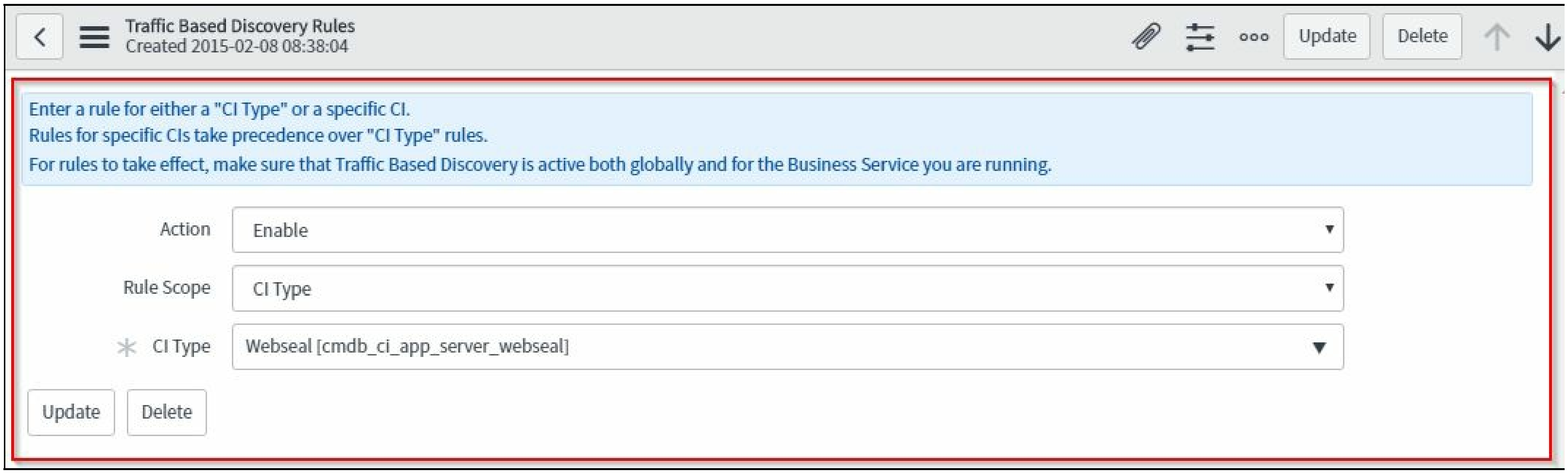
To view the traffic based discovery rules perform the following steps:

1. Navigate to Service Mapping | Administration | Traffic Based Discovery.



CI	CI Type	Rule Scope	Action
	cmdb_ci_app_server_webseal	CI Type	Enable
	cmdb_ci_exchange_hub_transport_server	CI Type	Disable
	cmdb_ci_exchange_frontend	CI Type	Disable
	cmdb_ci_db_mssql_integration	CI Type	Disable
	cmdb_ci_ad_controller	CI Type	Disable

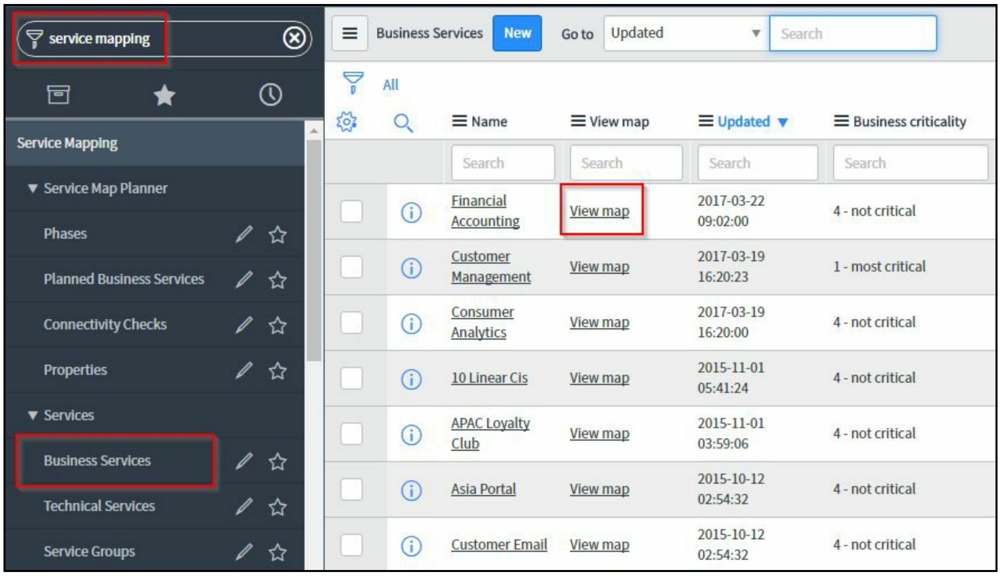
2. Click on the CI name to open the respective traffic based discovery rule.
    - Rule Scope: You can provide the scope to CI Type or a specific CI



Enter a rule for either a "CI Type" or a specific CI.
Rules for specific CIs take precedence over "CI Type" rules.
For rules to take effect, make sure that Traffic Based Discovery is active both globally and for the Business Service you are running.

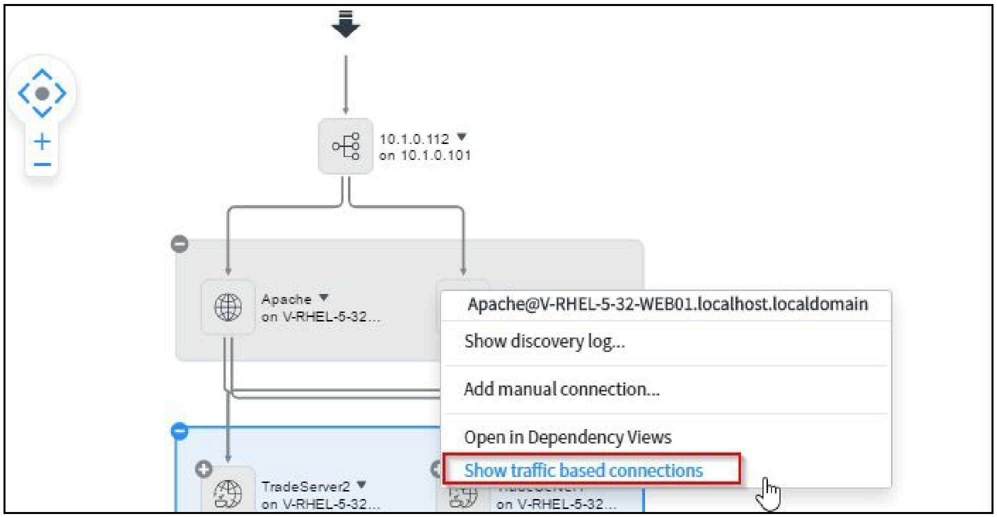
Action	Enable
Rule Scope	CI Type
* CI Type	Webseal [cmdb_ci_app_server_webseal]

3. The other way to look at the traffic based discovery rule is to navigate to Service Mapping | Services | Business Services. A list of business services appears and clicking on View map will open the business service map.



Name	View map	Updated ▼	Business criticality
Financial Accounting	View map	2017-03-22 09:02:00	4 - not critical
Customer Management	View map	2017-03-19 16:20:23	1 - most critical
Consumer Analytics	View map	2017-03-19 16:20:00	4 - not critical
10 Linear Cis	View map	2015-11-01 05:41:24	4 - not critical
APAC Loyalty Club	View map	2015-11-01 03:59:06	4 - not critical
Asia Portal	View map	2015-10-12 02:54:32	4 - not critical
Customer Email	View map	2015-10-12 02:54:32	4 - not critical

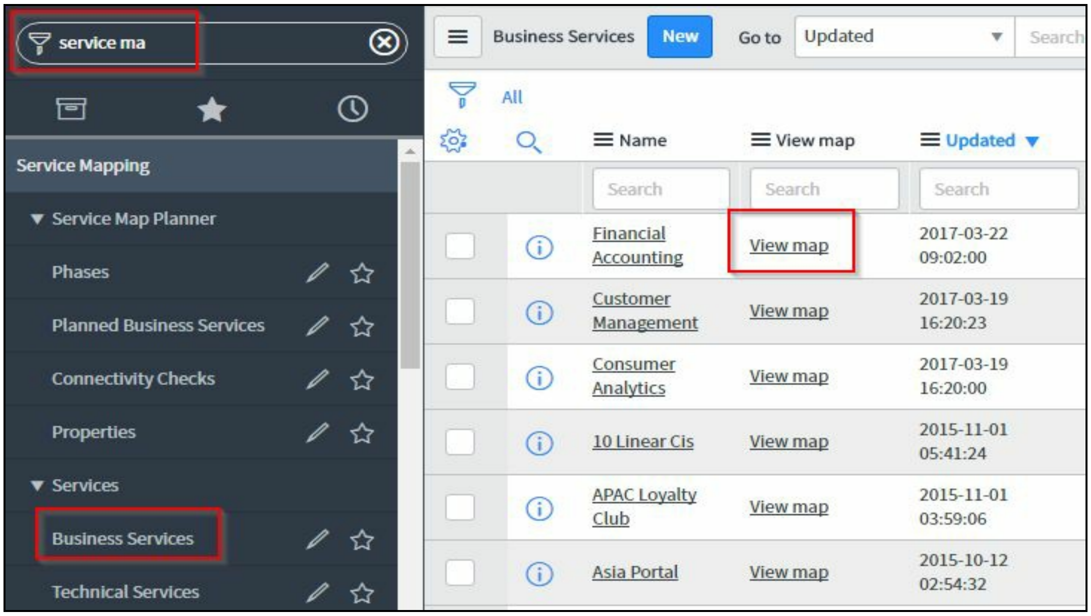
4. Right-click on a specific CI and click on Show traffic based connections to list all the traffic based connection pertinent to the selected configuration item



Identifying and fixing issues with service maps

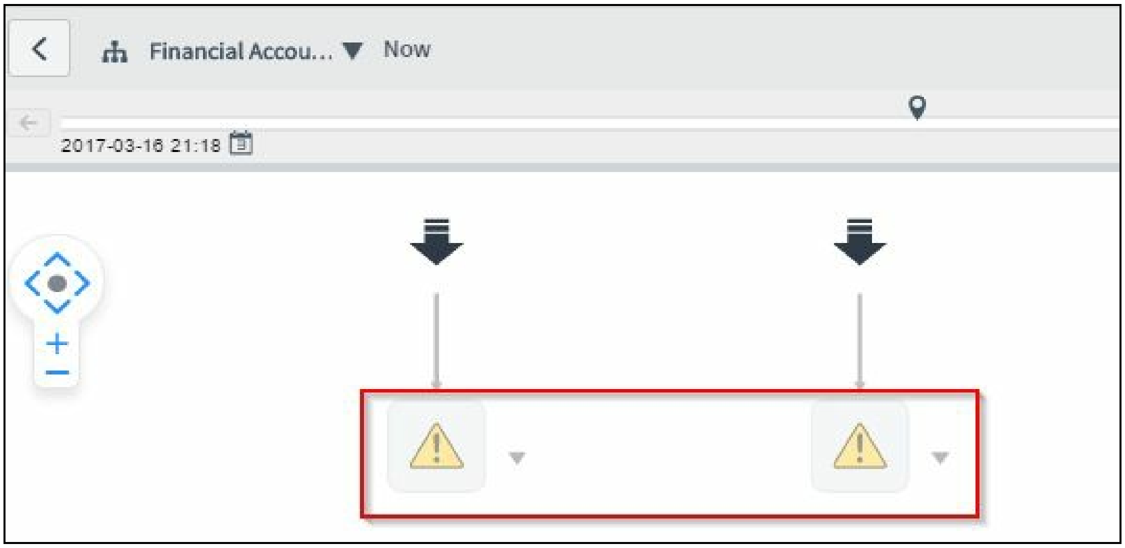
There might be some issues that you might face while setting up the service mapping. It is important that you understand about these errors and you fix this errors.

1. Once again, navigate to Service Mapping | Services | Business Services to list all the business services. Now click on View map to open up the map.

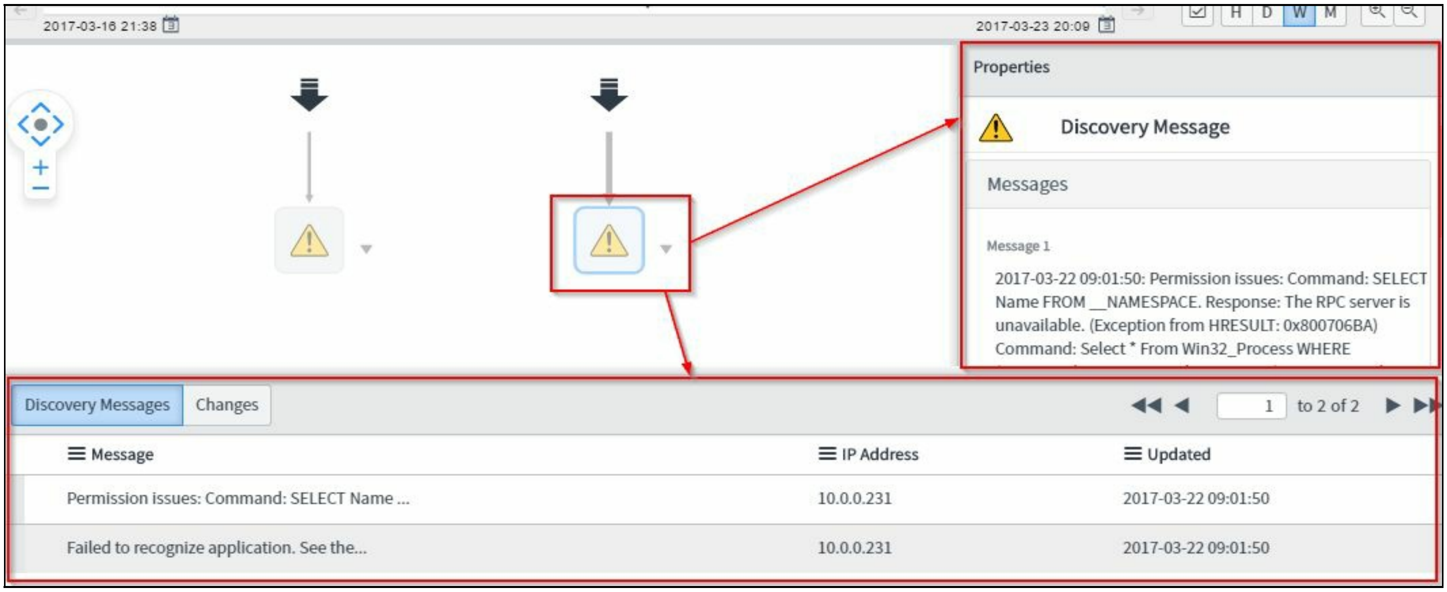


Name	View map	Updated
Financial Accounting	View map	2017-03-22 09:02:00
Customer Management	View map	2017-03-19 16:20:23
Consumer Analytics	View map	2017-03-19 16:20:00
10 Linear Cis	View map	2015-11-01 05:41:24
APAC Loyalty Club	View map	2015-11-01 03:59:06
Asia Portal	View map	2015-10-12 02:54:32

2. Once you open the map you might see a yellow triangle icon.



3. Clicking on the yellow icon will display the discovery message to the right and following. The description of the discovery messages are displayed.



Properties

Discovery Message

Messages

Message 1

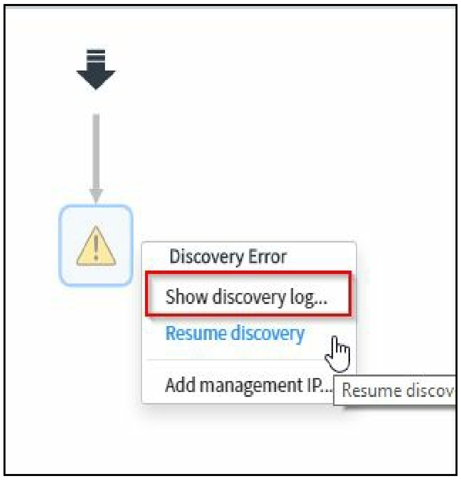
2017-03-22 09:01:50: Permission issues: Command: SELECT Name FROM __NAMESPACE. Response: The RPC server is unavailable. (Exception from HRESULT: 0x800706BA) Command: Select * From Win32_Process WHERE

Discovery Messages | Changes

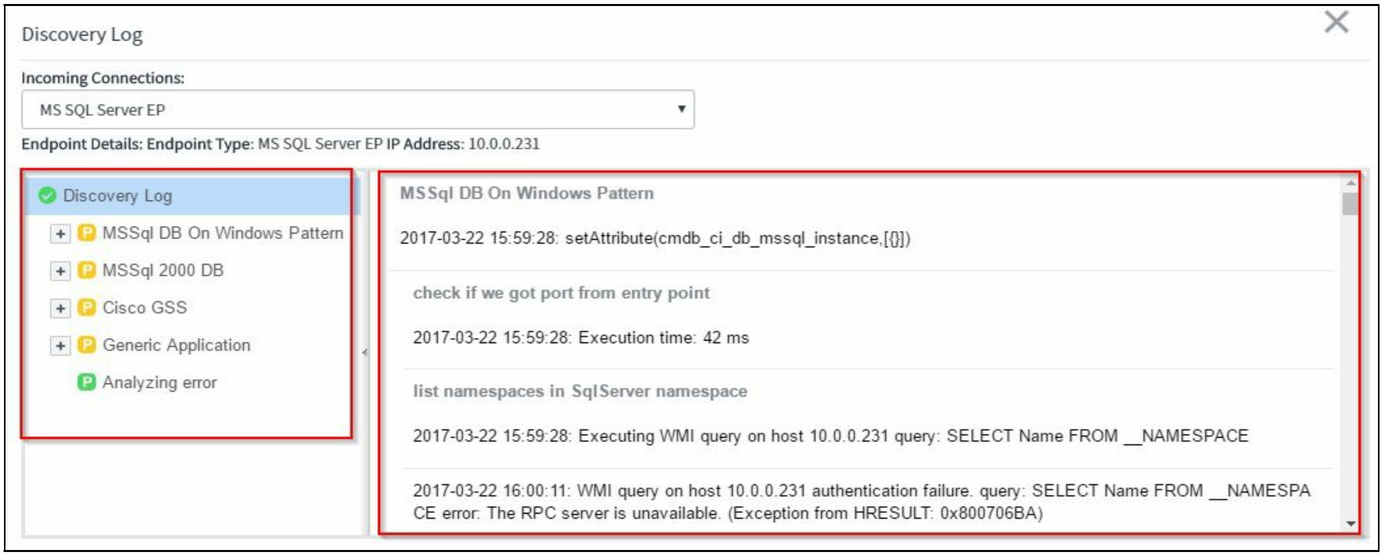
◀◀ ◀ 1 to 2 of 2 ▶ ▶▶

Message	IP Address	Updated
Permission issues: Command: SELECT Name ...	10.0.0.231	2017-03-22 09:01:50
Failed to recognize application. See the...	10.0.0.231	2017-03-22 09:01:50

4. Clicking on the Show discovery log... will display the errors that are associated with the particular configuration item.



5. Opening up the Discovery Log will display the list of errors; depending on the type of error, you will need to review and make the change accordingly and rerun the discovery.


Discovery Log

Incoming Connections:

MS SQL Server EP

Endpoint Details: Endpoint Type: MS SQL Server EP IP Address: 10.0.0.231

MSSql DB On Windows Pattern

2017-03-22 15:59:28: setAttribute(cmdb_ci_db_mssql_instance,[{}])

check if we got port from entry point

2017-03-22 15:59:28: Execution time: 42 ms

list namespaces in SqlServer namespace

2017-03-22 15:59:28: Executing WMI query on host 10.0.0.231 query: SELECT Name FROM __NAMESPACE

2017-03-22 16:00:11: WMI query on host 10.0.0.231 authentication failure. query: SELECT Name FROM __NAMESPACE error: The RPC server is unavailable. (Exception from HRESULT: 0x800706BA)

Summary

In this chapter, you have learned about what service mapping is about and we also saw what a business service is. We activated the service mapping plugin and configured service mapping to create business services and create a business service map finally.

In the following chapter, we will learn about event management application that includes, event management architecture, setting up event application, and configuring events and alerts.

Monitoring Using Event Management

In this chapter, we will learn about the event management application within ServiceNow. Just imagine the volume of IT infrastructure and the number of data centres and applications used in a large corporation. Each of these applications and individual IT infrastructure components are continuously generating events. These events are being monitored by multiple pieces of event monitoring software. There is a need to bring those events into ServiceNow and generate alerts and also react to the generated alerts to see a holistic view and be able to relate with other ServiceNow applications.

The important thing is to see how the events are effecting the business as you can see what business services are effected by the events, what business services are critical or not so critical, so the operational can decide on what event to start working on first. They want to start fixing the event that is effecting the service that is most business critical and vital, rather than focusing on low priority and low impact incidents

In this chapter, we will see how to setup the event management application to bring in the events from external tools by configuring different options available in ServiceNow event management application, which include:

- Creating event connectors and instances to connect to the external event monitoring tools
- Create event rules, mappings
- Configuring alerts, alerts correlations

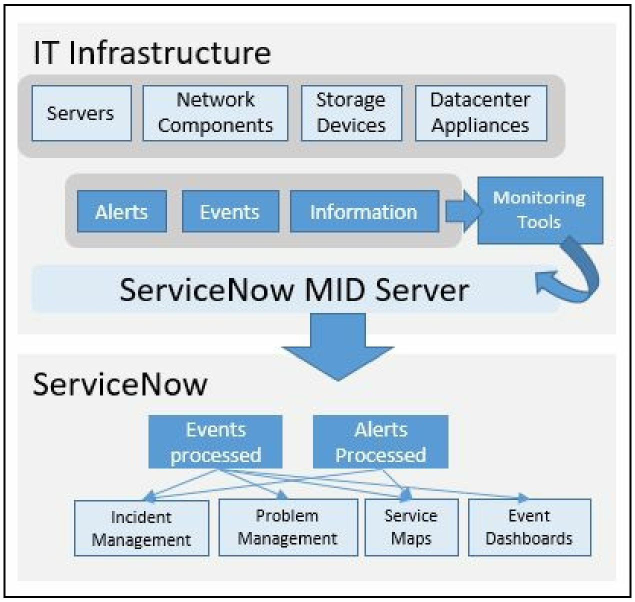
Event management overview

Event management is the process that monitors all events that occur through the IT infrastructure. It allows for normal operation and also detects and escalates exception conditions.

An **event** can be defined as any occurrence that has significance for the management of the IT Infrastructure or the delivery of IT service and evaluation of the impact a deviation might cause to the services. Events are typically notifications created by an IT service, **Configuration Item** (**CI**), or monitoring tool.

The ServiceNow event management application helps to identify health issues across the data center on a single management console. Service analytics supports the event management and problem management for **Root Cause Analysis** (**RCA**). It is important to note that ServiceNow event management is not a monitoring tool. It collects events from other monitoring tools.

ServiceNow event management architecture

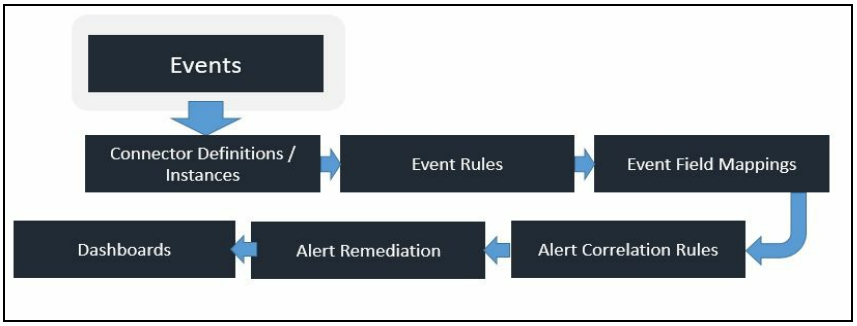


Events, alerts, and information are generated from IT infrastructure continuously, these generated events needs to be addressed appropriately and acted upon. There are several event monitoring tools available in the market to monitor the infrastructure. Event monitoring tools are isolated to the respective tools to handle and take appropriate remediation actions, but these tools are not related to the ServiceNow to be able to:

- Associate the event or alert associated with the CI
- Escalate the events to the right teams

The ServiceNow event management application helps to manage alerts and events that are escalated from different IT infrastructure components or configuration items. Important steps, as described following, are used to configure and set up the event management application.

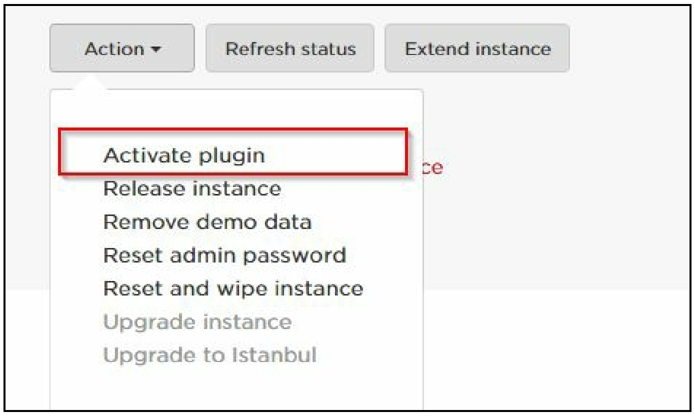
- **Events**: Events are generated by various infrastructure components and monitoring software
- **Connection definitions/Instances**: Connection to various event monitoring software
- **Event rules**: How to handle the events that are generated
- **Event field mappings**: Mapping values or fields generated by the different event sources and the mapping to the ServiceNow event fields
- **Alert correlation rules**: When to generate alerts and how to consolidate them
- **Alert remediation**: Action that needs to be taken on the alerts generated
- **Dashboards**: Overview of all the alerts generated, users are able to take appropriate remediation actions from the dashboards


Events
Connector Definitions / Instances
Event Rules
Event Field Mappings
Alert Correlation Rules
Alert Remediation
Dashboards

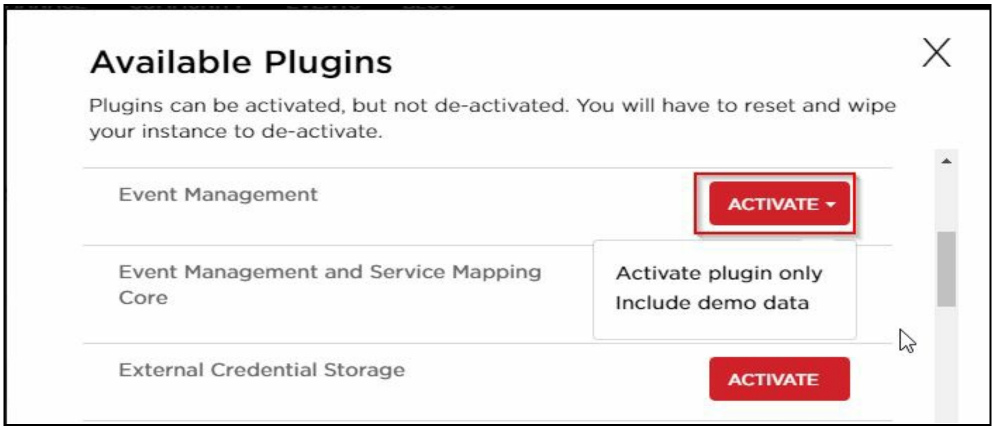
Setting and configuring event management

The event management plugin is available as a separate subscription. You will need to have access to the Hi portal for you to be able to activate the event management plug in. In our example, let's see how to activate the event management plug in from the personal developer instance.

1. On the instance, you will need to click Action and click on Activate plugin.



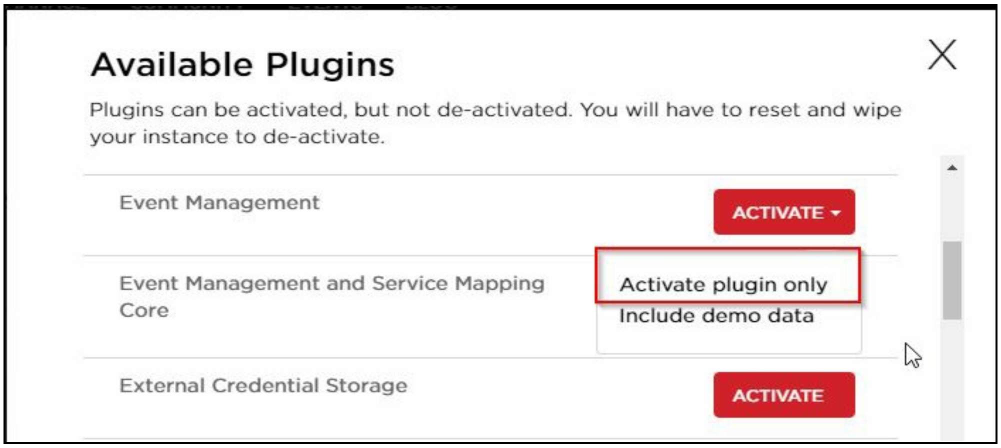
2. A list of plugins will be available which are mostly subscription based. Search for Event Management and then click on Activate.



Available Plugins

Plugins can be activated, but not de-activated. You will have to reset and wipe your instance to de-activate.

3. You have the choice to Activate plugin only or Include demo data.

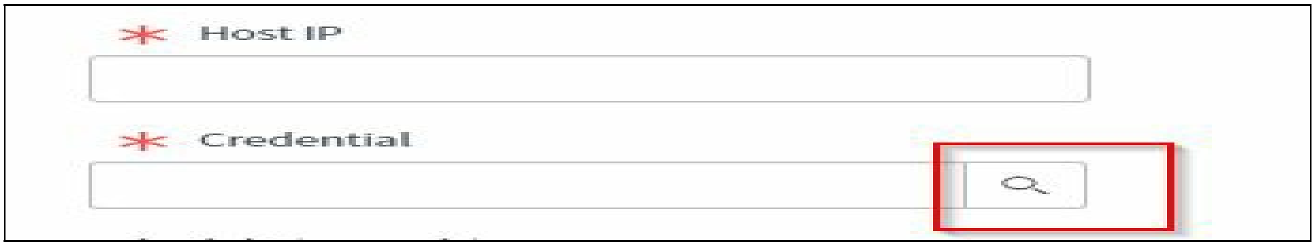


Available Plugins

Plugins can be activated, but not de-activated. You will have to reset and wipe your instance to de-activate.

4. You will see the status of the plugin that is being activated. Once activated, you will see a

completion message or you will be notified by an email when the plugin has been successfully activated as shown following:



There are two different ways of setting up the event management application.

- The traditional way is manual configuration
- The alternative is guided setup

In this chapter, let's see how to setup event management using the traditional way, manual configuration, and also introduce how to get started on guided setup.

Here are the steps to configure and setup the event management application

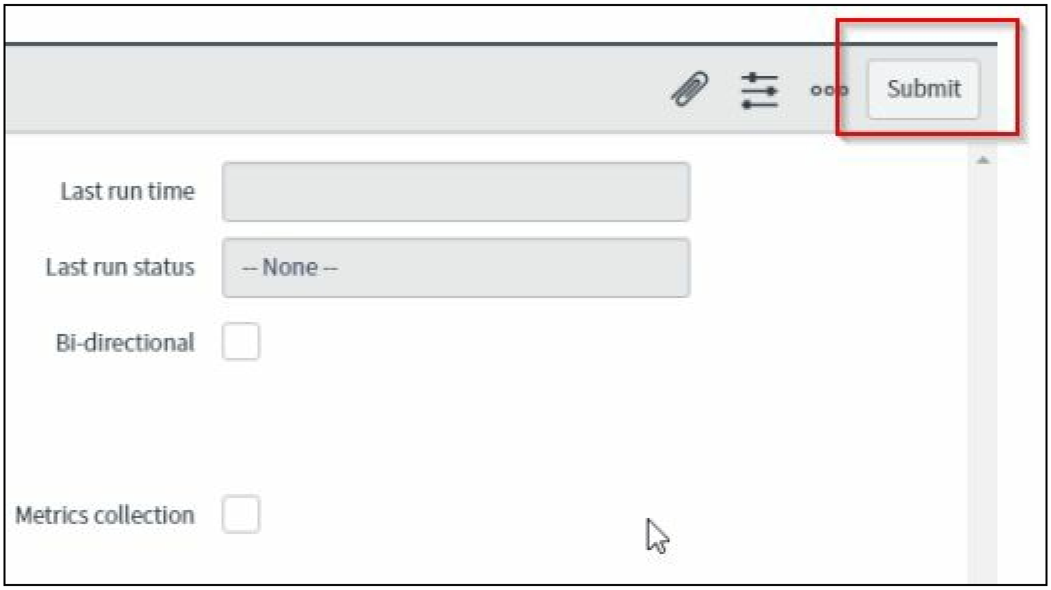
- Configure the MID Server
- Set up the event source and properties
- Configure connector definitions
- Configure connector instances
- Configure event field mapping
- Configure event rules
- Configure alert binding
- Configure alert rules
- Configure alert remediation
- Exploring the event dashboard

MID Server setup and configuration

The MID Server is only needed for the event connectors and SNMP traps. You can also use the REST API directly into the `em_event` table, and this does not require a MID Server. You may want to state that, and just say that the REST API way is out of scope for this chapter

The MID Server needs to be installed for you to be able to talk with ServiceNow and the corporate network. If you don't have the MID Server installed, see Chapter 2, *MID Server Essentials*, in this book.
The MID Server also needs to be validated for us to be able to configure the event management application.

Once the MID Server is set up, you will need to validate it. The following is the list of MID Servers; a green light next to the status and validated columns means the MID Server is configured and ready to be used.



Last run time

Last run status -- None --

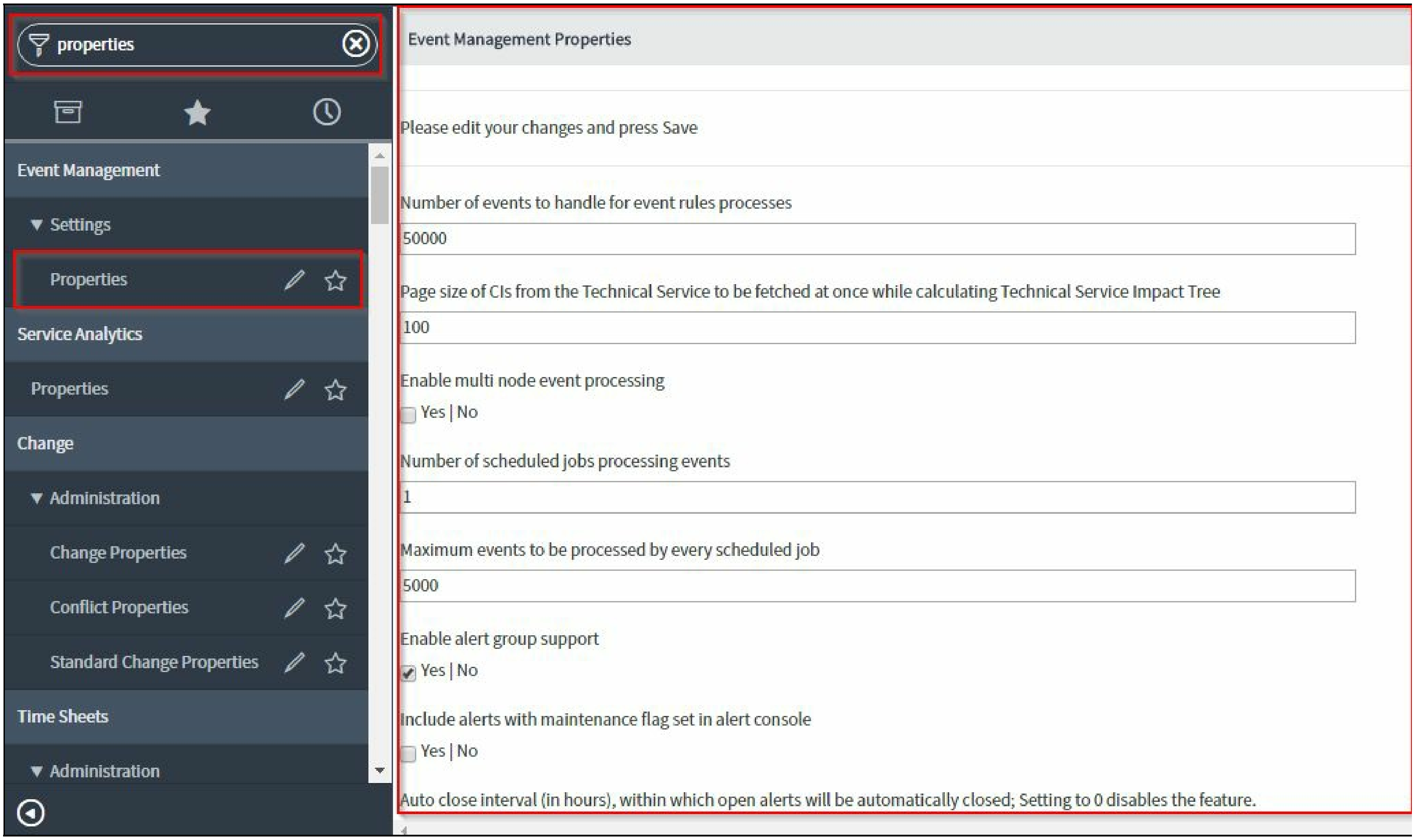
Bi-directional □

Metrics collection □

Event sources and properties setup

Event sources and properties are settings for the event management applications. To set properties type `properties` on the application navigator. Select Event Management | Settings | Properties to open up a window to enter the properties. Some of the important properties include the following:

- The number of events to handle for event rules processes
- The maximum number of events to be processed by every scheduled job
- Whether multi-node event processing is enabled
- The number of scheduled jobs processing events
- The maximum number of events to be processed by every scheduled job
- Whether alert group support is enabled
- An auto close interval (in hours), within which open alerts will be automatically closed
    - Setting to 0 disables the feature
- Timeout for the impact calculation (in minutes)
- A flap interval (in seconds), within which an alert enters the flapping state. Sometimes the event sources continues to generate events even after the associated alert is closed this is called **flapping**. This causes to fluctuate the status of the reporting resource.
- The maximum number of alerts to show on the dashboard and services bottom panel
- Acknowledge an alert when manually closing it
- Closing alerts will--Resolve incident and close incident
- Reopening alerts will--Create new incident and reopen incident



Event Management Properties

Please edit your changes and press Save

Number of events to handle for event rules processes

50000

Page size of CIs from the Technical Service to be fetched at once while calculating Technical Service Impact Tree

100

Enable multi node event processing

□ Yes | No

Number of scheduled jobs processing events

1

Maximum events to be processed by every scheduled job

5000

Enable alert group support

☑ Yes | No

Include alerts with maintenance flag set in alert console

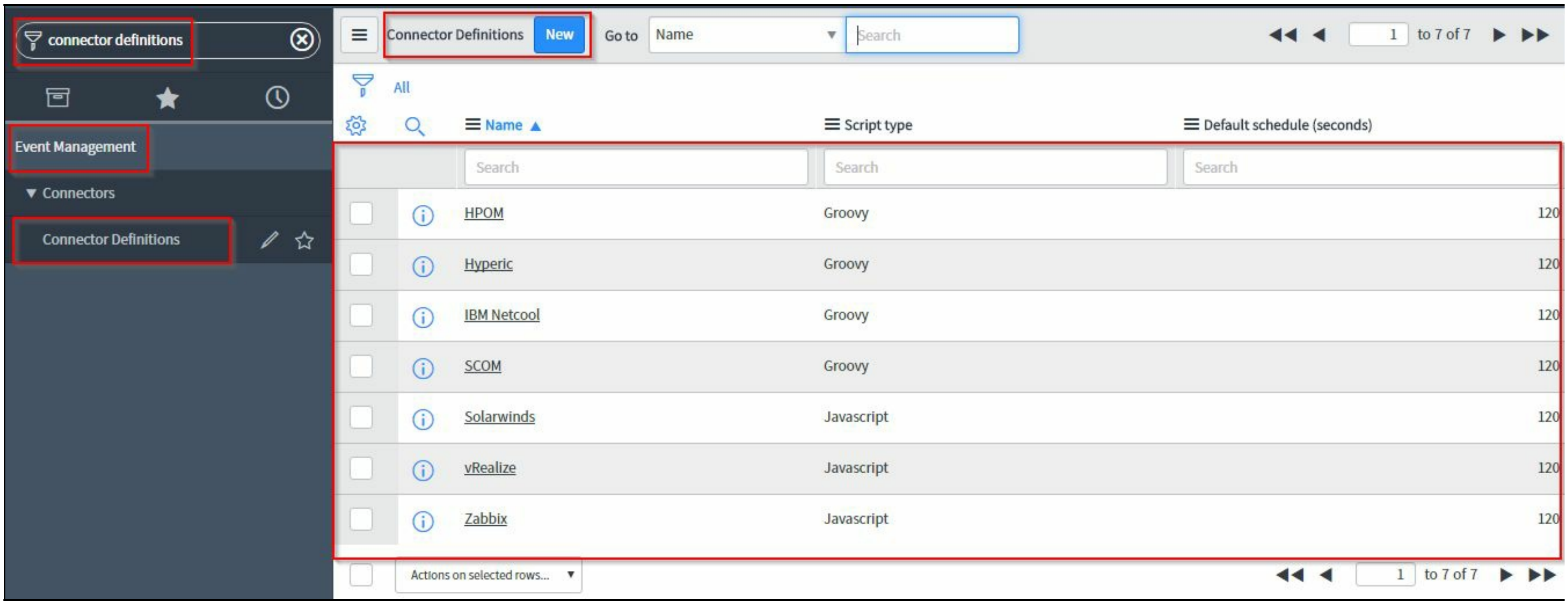
□ Yes | No

Auto close interval (in hours), within which open alerts will be automatically closed; Setting to 0 disables the feature.

Connector definition configuration

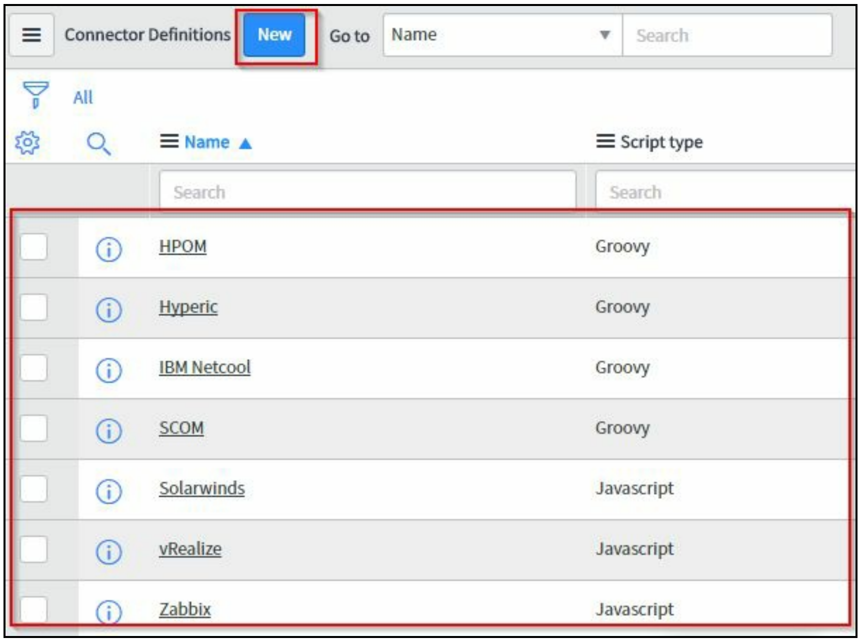
A connector definition specifies an event source to retrieve events from the defined event source. The connector definition configuration is only needed if you have an event source vendor that does not have a connector definition out of the box, in which case you also need to create the script to handle the events.
To create a connector definition follow these steps.

1. From the application navigator type `connector definitions` and click on Connector Definitions under Event Management | Connectors.



Name ▲	Script type	Default schedule (seconds)
HPOM	Groovy	120
Hyperic	Groovy	120
IBM Netcool	Groovy	120
SCOM	Groovy	120
Solarwinds	Javascript	120
vRealize	Javascript	120
Zabbix	Javascript	120

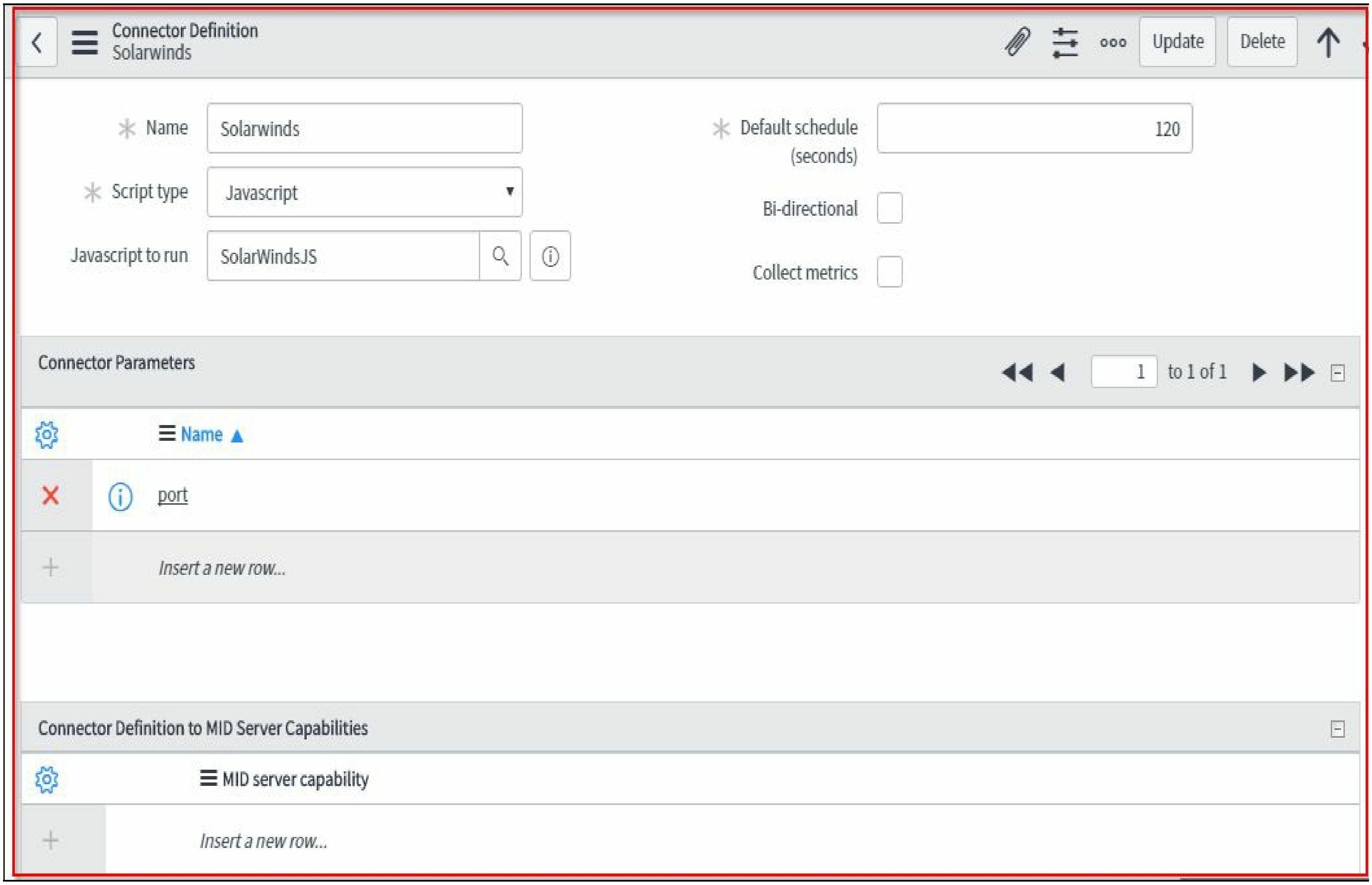
2. Click on New to create a new connector definition.



Name ▲	Script type
HPOM	Groovy
Hyperic	Groovy
IBM Netcool	Groovy
SCOM	Groovy
Solarwinds	Javascript
vRealize	Javascript
Zabbix	Javascript

3. You have an option to create a new connector definition. You can fill in the required fields
   - Name: The name of the events monitoring software

- Script type: The script type to run
- Connector Parameters: Attributes to communicate with the event monitoring software
- MID server capability: The MID Server to utilize for processing



* Name	Solarwinds	* Default schedule (seconds)	120
* Script type	Javascript	Bi-directional	□
Javascript to run	SolarWindsJS	Collect metrics	□

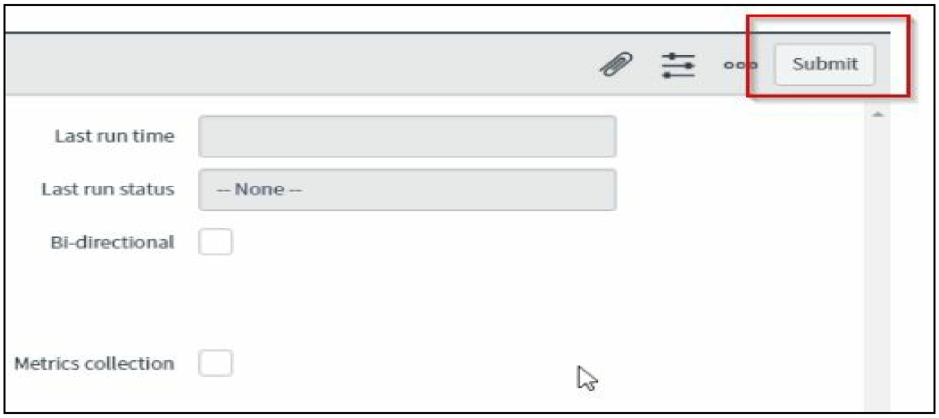
Connector Parameters

Name ▲
port
Insert a new row...

Connector Definition to MID Server Capabilities

MID server capability
Insert a new row...

4. Once the credentials and connector definitions are entered, you can click Submit to create the connector instance. Alternatively, you can right-click on the header and click Save.

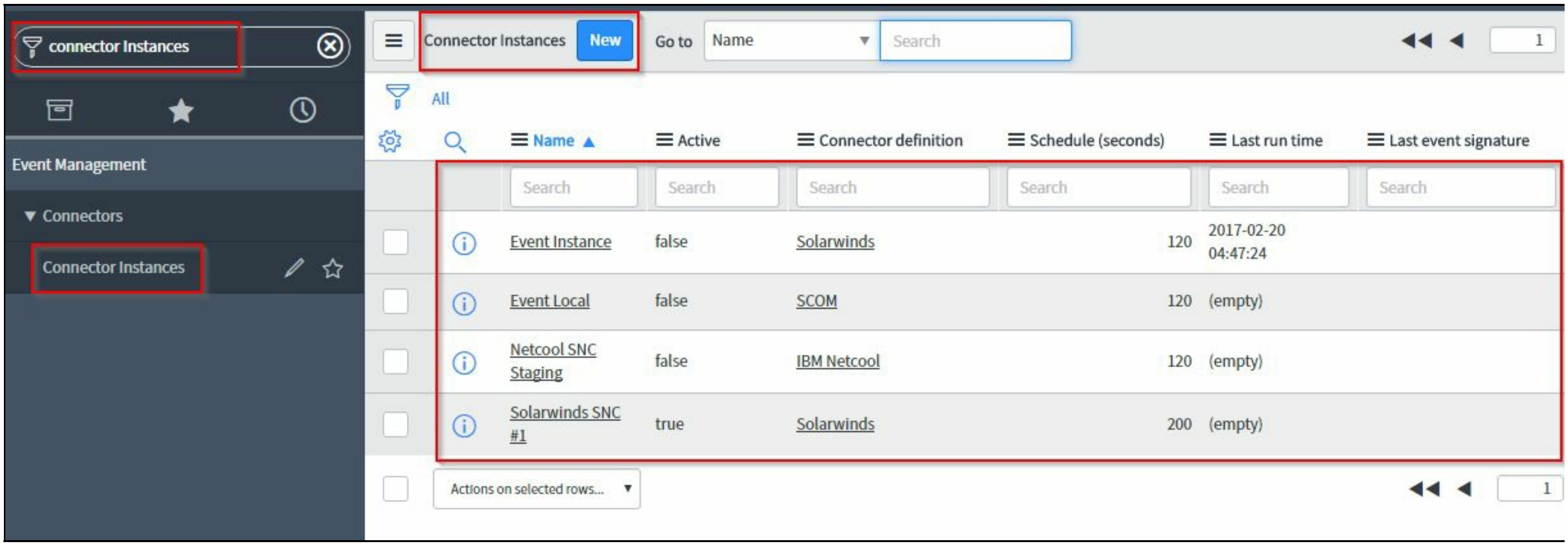


Last run time	
Last run status	-- None --
Bi-directional	□
Metrics collection	□

Configuring a connector instance

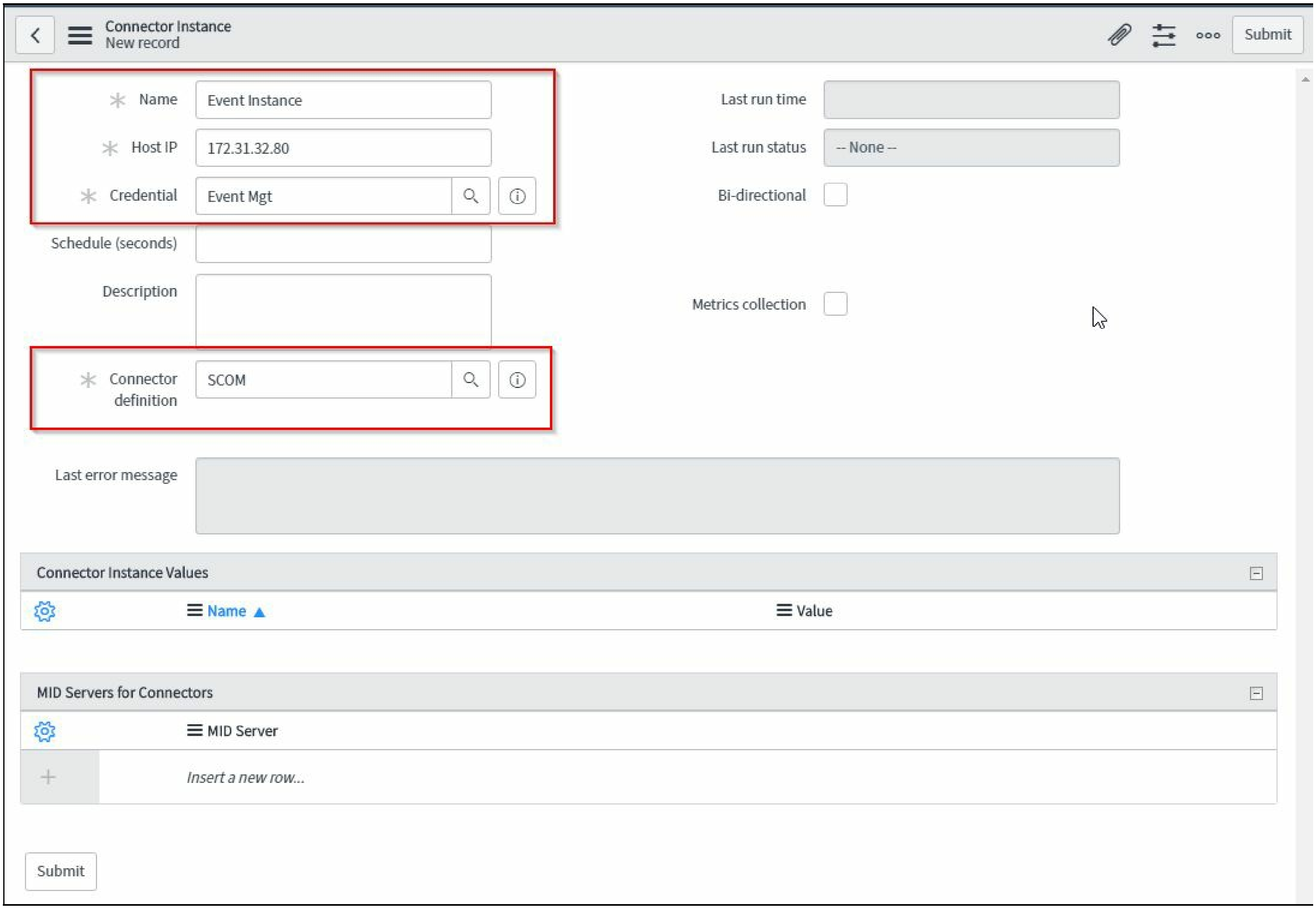
The MID Server gets the instructions through the connector instances to obtain event-related information based on the individual event source. Follow the following steps to configure a connector instance.

1. On the application navigator type, `connector Instances` and then click Connector Instances under Event Management | Connectors. The list of existing connector instances opens on the left pane.



Name	Active	Connector definition	Schedule (seconds)	Last run time	Last event signature
Event Instance	false	Solarwinds	120	2017-02-20 04:47:24	
Event Local	false	SCOM	120	(empty)	
Netcool SNC Staging	false	IBM Netcool	120	(empty)	
Solarwinds SNC #1	true	Solarwinds	200	(empty)	

2. Clicking on New opens up a form to create a new connector instance. The following mandatory fields need to be filled to create a connector instance:
   - Name: The name of the connector instance
   - Host IP: The IP of the event host
   - Credential: Credentials to logon to the event monitoring tool
   - Connector definition: The connector type; you can choose whether to select connector definition out of box or create a new connector definition



Connector Instance
New record

Submit

* Name	Event Instance
* Host IP	172.31.32.80
* Credential	Event Mgt
Schedule (seconds)	
Description	
* Connector definition	SCOM
Last run time	
Last run status	-- None --
Bi-directional	□
Metrics collection	□
Last error message	

Connector Instance Values

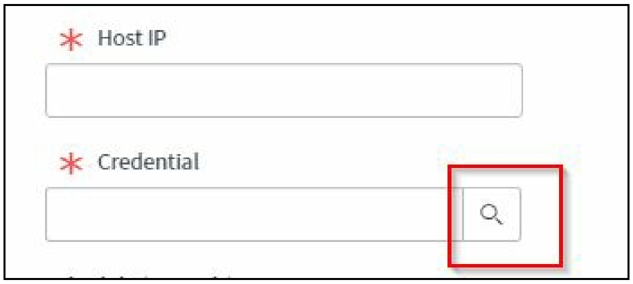
Name ▲	Value

MID Servers for Connectors

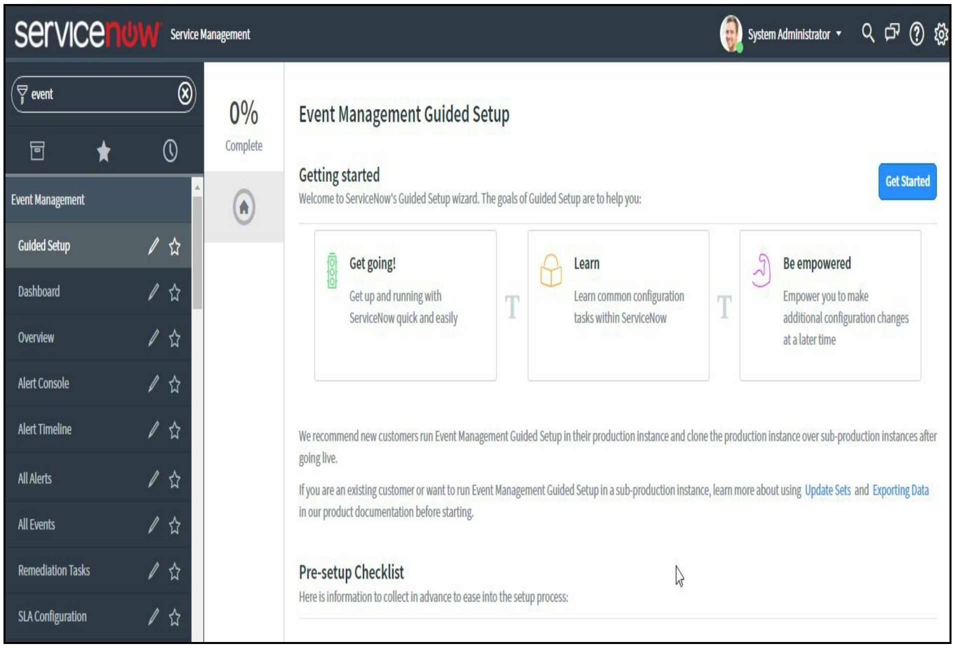
MID Server
Insert a new row...

Submit

3. Credential and Connector definition needs to be configured separately. Let's see how to configure the credential. Click on the magnifying glass next to the Credential text box.



4. Clicking on the magnifying glass bring up the Credentials window. You can select any existing credential or click on New to create a new credential.



Event Management Guided Setup

Getting started

Welcome to ServiceNow's Guided Setup wizard. The goals of Guided Setup are to help you:

- Get going! Get up and running with ServiceNow quick and easily
- Learn Learn common configuration tasks within ServiceNow
- Be empowered Empower you to make additional configuration changes at a later time

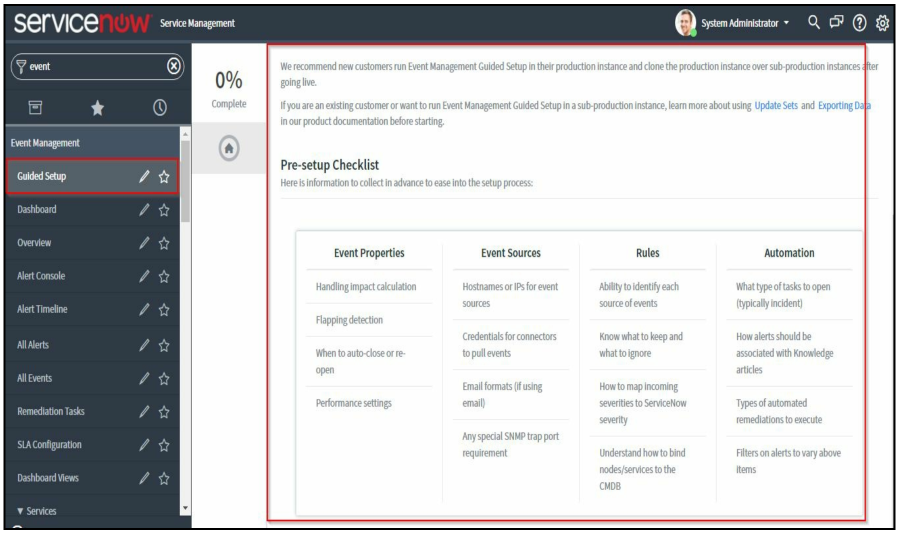
We recommend new customers run Event Management Guided Setup in their production instance and clone the production instance over sub-production instances after going live.

If you are an existing customer or want to run Event Management Guided Setup in a sub-production instance, learn more about using Update Sets and Exporting Data in our product documentation before starting.

Pre-setup Checklist

Here is information to collect in advance to ease into the setup process:

5. Clicking on New, you will find different types of credentials to create. You can click on the required credential, which opens up a form to provide the credential depending on the type of credential chosen.



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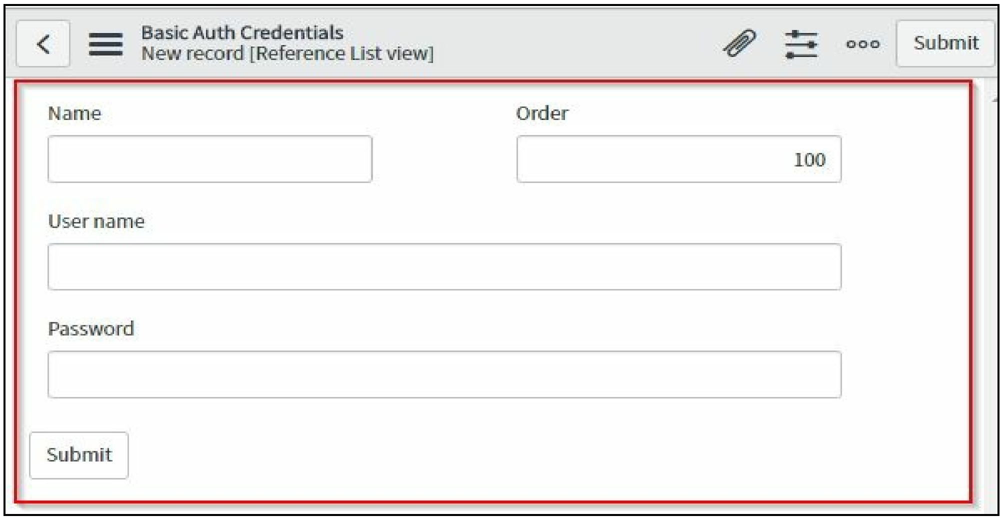
If you are an existing customer or want to run Event Management Guided Setup in a sub-production instance, learn more about using Update Sets and Exporting Data in our product documentation before starting.

Pre-setup Checklist

Here is information to collect in advance to ease into the setup process:

Event Properties	Event Sources	Rules	Automation
Handling impact calculation	Hostnames or IPs for event sources	Ability to identify each source of events	What type of tasks to open (typically incident)
Flapping detection	Credentials for connectors to pull events	Know what to keep and what to ignore	How alerts should be associated with Knowledge articles
When to auto-close or re-open	Email formats (if using email)	How to map incoming severities to ServiceNow severity	Types of automated remediations to execute
Performance settings	Any special SNMP trap port requirement	Understand how to bind nodes/services to the CMDB	Filters on alerts to vary above items

6. Clicking on basic authentication will open up a form like the following:



Basic Auth Credentials
New record [Reference List view]

Name

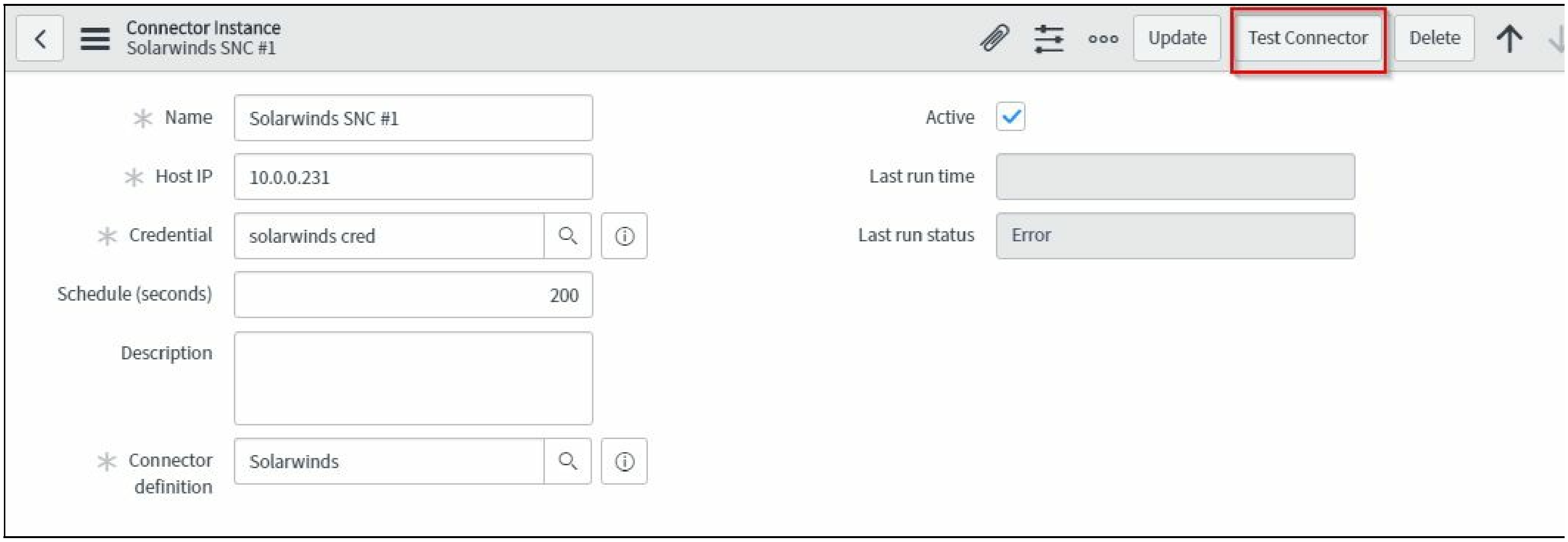
Order 100

User name

Password

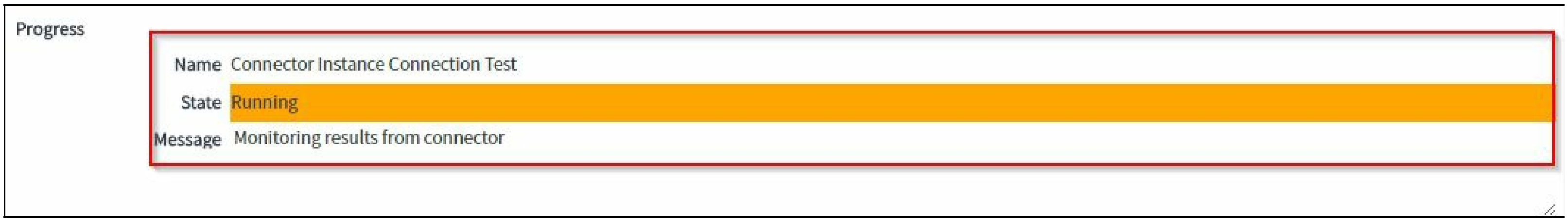
Submit

7. Once the connector instance is created you can click on Test Connector to validate the connection and credentials.



* Name	Solarwinds SNC #1	Active	✓
* Host IP	10.0.0.231	Last run time	
* Credential	solarwinds cred	Last run status	Error
Schedule (seconds)	200		
Description			
* Connector definition	Solarwinds		

8. You can see the progress of the connector test as shown following:

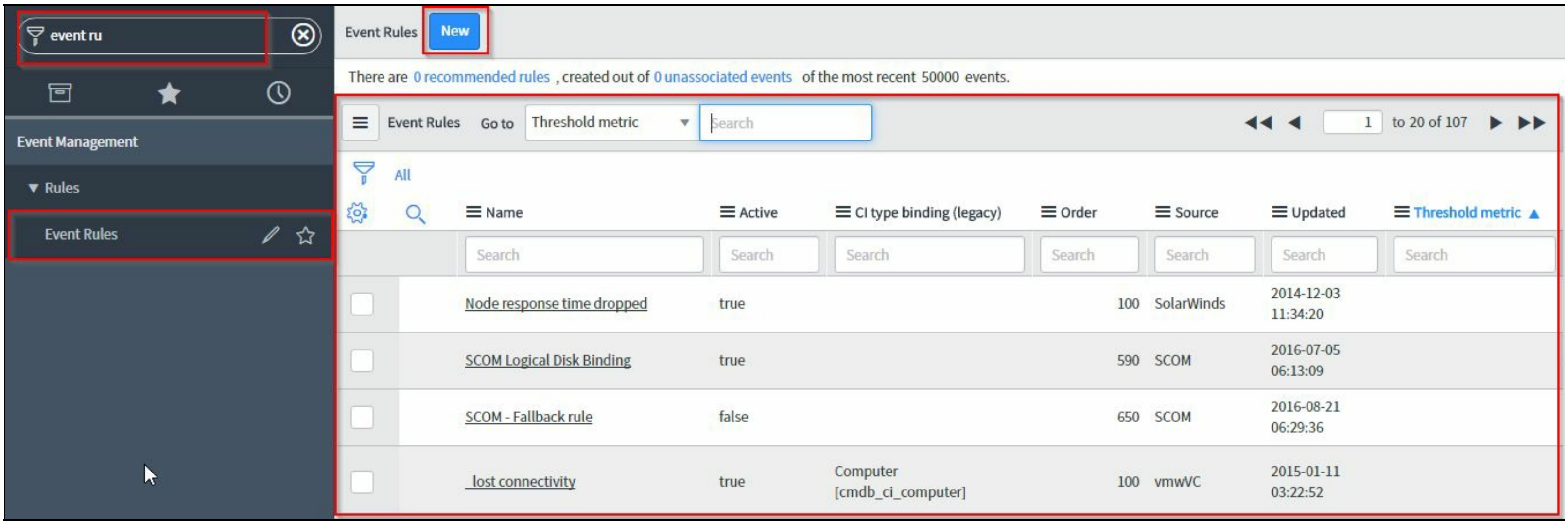


Name	Connector Instance Connection Test
State	Running
Message	Monitoring results from connector

Event mapping rules and filters

Event rules are there to generate alerts based on a specific condition that must satisfy before or after an action is taken. For example, similar to your email mail box, you write rules to specific when an email arrives with specific criteria you specific actions to take. Similar to that, event rules specifies the alerts to generate when a specific event rule criteria is met.

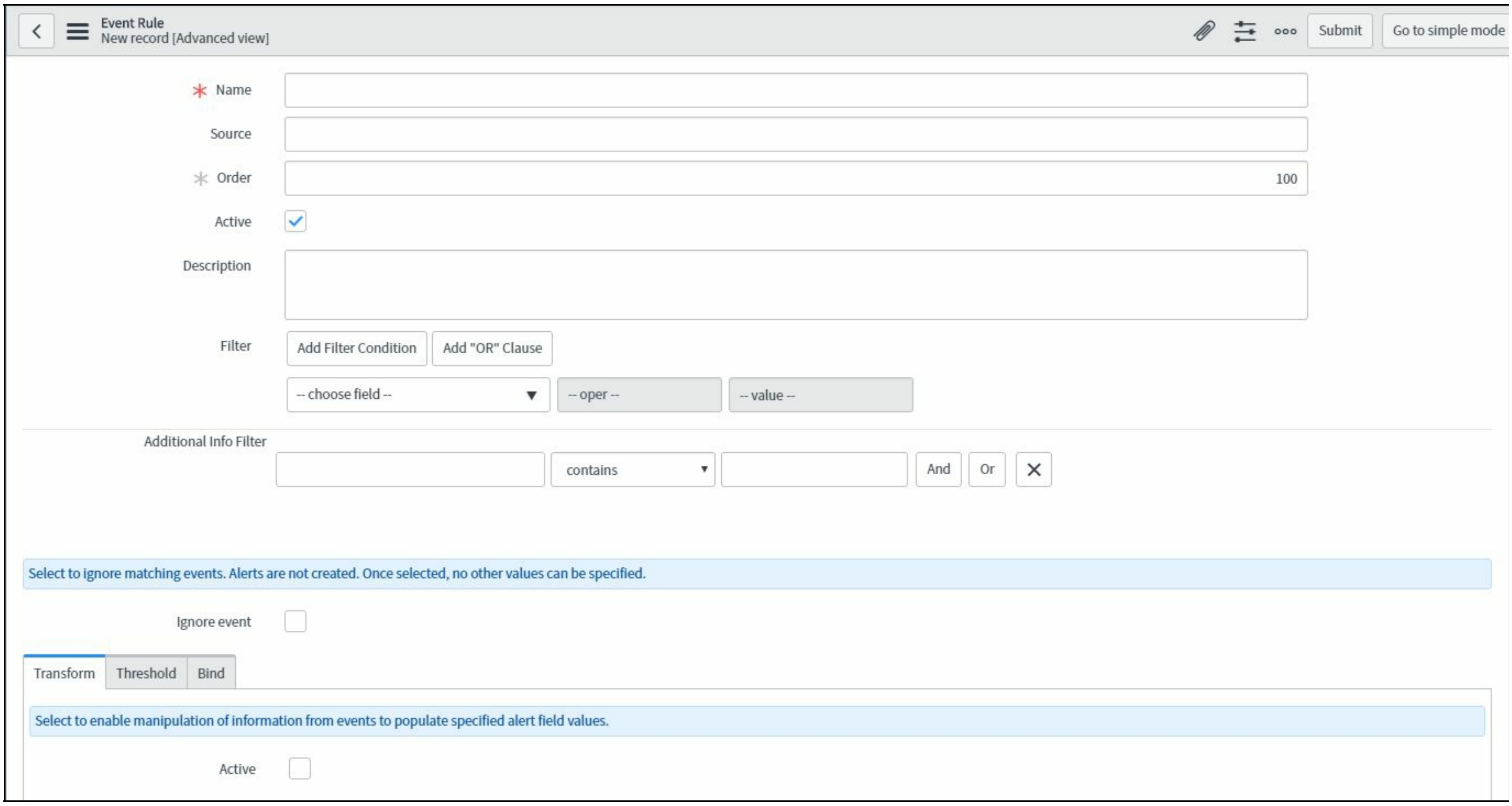
To configure event rule, type `event rules` on the application navigator and click on Event Rules under Event Management | Rules. A list of existing event rules opens on the right pane. By clicking on the New button, you can create a new event rule.



There are 0 recommended rules , created out of 0 unassociated events of the most recent 50000 events.

Name	Active	CI type binding (legacy)	Order	Source	Updated	Threshold metric ▲
Node response time dropped	true		100	SolarWinds	2014-12-03 11:34:20	
SCOM Logical Disk Binding	true		590	SCOM	2016-07-05 06:13:09	
SCOM - Fallback rule	false		650	SCOM	2016-08-21 06:29:36	
lost connectivity	true	Computer [cmdb_ci_computer]	100	vmwVC	2015-01-11 03:22:52	

When you click on New button a new event rule form opens up, where you will need to fill in the required details:



Name

Source

Order: 100

Active: ☑

Description

Filter: Add Filter Condition | Add "OR" Clause

-- choose field -- | -- oper -- | -- value --

Additional Info Filter: contains | And | Or | ✕

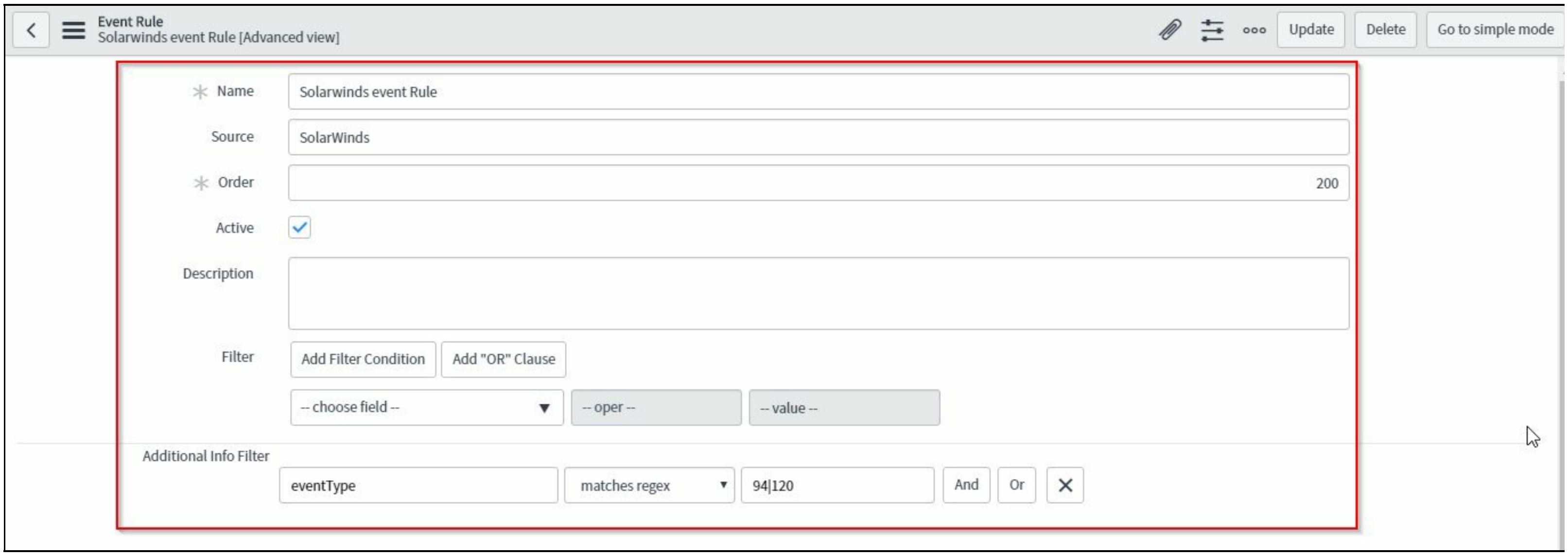
Select to ignore matching events. Alerts are not created. Once selected, no other values can be specified.

Ignore event: □

Select to enable manipulation of information from events to populate specified alert field values.

Active: □

You will need to provide a name for the event rule, then right-click on the header and click on Save.



Name: Solarwinds event Rule

Source: SolarWinds

Order: 200

Active: ☑

Description

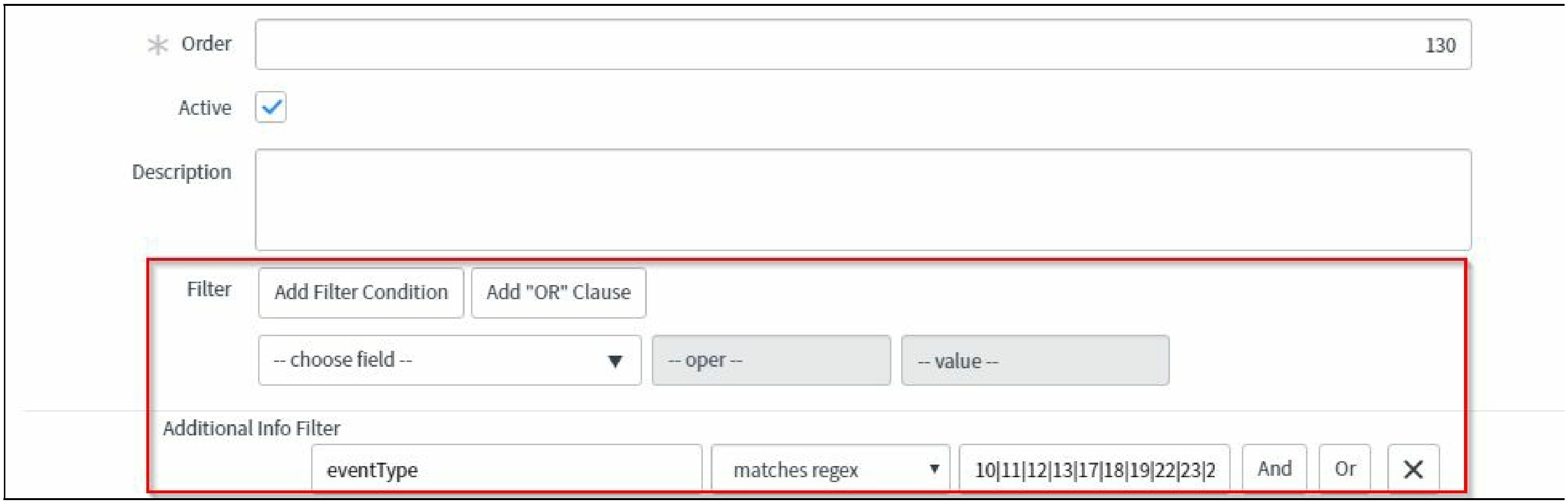
Filter: Add Filter Condition | Add "OR" Clause

-- choose field -- | -- oper -- | -- value --

Additional Info Filter: eventType | matches regex | 94|120 | And | Or | ✕

Description of the event fields are as follows:

- Name: The name of the event rule, this can be any meaningful name
- Source: The event monitoring software that generated the event, such as SolarWinds or SCOM
- Active: Make the event rule active or inactive
- Description: A description of the event rule mapping
- Filter and Additional Info Filter: The specific condition used to filter out the event data. The event rule will apply to events that match the filter, which come from the source specified in the form



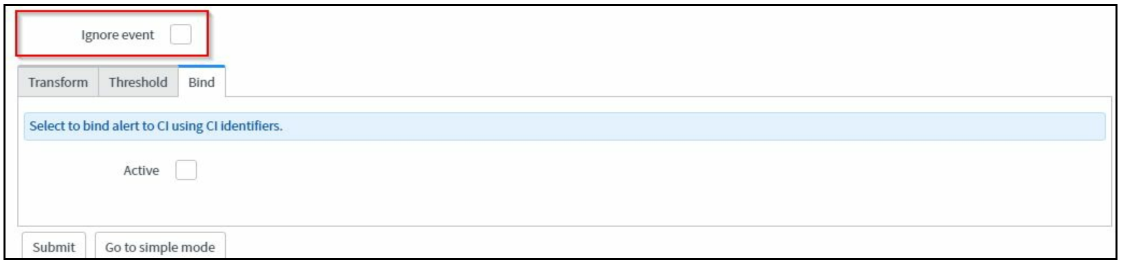
✱ Order 130

Active ☑

Additional Info Filter

eventType matches regex 10|11|12|13|17|18|19|22|23|2

You can configure an event rule to ignore extraneous events and prevent alert generation.



Ignore event □

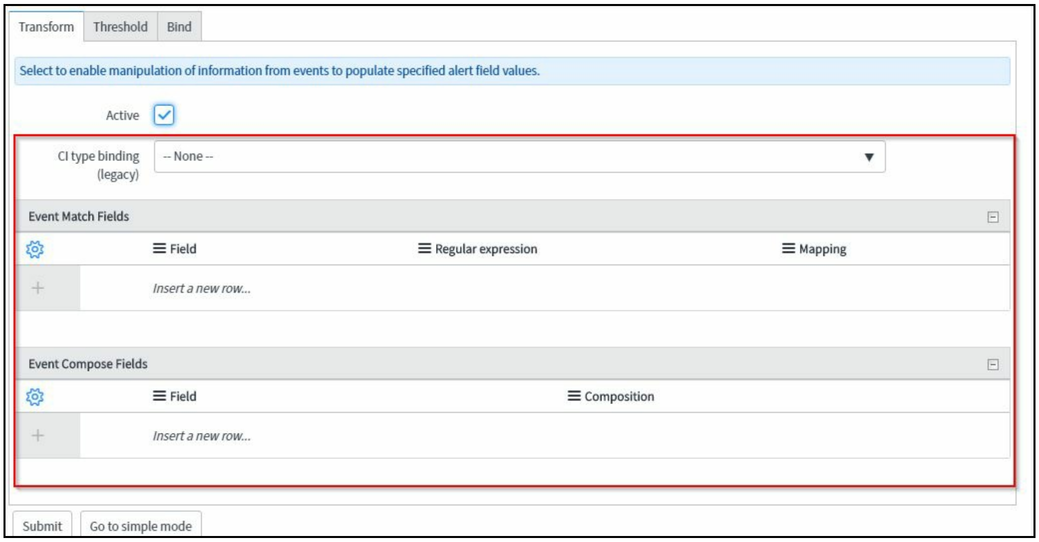
Select to bind alert to CI using CI identifiers.

Active □

Once the Ignore event is clicked the related tabs Transform, Threshold, and Blind gets locked down.

Create a transform to populate specified alert field values as shown following. Using these options, alerts are immediately created from the events. Click on the Transform tab and then click on the Active checkbox for additional options.

- Clicking on Active checkbox will open additional options that include
  - CI type binding: If, in the Bind section, criteria have not been specified or if the specified bind criteria are not matched, then the legacy binding criteria are considered
  - Event Match Fields: Here you create regular expressions to pick the specific fields you need from the event



Select to enable manipulation of information from events to populate specified alert field values.

Active ☑

CI type binding (legacy) -- None --

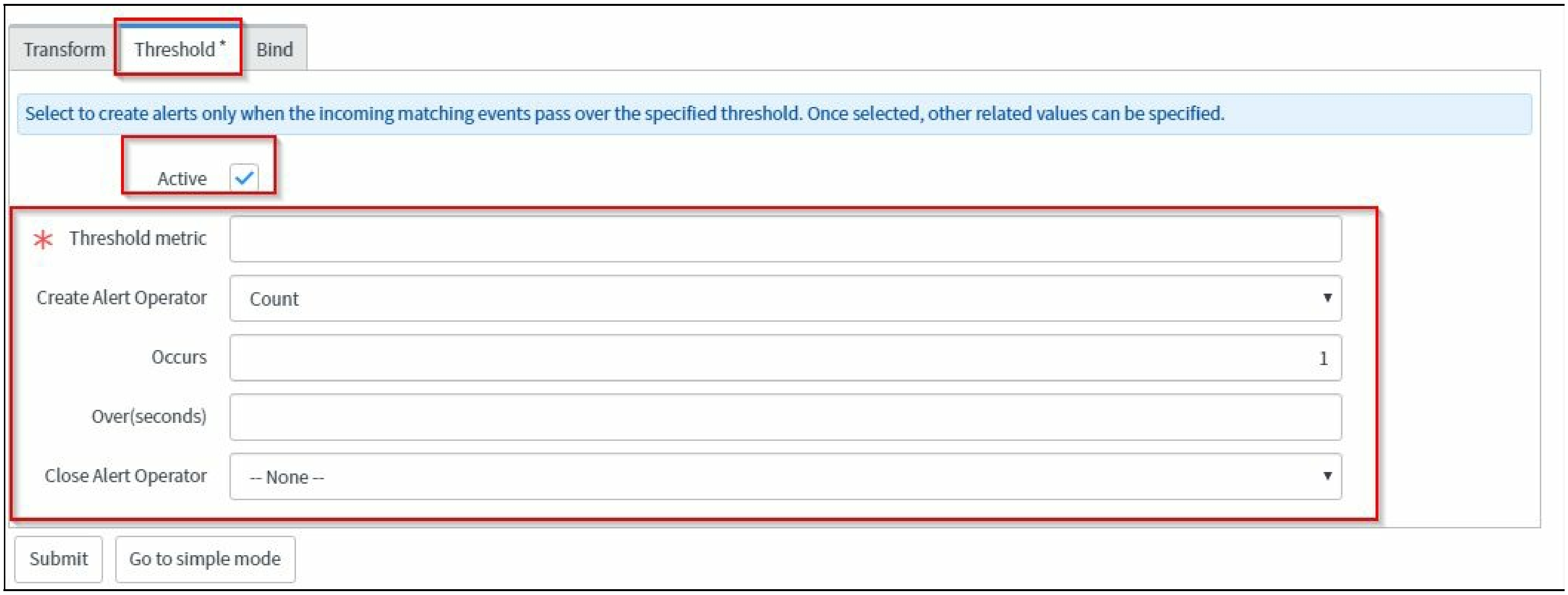
Event Match Fields

Field	Regular expression	Mapping
Insert a new row...		

Event Compose Fields

Field	Composition
Insert a new row...	

Threshold can be set based on the volume of events received over a certain period. This creates the alert only if the number of incoming events passes a certain threshold. To set a threshold, click on the Threshold tab on the related list. Click on Active certain fields appear that needs to be filled.



Select to create alerts only when the incoming matching events pass over the specified threshold. Once selected, other related values can be specified.

Active ☑

* Threshold metric

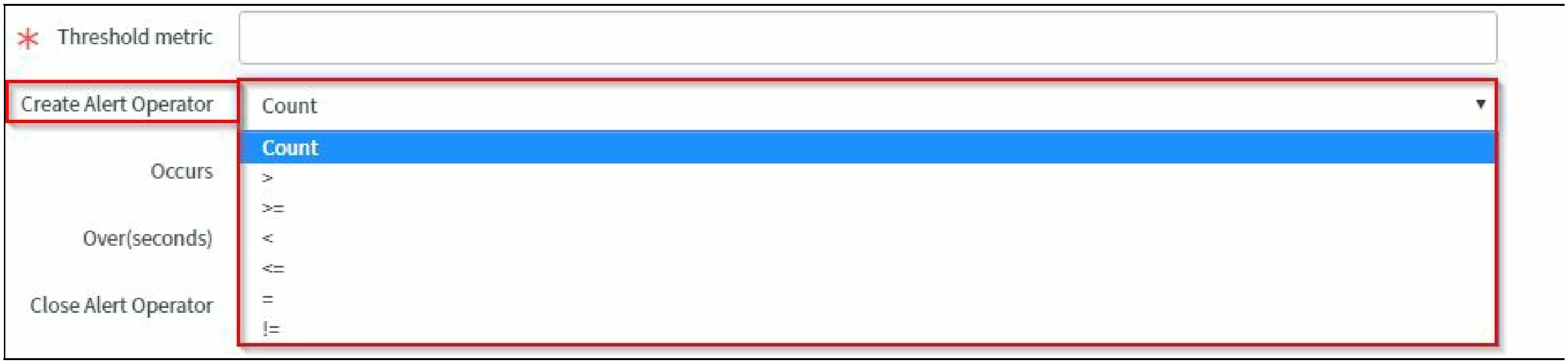
Create Alert Operator: Count

Occurs: 1

Over(seconds)

Close Alert Operator: -- None --

- Threshold metric: This can be a logical naming or add on information that is added to an event example--`network bandwidth`
- Create Alert Operator: The math operator which works against the threshold metric and the value. For example, selecting `>` operator assumes that; if Threshold metric `network bandwidth` is `>`.



* Threshold metric

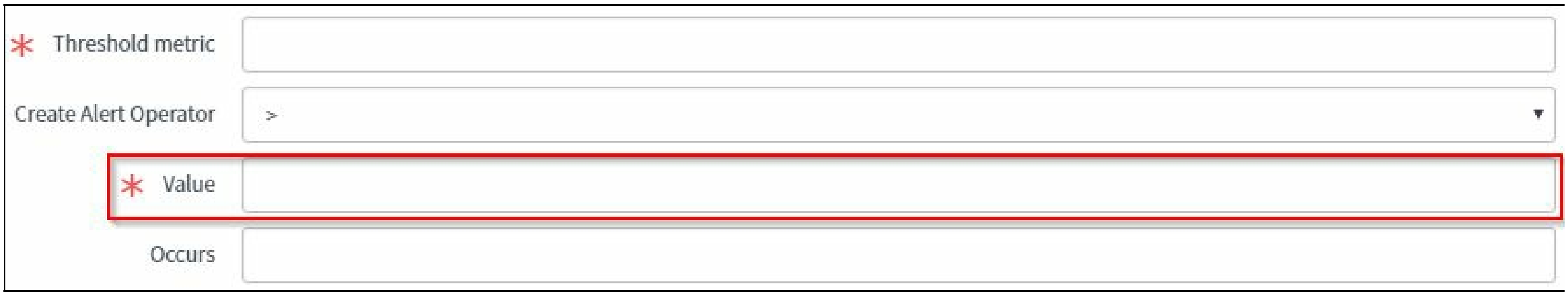
Create Alert Operator: Count

Occurs

Over(seconds)

Close Alert Operator

- Value: The threshold limit value. This value works with the Create Alert Operator and the Create Alert Operator works against the Threshold metric. For example, if Threshold metric `network bandwidth` is Create alert Operator `>` `*:95` . Value of `*:95` means 95% which means the network bandwidth is greater than 95%.



* Threshold metric

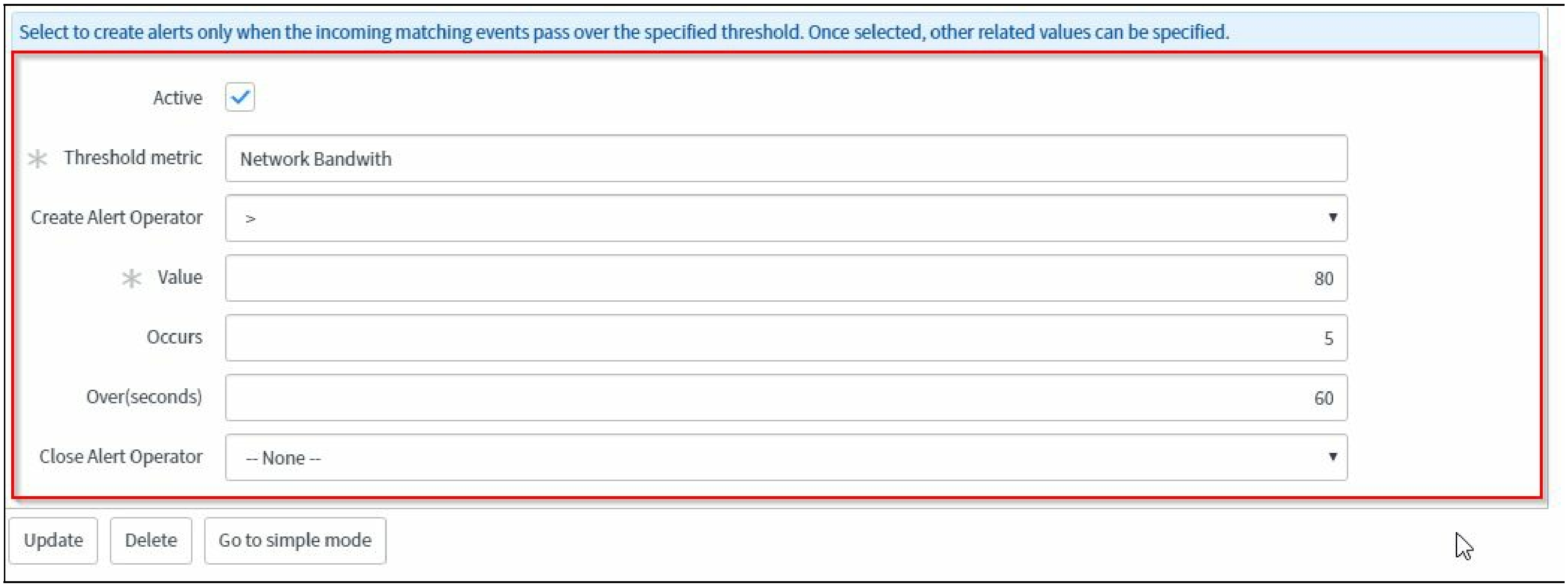
Create Alert Operator: >

* Value

Occurs

- Occurs: The number of times the event needs to occur to generate an alert. This is a numerical value. If you set `5` then the event should occur five times.

- Over(seconds): This works with the Occurs field; this is a time bound field which accepts numerical value in seconds. If you provide `60` an alert will be generated if Threshold metric occurs 5 times in 60 seconds.
- You can also configure a Close Alert Operator similarly by using the filed Close Alert Operator.

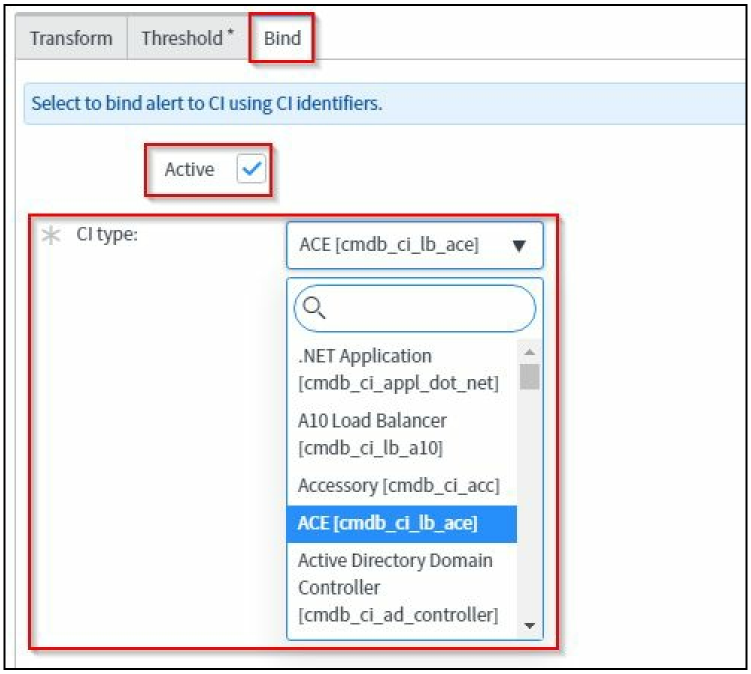


Select to create alerts only when the incoming matching events pass over the specified threshold. Once selected, other related values can be specified.

Active	☑
* Threshold metric	Network Bandwith
Create Alert Operator	>
* Value	80
Occurs	5
Over(seconds)	60
Close Alert Operator	-- None --

You can bind alerts to a particular CI type. It is important to bind the alerts to be able to associate with a particular CI. For example, if you have an event that is saying that a SQL Server is having CPU over 90%, you would like it to be bind to the SQL server application as well as to the host that is running the SQL.

Click on the Bind tab and then click on Active. The CI type field appears where you will need to select the CI identifier or the CI type to bind the alert to a CI type.



Transform
Threshold *
Bind

Select to bind alert to CI using CI identifiers.

Active ☑

* CI type: ACE [cmdb_ci_lb_ace]

.NET Application [cmdb_ci_appl_dot_net]
A10 Load Balancer [cmdb_ci_lb_a10]
Accessory [cmdb_ci_acc]
ACE [cmdb_ci_lb_ace]
Active Directory Domain Controller [cmdb_ci_ad_controller]

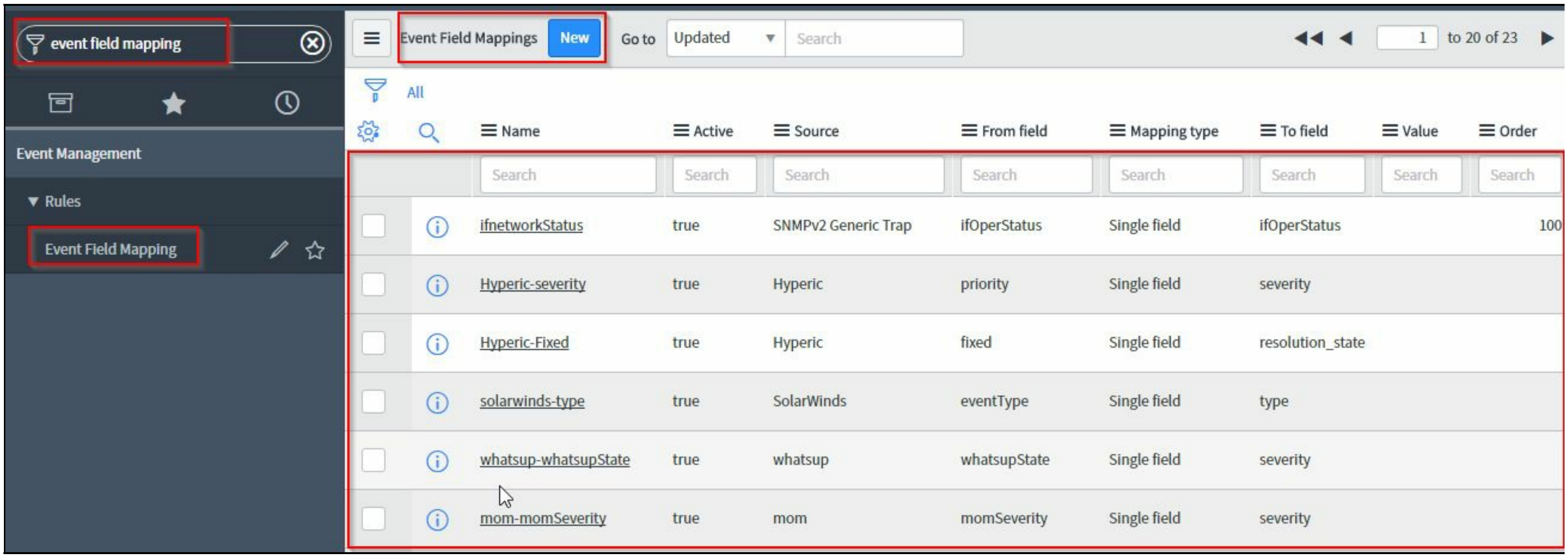
Exploring alert rules, threshold rules and event transform rules

Alerts are generated through events; alerts are setup through event rules. Alerts are nothing but notifications that are generated based on the event rules which require attention. In the earlier topic, we saw how to manage events, now let's see how to create alerts.

Creating event field mappings

When events are generated from different event sources, the incoming event source value might be different than the value in event management application. Event field mapping helps to identify which field from event source maps to which field in ServiceNow table. Once the event rules are executed, the event field mapping occurs and then the alerts are generated. Follow the steps for creating event field mappings.

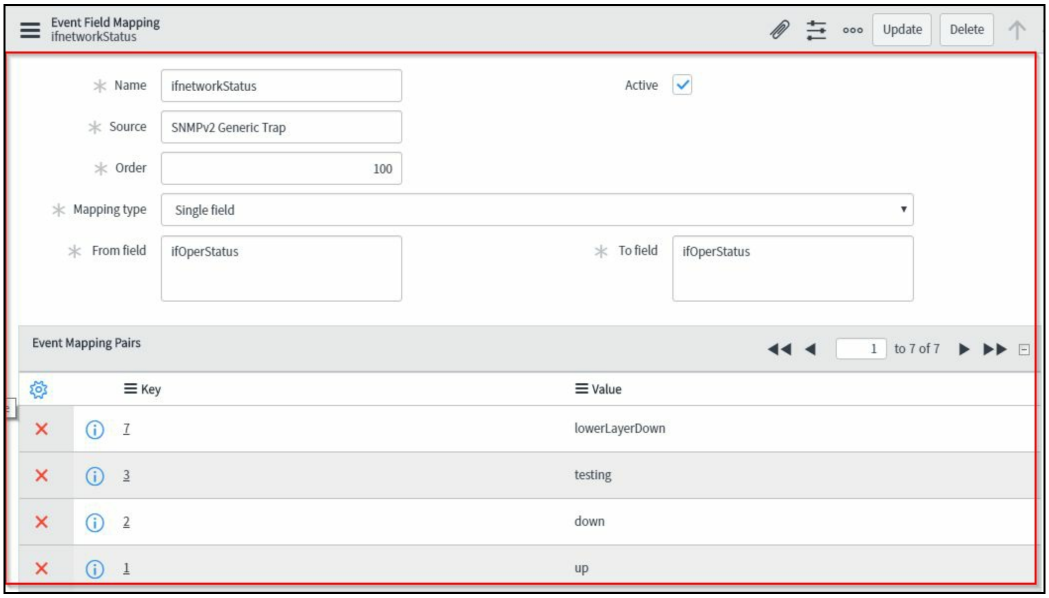
1. From the application navigator type `event field mapping`, then click on Event Field Mapping under Event Management | Rules to list all the existing Event Field Mappings.



		Name	Active	Source	From field	Mapping type	To field	Value	Order
		Search	Search	Search	Search	Search	Search	Search	Search
□	ⓘ	ifnetworkStatus	true	SNMPv2 Generic Trap	ifOperStatus	Single field	ifOperStatus		100
□	ⓘ	Hyperic-severity	true	Hyperic	priority	Single field	severity		
□	ⓘ	Hyperic-Fixed	true	Hyperic	fixed	Single field	resolution_state		
□	ⓘ	solarwinds-type	true	SolarWinds	eventType	Single field	type		
□	ⓘ	whatsup-whatsupState	true	whatsup	whatsupState	Single field	severity		
□	ⓘ	mom-momSeverity	true	mom	momSeverity	Single field	severity		

There are default mappings that are provided in the platform for commonly used system monitoring tools, and you only need to create new ones if there are none in the provided list that capture the current mapping.

2. Clicking on the New button will open a form to create a new Event Field Mapping. You will need to enter all the required fields on the form.
   - Name: The event field mapping name
   - Source: The event generating software or the source of the event
   - Mapping type: Used to change an event field value. There are different values you select:
     - Single field: Specific values are transformed from one event field to another event field
     - Constant: Transforms a value provided to the new value provided
   - Form field and To field: The event field to replace from an existing value in the Form field to a value given in the To field field
   - Event Mapping Pairs : The value that needs to be inserted into the To Field



Event Field Mapping
ifnetworkStatus

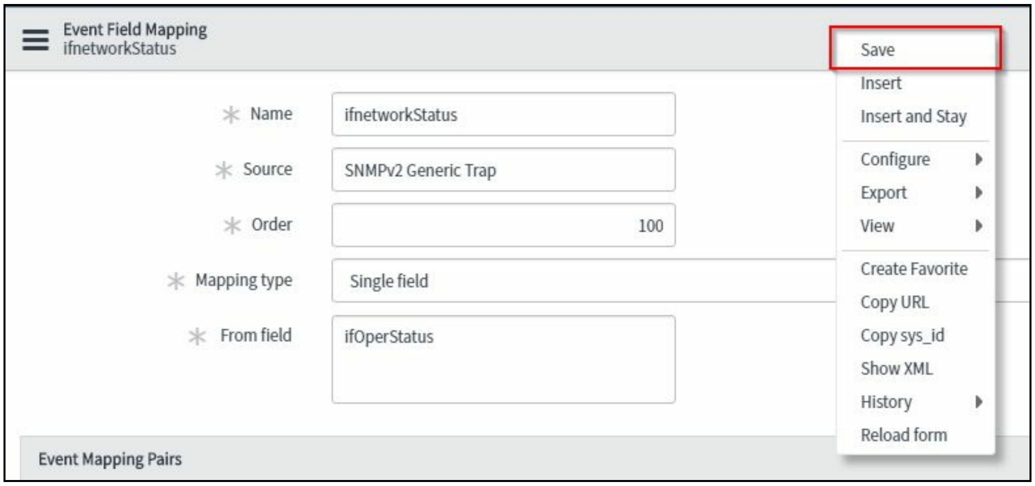
Name	ifnetworkStatus	Active	☑
Source	SNMPv2 Generic Trap		
Order	100		
Mapping type	Single field		
From field	ifOperStatus	To field	ifOperStatus

Event Mapping Pairs

1 to 7 of 7

Key	Value
7	lowerLayerDown
3	testing
2	down
1	up

3. Now, right-click on the header and click on Save to complete mapping.



Event Field Mapping
ifnetworkStatus

Name	ifnetworkStatus
Source	SNMPv2 Generic Trap
Order	100
Mapping type	Single field
From field	ifOperStatus

Event Mapping Pairs

Alert correlation rules

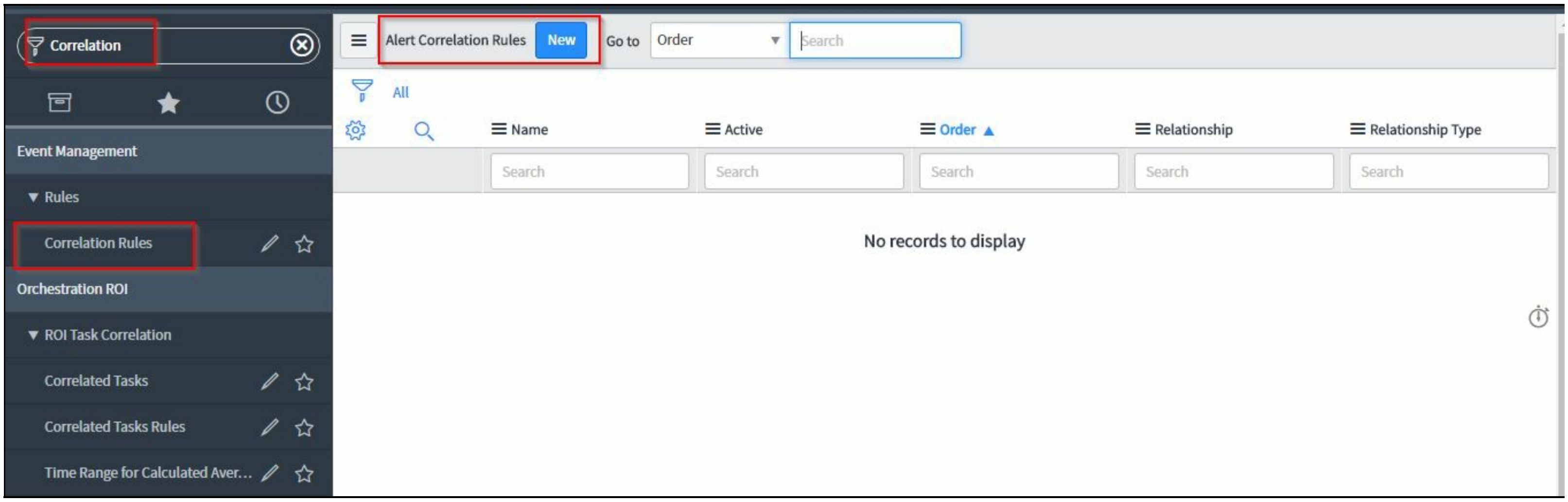
When events are generated and event rules are triggered, alerts are generated. There might be alerts which are related to one another like your service maps, the CI relationship where a parent CI or business services have all the downstream CI mapped below them. Similarly, there might be a parent alert and the underlying alerts might be related to them because the parent alert is generated it is expected that the child alert will get triggered. For example, in a network environment, you have a main router and there are many other sub routers and switches and pieces of network equipment associated to the network. When the main network goes down, it is expected that other network equipment is not going to work.

Alert correlation rules are used for this exact purpose to classify the alerts and create relationships between them. By identifying the primary and secondary, we can identify which alerts to suppress and pay attention to the important alerts.

Based on the CI relationship in the CMDB, a rule is established on primary and secondary alerts. There are different relationships that can be provided that include:

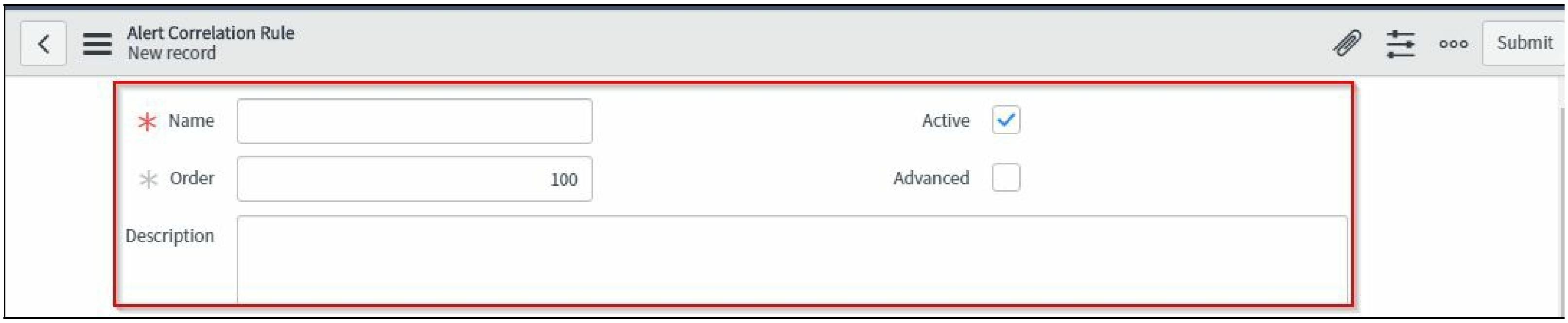
- **None**: Do not create relationship between primary and secondary alert
- **Same CI**: Primary and Secondary alerts need to be related to the same CI
- **Parent to Child**: Alert has a parent child relationship similar to CMDB
- **Child to Parent**: Alert relationship is a child-parent CI relationship similar to the relationship in the CMDB

To create an Alert Correlation Rules, type `Correlation` on the application navigator, then click on Correlation Rules under Event Management | Rules. Clicking on New button next to Alert Correlation Rules will help to create a new alert correlation rule.



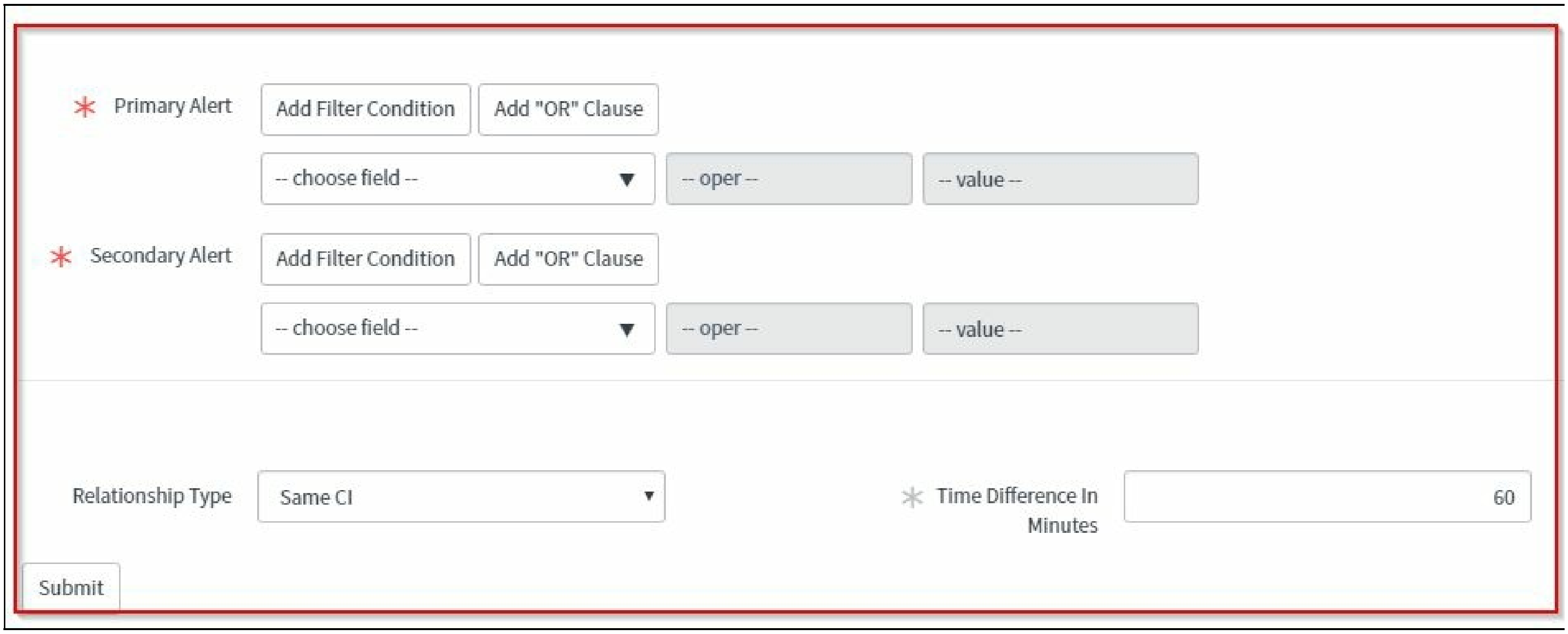
Clicking on configure opens a window to configure Alert Correlation Rules and clicking on New opens a form to create a new Alert Correlation Rule. Some of the important field are as follows:

- Name: A meaningful name for the correlation rule. For example: `Storage Limit`
- Order: The priority for the rule execution
- Description: Rule description



* Name		Active	☑
* Order	100	Advanced	□
Description			

- Primary Alert: Filter condition to identify the primary alert
- Secondary Alert: Filter condition to identify the secondary alert
- Relationship Type: Type of relationship between primary and secondary alert



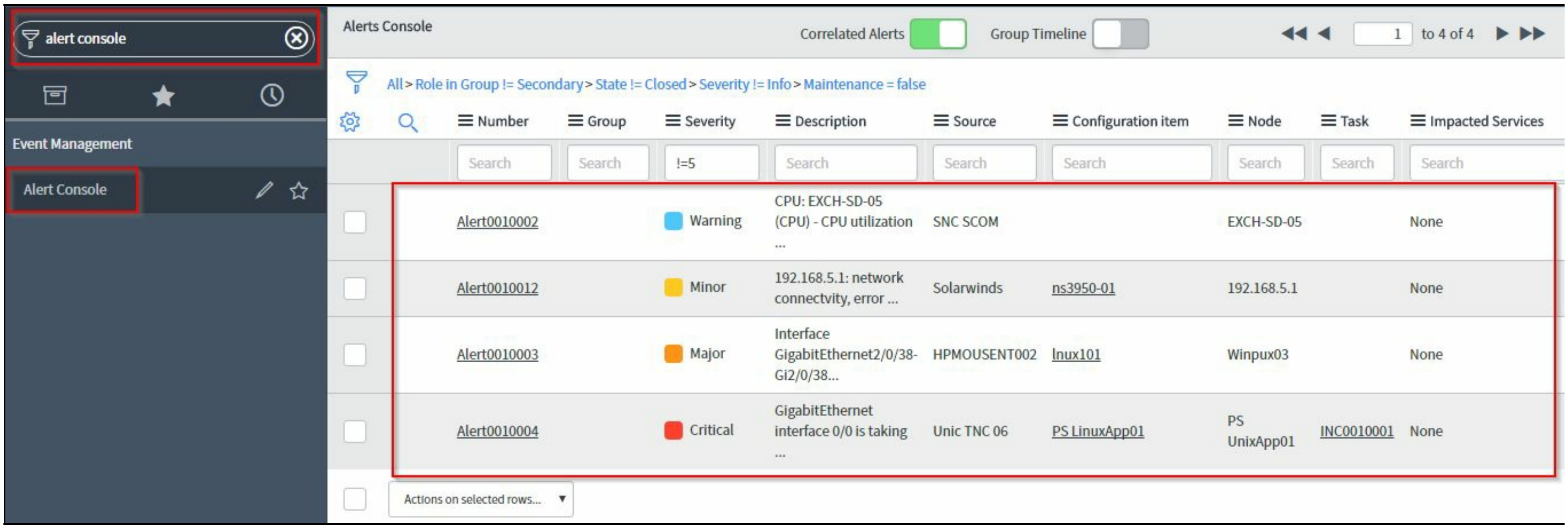
Relationship Type: Same CI

* Time Difference In Minutes: 60

Once completed right-click on the header of the form and click Save to complete the alert correlation rule.

Alert remediation

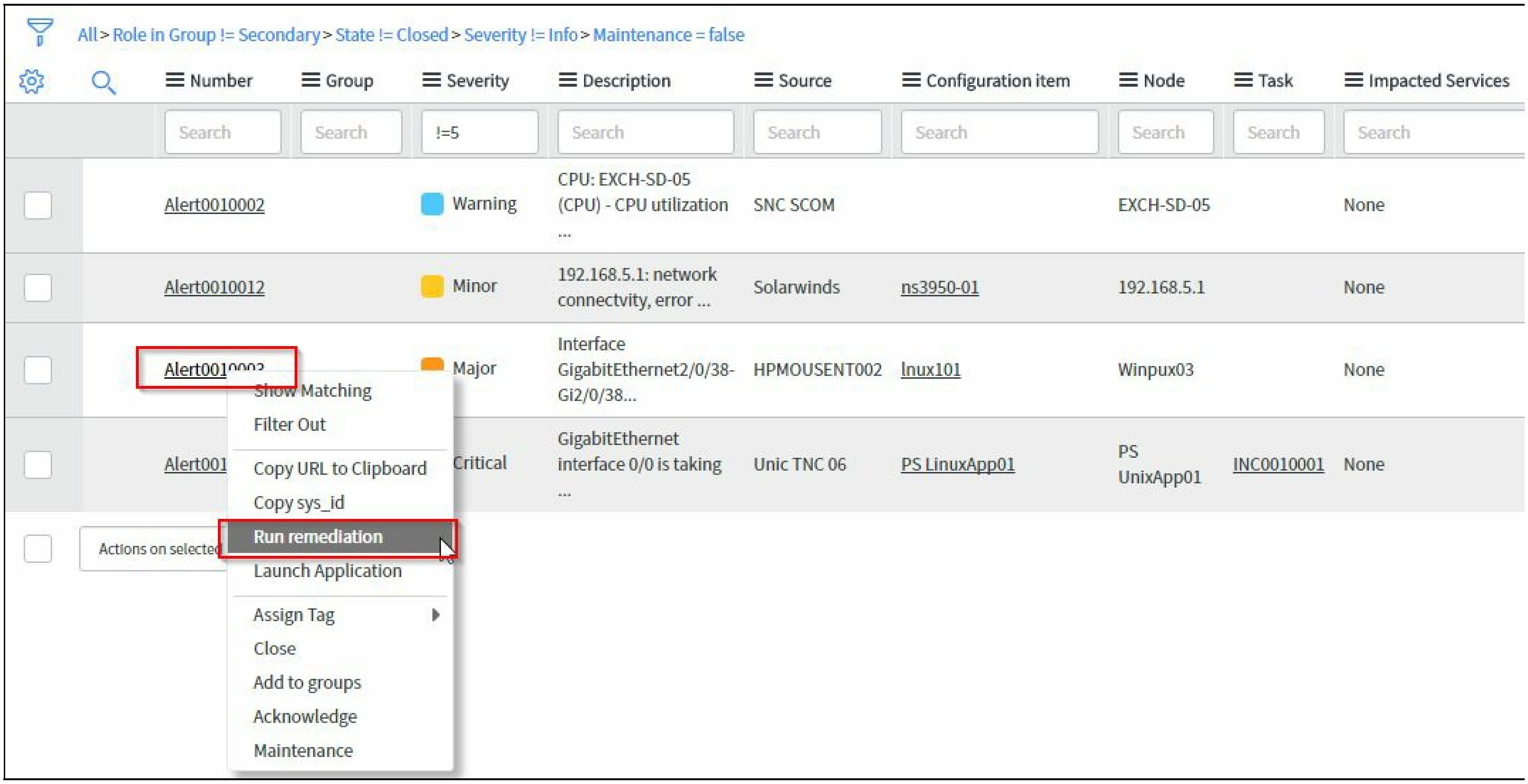
Generated alerts require remediation, this can be done automatically or manually. Let's see how to remediate alerts manually from the alert console. Search for alert console on the application navigator. Click on Alert Console under Event Management and a list of alerts appear on the right navigation pane.



All > Role in Group != Secondary > State != Closed > Severity != Info > Maintenance = false

Number	Group	Severity	Description	Source	Configuration item	Node	Task	Impacted Services
Search	Search	!=5	Search	Search	Search	Search	Search	Search
Alert0010002		🟦 Warning	CPU: EXCH-SD-05 (CPU) - CPU utilization ...	SNC SCOM		EXCH-SD-05		None
Alert0010012		🟨 Minor	192.168.5.1: network connectvity, error ...	Solarwinds	ns3950-01	192.168.5.1		None
Alert0010003		🟧 Major	Interface GigabitEthernet2/0/38-Gi2/0/38...	HPMOUSENT002	lnux101	Winpux03		None
Alert0010004		🟥 Critical	GigabitEthernet interface 0/0 is taking ...	Unic TNC 06	PS LinuxApp01	PS UnixApp01	INC0010001	None

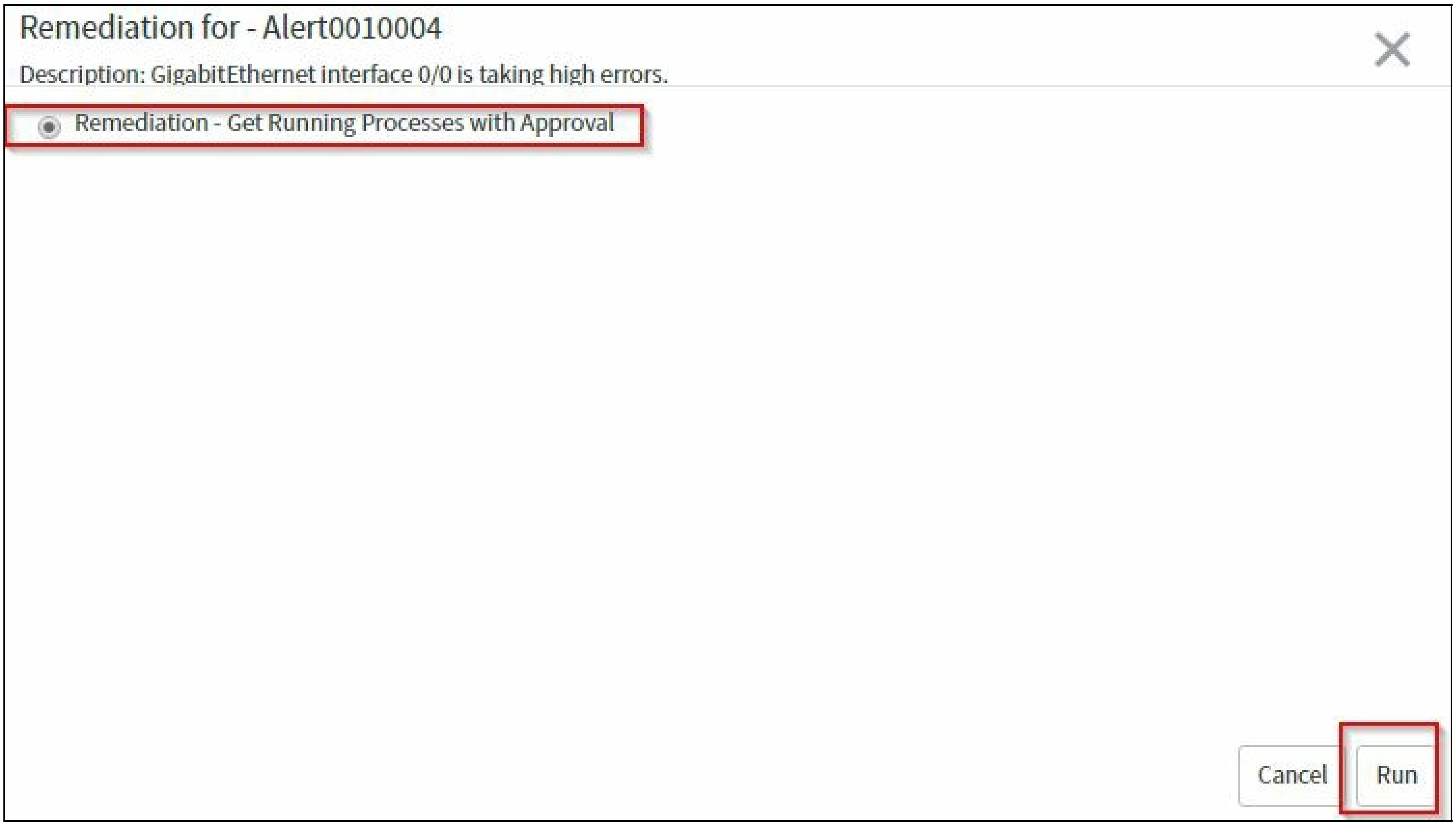
You can right-click on an alert and click on Run remediation option.



All > Role in Group != Secondary > State != Closed > Severity != Info > Maintenance = false

Number	Group	Severity	Description	Source	Configuration item	Node	Task	Impacted Services
Search	Search	!=5	Search	Search	Search	Search	Search	Search
Alert0010002		🟦 Warning	CPU: EXCH-SD-05 (CPU) - CPU utilization ...	SNC SCOM		EXCH-SD-05		None
Alert0010012		🟨 Minor	192.168.5.1: network connectvity, error ...	Solarwinds	ns3950-01	192.168.5.1		None
Alert0010003		🟧 Major	Interface GigabitEthernet2/0/38-Gi2/0/38...	HPMOUSENT002	lnux101	Winpux03		None
Alert001		Critical	GigabitEthernet interface 0/0 is taking ...	Unic TNC 06	PS LinuxApp01	PS UnixApp01	INC0010001	None

Right-click on the alert that you want to remediate, select the remediation action that needs to be taken and then click on Run button.

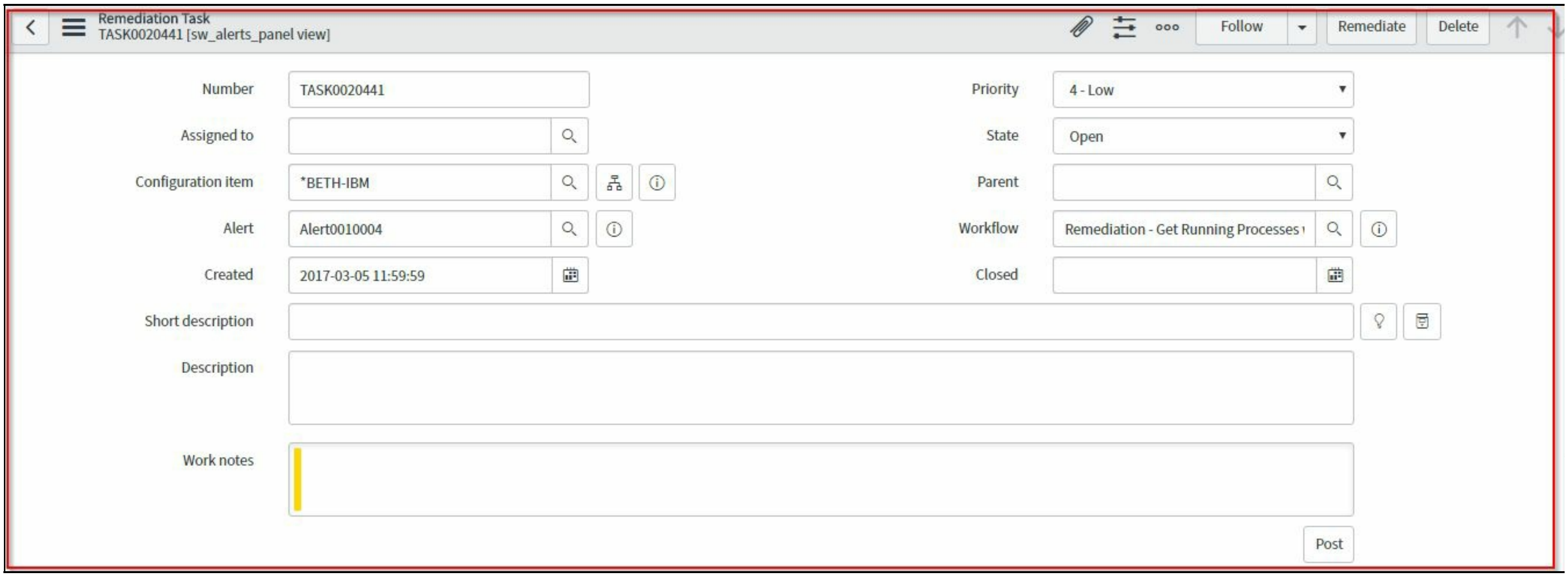


Remediation for - Alert0010004

Description: GigabitEthernet interface 0/0 is taking high errors.

● Remediation - Get Running Processes with Approval

Once you click on Run a remediation task will be created based on the defined workflow that is attached to run on the remediation task. A workflow, which can be an orchestration workflow, can be attached to the remediation task.

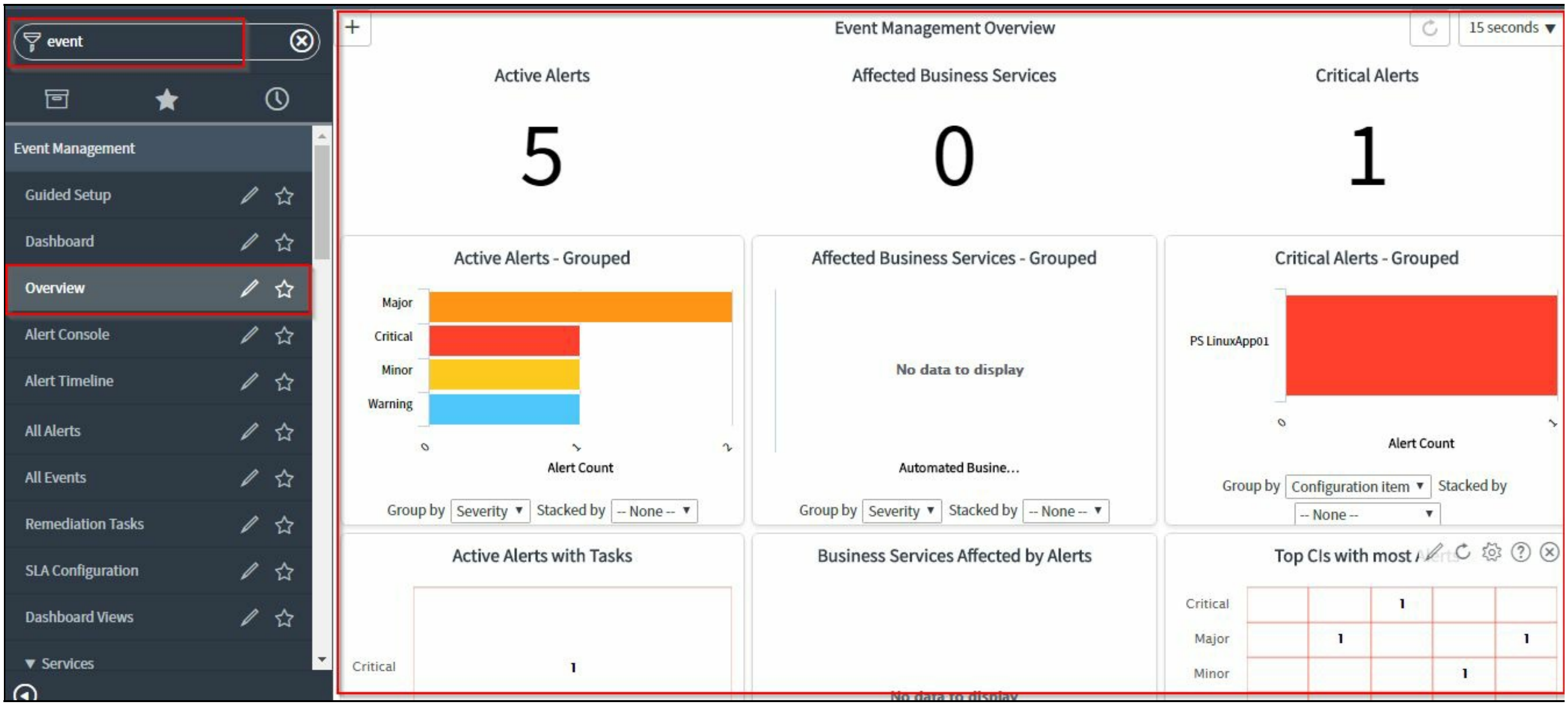


Remediation Task
TASK0020441 [sw_alerts_panel view]

Number	TASK0020441	Priority	4 - Low
Assigned to		State	Open
Configuration item	*BETH-IBM	Parent	
Alert	Alert0010004	Workflow	Remediation - Get Running Processes ı
Created	2017-03-05 11:59:59	Closed	
Short description			
Description			
Work notes			

Event management dashboard and overview

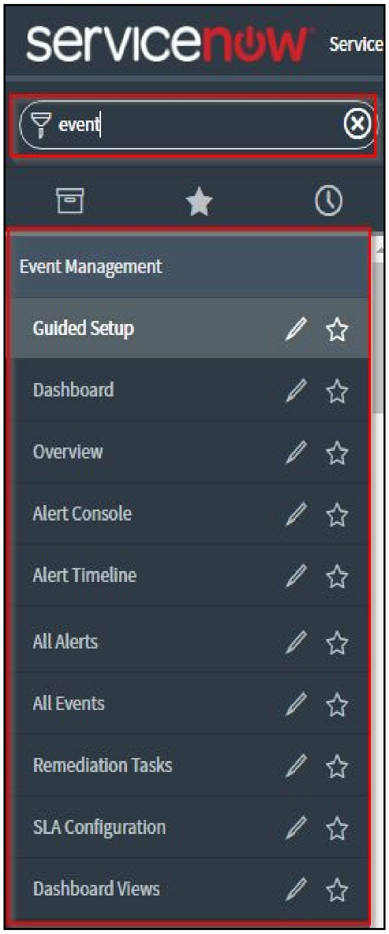
Events and alerts can be monitored and appropriate remediation actions can be taken right from the dashboards. You can click on Overview or Dashboard under event management application. Clicking on Dashboard shows the snapshot of the business services that require attention. Overview gives an overall snapshot of the event management application. You can click on the respective alerts to take appropriate remediation action.



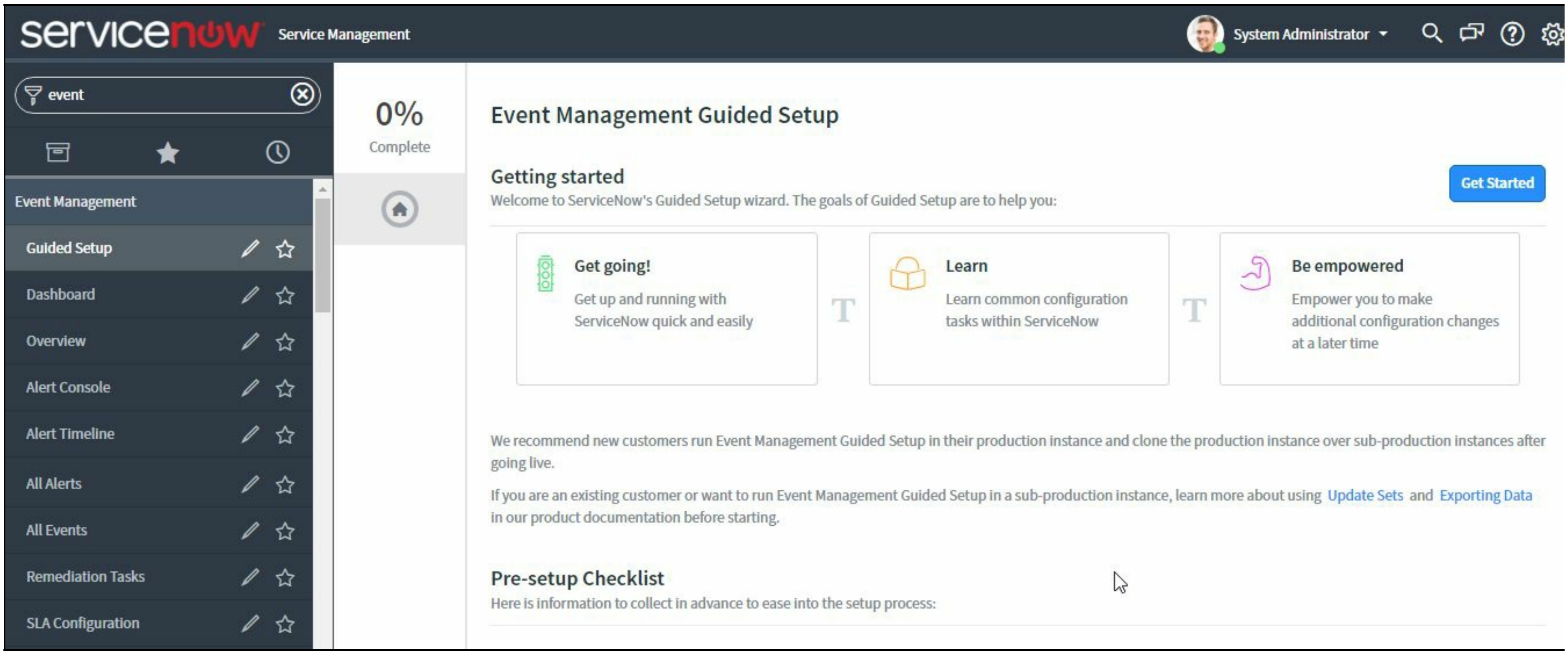
Setting up the event management application with guided setup

We saw how to setup event management application using manual configuration. Now lets see how to configure event management application using guided setup.

1. On the application navigator, search for the Event Management application by entering the `event` keyword.



2. Now click on Guided Setup under the Event Management. A guided setup window will open up on the content pane as shown following:



Event Management Guided Setup

Getting started

Welcome to ServiceNow's Guided Setup wizard. The goals of Guided Setup are to help you:

Get going! Get up and running with ServiceNow quick and easily

Learn Learn common configuration tasks within ServiceNow

Be empowered Empower you to make additional configuration changes at a later time

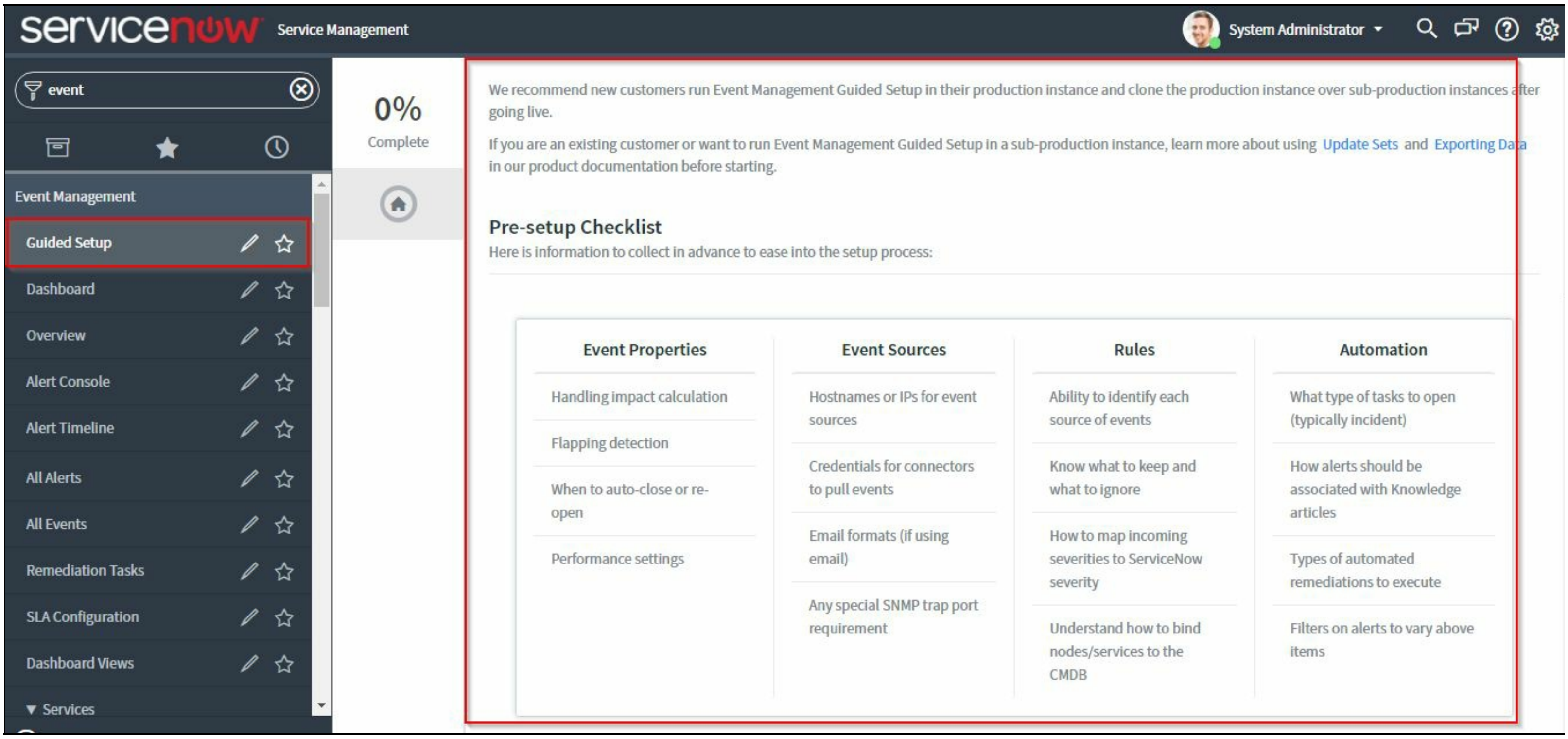
We recommend new customers run Event Management Guided Setup in their production instance and clone the production instance over sub-production instances after going live.

If you are an existing customer or want to run Event Management Guided Setup in a sub-production instance, learn more about using Update Sets and Exporting Data in our product documentation before starting.

Pre-setup Checklist

Here is information to collect in advance to ease into the setup process:

3. Guided setup will list all the prerequisites that are required to setup your event management application.



We recommend new customers run Event Management Guided Setup in their production instance and clone the production instance over sub-production instances after going live.

If you are an existing customer or want to run Event Management Guided Setup in a sub-production instance, learn more about using Update Sets and Exporting Data in our product documentation before starting.

Pre-setup Checklist

Here is information to collect in advance to ease into the setup process:

Event Properties	Event Sources	Rules	Automation
Handling impact calculation	Hostnames or IPs for event sources	Ability to identify each source of events	What type of tasks to open (typically incident)
Flapping detection	Credentials for connectors to pull events	Know what to keep and what to ignore	How alerts should be associated with Knowledge articles
When to auto-close or re-open	Email formats (if using email)	How to map incoming severities to ServiceNow severity	Types of automated remediations to execute
Performance settings	Any special SNMP trap port requirement	Understand how to bind nodes/services to the CMDB	Filters on alerts to vary above items

Through the instructions provided you will be able to configure the event management application through the guided setup.

The guided setup provides a checklist of what need to be configured step by step. These steps overlap with the manual steps that we went through.

Summary

In this chapter, we learnt about event management overview, how to enable event management plugins, how to setup and configure event management application, how to use guided setup, how to create connector definitions and instances, and how to create event rules, event field mappings and correlation rules.