Data Center Discovery 2020.1

SCAN ENGINE USER GUIDE

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Contents

Introduction 7
About the Data Center Discovery scan engine 7
Installation instructions 8
Accessing the configuration user interface – “dashboard” 8
How the Data Center Discovery scan engine works 9
Initial login 11
User interface 11
Change Admin password 11
Active Directory and application users 12
Active Directory login 13
How to start 14
System settings – activation 14
Setting up the scan 14
Use case 1 – Basic estate 16
Basic estate - Responsibility & ownership 16
Basic estate - Locations 17
Basic estate - Scan Windows 18
Basic estate - Targets 18
Basic estate - Direct application scanning 19
Basic estate - Bulk-load of targets 20
Basic estate – Connections 21
NavisphereCLI connection 21
SSH connection 22
SSHProxy connection 23
Basic estate - Product adapters 23
Basic estate - System credentials 24
Basic estate - Application credentials 26
Basic estate - Privilege escalation credentials 29
Basic estate - Project 29
Location 30
Start scan 30
Status 31
Discover network devices 31
Mark scan as complete 35
Mark scan as archived 35
Use case 2 - Multi-departmental estate 36
Multi-departmental estate – Personnel expectations 36

Summary 36
Multi-departmental estate – Network infrastructure 36
Multi-departmental estate – Responsibility & ownership 37
Multi-departmental estate – Top-level location 38
Multi-departmental estate – Country-level location 38
Multi-departmental estate – Scan Windows 39
Multi-departmental estate – Targets 39
Multi-departmental estate – Connections 42
NavisphereCLI connection 42
Multi-departmental estate – Product adapters 43
Multi-departmental estate – System credentials 44
Global system credential 45
Multi-departmental estate – Application credentials 46
Americas application credentials 47
EMEA application credentials 49
Multi-departmental estate – User roles 51
Create roles 51
Create users 51
Multi-Departmental Estate – Project EMEA 53
Locations tab 54
Product Adapters tab 54
Targets tab 54
Credentials tab 55
Multi-departmental estate – Project Americas 55
Locations tab 56
Product Adapters tab 56
Targets tab 56
Credentials tab 57
Multi-departmental estate – Operations 57
Start EMEA scan 57
Start Americas scan 57
Status Americas scan 58
Status EMEA scan 58
Americas mark scan as complete 59
EMEA mark scan as complete 59
Use case 3 – Complex estate 60
Complex estate – Personnel expectations 60
Summary 60
Complex estate – Network infrastructure 60

Complex estate – Responsibility & ownership 61
Installation of primary and secondary scan engine 62
Complex estate – Top-level location 62
Complex estate – Country-level location 63
Complex estate – Scan Windows 64
Complex estate - Configurations 66
Network scanning 68
Discover network devices 68
Using custom OIDs 70
Project scan analysis 71
Project summary 71
Project diagnostics target – No credential(s) attempt 72
Project diagnostics target – Valid credential 73
Log files 78
Projects status – Project summary 78
Projects status – Project results 79
Found devices 79
Devices 80
Found applications 81
Applications 81
Project reports 81
Project status – Diagnostics 82
System activity 85
System performance 85
Scanning activity 85
System audit log 85
Tracing log 86
Administration 87
Scanning servers 87
System settings 88
Product adapter manager 88
Activation 88
CyberArk 88
Configuration 89
User settings 90
Manage user (local) 91
Manage user (Active Directory) 92
Manage role permission 93
Device deletion 94

Data explorer 96
Reports 96
Oracle LMS reports 96
Oracle LMS utilities 97
Diagnostic reports 98
Deleting reporting data 98
Visualize 98
Configuration item information 99
Appendix A: Key terms, emails, and links 100
Appendix B: Custom OID files 101
Format 1: Simple string value retrieval 101
Format 2: Complex table value retrieval 101

Introduction

This user guide provides all the information you need to operate the Ivanti Data Center Discovery scan engine through its dashboard UI. This document uses a series of use cases to identify potential configuration options that may be required to manage your project. Read this guide to learn about:

- How the scan engine works
- Using the dashboard to set up a scan
- Use cases for scanning basic to complex estates
- How to analyze the scan data
- General administration

The documentation set for the Data Center Discovery scan engine contains the following guides:

Guide	Description
Prerequisites	Defines system requirements for the installation.
Installation	Guides you through installing the Data Center Discovery scan engine.
Deployment	Provides deployment scenarios and constraints.
User	Helps users control and configure the scan engine.
Security	Outlines security considerations.
REST API Quick Start	Explains how to access and authenticate the API and how to navigate between resources.

About the Data Center Discovery scan engine

The Data Center Discovery scan engine is a discovery and inventory tool used to retrieve relevant data from an estate in a secure manner.

It's both **agentless** and **secure** and is designed to have a small deployment footprint within your estate.

Agentless integration describes a process whereby the scan engine does not require the installation of additional software on the target servers from which the scan engine will gather data.

Additional attributes of the product are:

- It's quickly installed (less than 5 minutes assuming prerequisites have been met), allowing you to move on to the scan configuration stage.
- It's centrally managed. Multiple scanning servers can be controlled from a single dashboard.

Secure identifies that the scan engine software was designed with the protection of the process and data-retrieval operations in mind.

The credentials you enter into the product do not have to be shared with Ivanti. A customer-specific private key can be generated to isolate knowledge of the encrypted data within the deployment. This is encrypted using the RSA-2048 algorithm.

The scan engine focuses on the inventory of complex enterprise server technologies from Oracle, Microsoft, IBM, VMWare, and others to deliver the visualization of physical, virtual, and cloud-based

hardware and software assets. It's designed for use in all sizes of network estates, with a multi-threaded architecture and an innovative database design enabling scalability to support 100,000+ devices.

The scan engine is deployed entirely within the client network; it retains all data centrally and securely. Security is enhanced through intelligent credential management and seamless integration with user access control products, proxies, and administration gateways. For more on security, refer to the *Data Center Discovery—Scan Engine Security Guide*.

Installation instructions

The installation instructions for the scan engine software are available in the *Data Center Discovery—Scan Engine Installation Guide.*

Accessing the configuration user interface – "dashboard"

The scan engine interface is web based, so it's remotely accessible from any device over a browser interface to the installation device. To access the dashboard after installation, type the following URL in your Internet Explorer browser:

http://{hostmachine}/{uipath}

The **hostmachine** is the hostname (or IP address of the host) upon which the scan engine UI installation is made. If this is the local device, then the "localhost" value may be used here. The **uipath** element is specified as part of the Data Center Discovery scan engine UI. The default value for the installer is "Data Center Discovery."

An example for access to the UI on a local device installation is:
http://localhost/DataCenterDiscovery

On opening the UI for the first time, Internet Explorer may display a popup similar to the one below. If this happens, click **Add** to include Data Center Discovery in your browser's list of trusted sites. Failure to do so may lead to Internet Explorer blocking scripts required for the application to function correctly.

How the Data Center Discovery scan engine works

The scan engine is composed of scan engine software, a database, and controlling dashboard. The web-based dashboard is used by the scan administrator to identify scan targets within the estate, provide credentials that will allow access to the targets, and configure projects that identify the scope of the scanning operations.

About the scan process

The Data Center Discovery scan engine searches your estate for target devices. The possible target device ranges are identified as part of the configuration of the scan engine. They can be a set of IP ranges (essentially any access point for devices). These IP ranges are probed and active devices are identified. The primary discovery methods used to discover devices on an estate are **Ping** and **Port Scan**.

Once a device is discovered, a test is executed. This test is called device uniqueness. If the device passes the uniqueness test, it's retained for additional scanning.

The unique device is then scanned for applications. The applications must pass the uniqueness test in order to be scanned further.

The unique devices and/or application-scanned information is stored in the scan database.

Supported platforms

The platforms supported for the features outlined in this document are:

- Windows Server
- Windows Desktop
- Linux
- HP-UX
- Solaris
- AIX
- Network

- Routers/switches
- Printers
- Storage devices

Initial login

Following the installation, a single login page exists for the dashboard. Access to the dashboard is provided with the defaults of:

- **Username:** Admin
- **Password:** password

You need to protect access to the web interface by the creating additional user logins and appropriate password values, and by modifying the default Admin password.

Once a correct set of credentials is provided, the standard user interface for the dashboard displays. It's composed of the top-level scanning component items that you use to configure the scan operations for an estate. The workload of scanning an estate may be broken into sub-components using multiple scan engines (services). In such a case, the configuration and scanning information shares a central scan engine database.

User interface

The scan engine includes an administrative UI, called the dashboard, which allows configuration and control from a web browser.

This is a view of the scan engine dashboard immediately after login. The UI contains the following sections as shown in the image above:

- **Projects**: View the scan operation by functional requirements.
- **Locations**: View the scan operation by localities.
- **System Activity**: View system activity across the scan estate.
- **Administration**: Control the general operations of the scan.

> **Note:** If the scan engine hasn't been activated, an optional **Activation** banner displays. Click this banner to move immediately to the activation section of the UI.

Change Admin password

As a general security procedure, it's advisable to change the default Admin user password.

To change the password

1. Open **Administration > User Settings**.
2. Under the **Manage User** tab, click the **Reset Password** link.
3. Provide a new password.
4. Click the **Reset** button.

Active Directory and application users

Login: Admin

The scan engine UI supports the creation of users that you can assign to project-specific roles. Users can be either local to the scan engine UI application, or they can be pre-existing Active Directory (A/D) Users. The rest of this document provides example use-cases with local users. However, any local-user identity can be replaced with an A/D registered user.

> **Note:** To use Active Directory authentication, select the **Enable Active Directory for User Accounts** option during the IIS Configuration step of the installation process. If this option is not selected, enabling Active Directory authentication for the scan engine application in IIS will allow the use of Active Directory accounts.

The following steps show how a user called **demouser** (from a domain called **demodomain**) logged into the application. This Active Directory user is associated with the administration role for the scan engine (i.e., this A/D user has the same permissions as the built-in admin user). Refer to the image above for reference.

1. Click the **Administration** > **User Settings** menu in the dashboard. The administrator role already exists and does not require any specific handling.
2. Select the **Manage User** tab.
3. Click the **Create A New User** button.
4. Click the **AD user** checkbox; this is an Active Directory user.
5. Insert the domain name into the Domain Name field (e.g., demodomain).
6. Insert the domain user into the Username field (e.g., demouser).
7. Insert a value as the Firstname field (optional).
8. Insert a value as the Lastname field (optional).
9. Provide an email address for the receipt of e-mails (optional).
10. Note a password is not required, as this is an A/D user.
11. Select the **Administrator** role for the user.
12. Click the **Create** button. The new user will now be available for login.

Active Directory login

If the current domain login doesn't match a Data Center Discovery scan engine-registered active domain user account, a Windows Challenge login window will display.

Provide the domain login information for the A/D user and click the **OK** button.

> **Note:** The above Windows challenge is used **exclusively** for Active Directory user login. The UI standard login challenge below is used **exclusively** for application-based user logins. If you're presented with the standard login window and want to log in with a domain user, then click the **Switch User** link at the bottom of the login page.

How to start

There are several important steps you must follow to ensure device and application discovery, and that the information required is retrieved from the scan:

- Set up a scan from the dashboard
- Initiate scanning discovery and scanning services
- View the scan data and log files

System settings – activation

The scanning service requires an activation license. If you haven't previously set up the licensing for this scan engine, then you need to do this *before* starting the scan by accessing the **Administration > System Settings** tab.

This license is provided by Ivanti support or through an online activation website.

Automatic activation requires an assigned email address and an assigned license key. Clicking the **Activate All Servers** button initiates the registration of the scan engine. Projects will now be allowed to execute.

Setting up the scan

There are several important steps involved in setting up the scan from the scan engine dashboard. The two most important steps are inputting the **targets** (which are the IP ranges to scan) and the **operating system** and **application** credentials that will be used to gain access to the target devices.

There are six sets of instructions that you need to follow:

1. Scan Windows
2. Input targets
3. Set up connections
4. Enable product adapters
5. Input operating system credentials
6. Input application credentials

The rest of the document is composed of a number of use cases. These are complete configuration examples that walk you through the configuration of the scan engine UI. These use cases should act as a basis for deciding on the details of an actual on-site configuration.

The use cases provided here are:

- **Use Case 1—Basic estate (or POC):** A basic estate is composed of a single location or a single non-disjoint network. Responsibility for the network resides with a single person or group. The scan results do not have to be segmented into different overall projects (e.g., Oracle project results, SQL Server project results, etc.).
- **Use Case 2—Multi-departmental estate:** A multi-departmental estate is composed of multiple locations and/or a disjoint network infrastructure. Responsibility for the network resides with a single person or group, with the complexity that locations are typically geographically disjointed and are also split into production and test sub-areas. The scan results may be segmented into different overall projects (e.g., Oracle project results, SQL Server project results, etc.) depending on the customer use case.
- **Use Case 3—Complex estate:** A complex estate is composed of multiple locations and/or a disjoint network infrastructure. Responsibility for the network resides with a central person, but responsibility also resides with a local infrastructure control person or group. Local control covers test and production sub-areas. The scan results may be segmented into different overall projects (e.g., Oracle project results, SQL Server project results, etc.). Additionally, to spread the CPU load and network load of the scanning operations, additional scan engines have to be deployed.

Use case 1 – Basic estate

For a basic estate, the network infrastructure is composed of a relatively open network with no major restrictions in terms of firewalls, network latency, or bandwidth.

Basic estate - Responsibility & ownership

The advantage of a basic estate or POC (Proof of Concept) is that little configuration or control is required during the running of the scan operation; in addition, responsibility for the network configuration is (typically) restricted to a single person.

This sole responsibility will reside in an identity called “Admin” who identifies the target infrastructure, the credential to be used during the scan operation, and the projects that are to be run within the estate.

Basic estate - Locations

A default location is provided with the standard install. This default location can be used to encompass all of the proposed estate. Follow the instructions below:

1. Click the **Locations** menu in the dashboard to display the current available locations. By default, a single location called “Default” is available as a top-level item. This is the top-level grouping and cannot be deleted (but can be renamed). It’s recommended that you rename it to a customer/project-appropriate value.
2. Enter the details of your new default location in the Location Name field.
3. Ensure that **Enabled** is selected.
4. Enter the Time Zone of this locality.
5. Enter the Max Scanning Count of **5** (how many concurrent jobs that can be run for targets in this location).
6. Select the scan engines associated with this locality.
7. Click the **Save** button to save your details.

This single location is sufficient for a small project – a basic estate; however, larger projects may need more granular control over which/how elements of the estate are to be scanned.

Basic estate - Scan Windows

Scan Windows provides a means to limit the period when active scanning of an estate is carried out. For mission-critical enterprises, the possibility of additional network traffic or CPU is viewed as a risk. For this reason, you can specify specific time periods for scanning.

For a basic estate or POC, it's assumed that no restrictions will be applied. The Scan Windows settings can be ignored for this basic estate operation.

Basic estate - Targets

Targets are used to identify the scope of the scan operations. Scan operations can be targeted against a single IP address, a range of IP addresses, or a complete subnet. The location needs to have an associated IP range to scan. The following procedure identifies an example range of IP addresses and associates this range with a name of **SUBNET4LOW.**

1. Select the top-level location.
2. Select the **Targets tab**.
3. Click the **Create** button to add a new target.
4. In the Create Target dialog, set the IP Range Type to **Range**.

5. Set the Name to be **SUBNET4LOW**.
6. Set the Start IP to be **192.0.2.0** - this is an example value.
7. Set the End IP to be **192.0.2.29** - this is an example value.
8. Clear the **Exclusion** option.
9. Click **Save & Close**.
10. Check that the new range is now associated with the location.

Basic estate - Direct application scanning

If you want to scan an application directly, for instance, where the device is inaccessible or where you're certain of the existence of an application, the option is available to perform a direct application scan.

To do a direct application scan, you must identify the application type in question and provide the necessary connection details to connect to the application. This is done by creating an application target.

To create an application target

1. Select the **Targets** tab on the location in question.

2. Click the **Create** button to display the Create Target dialog.

3. For target, select **Application**, and then select the specific application type to be scanned.
4. Issues to be considered for specific application types:
   - Instance Name is not required for vCenter type.
   - The default port will be used if none is specified.
   - Port needs to be specified for vCenter.
5. Click **Save & Close**.

The new application target will appear in the Targets list for the location. You can edit or delete the target in the same way as other targets.

> **Note:** If the application target is created in a location that doesn't have the required settings enabled for the target to be scanned successfully (e.g., required connection is not enabled), the target will still be created, but a warning message will appear, notifying you of the settings that need to be enabled to successfully scan the target.

Basic estate - Bulk-load of targets

The ability to bulk load targets is provided under the **Locations > Detail** tab. The Import and Export menus provide the ability to import targets. Follow the instructions and file formats provided (a template is provided).

> **Note**: If changes are made to values in the target import file once it has been imported, the only change that will take effect on re-importing the file is in the Name field.

Basic estate – Connections

Detail | Scan Windows | Targets | Connections | Product Adapters | Credentials

Connections are the means by which information retrieval is achieved by the scan engine. Each connection type is associated with one or more configuration items (such as connection time, command time out, etc.)

A connection type is a logical communication path to a target device or application. Underlying this logical connection is one or more physical protocols that are established between the scan engine and the target device. These connections are used to execute commands that retrieve data.

1. Click the top-level **Enabled** check box.
2. Click the **Save** button.
3. Click the items icon on any row to show associated configuration items.

NavisphereCLI connection

The connection type **NavisphereCLI** is used by the storage product adapter to retrieve storage information from EMC-based storage devices. This product adapter is still in BETA release and subject to change.

The connection is based on the installation of the NavisphereCLI software as specified in the *Data Center Discovery—Scan Engine Prerequisites Guide*. This connection uses a third-party API to connect to and retrieve storage usage/configuration information from the remote storage device.

There are specific elements of the configuration that you need to address here to allow the retrieval of the storage device information.

Click the **NavisphereCLI** expand button to expand the options. The settings provided here must match those that were specified during the installation of the NavisphereCLI package.

- **Port**: The secure port used to establish the SSL connection to the remote storage device. This only needs to be modified if another port is being used.
- **Command Time Out**: This time out value does not need to be modified.
- **Credential Scope**: Credentials for NavisphereCLI software can be created globally or locally for storage. If global credentials are to be used, then set the credentialscope value to **0**; if local credentials are used, then set this value to **1**.
- **Ignore Invalid Certificate:** The security associated with the NavisphereCLI client can be installed with either **medium** or **high** security settings. SSL interaction requires the exchange of certificate information and a high security setting will enforce that certificate validation must pass. This option downgrades this requirement to the medium level and allows certificate checking to be ignored.
- **Optional NaviClient Location:** The location of the NavisphereCLI software is typically located through the use of the Windows registry. If a non-standard installation of the NavisphereCLI software was carried out, the location of the software installation directory can be specified using this option.

SSH connection

- **Use Pseudo Terminal:** A sudoers file with the configuration **requirestty** will fail to execute commands when a terminal isn't provided. Setting **usepseudoterminal** with a value of **True** will prevent this failure.
- **Command Prefix Code:** The connection type **SSH** can be used in with a command prefix to escalate the current user's permissions. To do this:
    - Set **Command Prefix Code** to **SUDO, DZDO, SESUDO**, or any combination of the three. It's important that this is all uppercase. (When using prefixes, separate them with a comma and note that the order they're listed in the field will be respected.)
    - Set **Use Command Prefix** to **True**.
    - Optionally, set **Use Psuedo Terminal** to **True** (see above).
- **Use Command Without Path:** By default, the scan engine executes commands on the target by defining the full path to it. In the case of a restricted shell (HMC, for example), slashes are not permitted. This results in the commands failing if the full path is defined. By setting this option to **True**, the command will execute without using the full path.

SSHProxy connection

- **RequestFailedPermittedRetries:** When using the SSHProxy connection, it's possible for the proxy server to deny the connection and attempt a shell. In this situation, an exception will be thrown with the message "The request has failed." This option allows you to configure the number of attempts the scan engine will re-attempt the connection before the connection is abandoned for the given target. It supports Integer values.

Basic estate - Product adapters

The **Product Adapters** functionality means that additional protocols, commands, and "transformation of scanned data" can be added to the core platform. This product development can be driven by customer requirements or emerging technology.

The Product Adapters dialog below identifies the currently enabled product adapters:

The expand button enables you to further expand elements of the product adapter, exposing the individual strategies that you can then enable or disable. Any enabling or disabling of a product adapter can be achieved clicking the **Save** button.

Clicking the expand button again collapses the expanded product adapter.

To disable individual strategies, access the scan engine's configuration file:

1. Navigate to the bin folder in the install directory. (Typically C:\Program Files\Ivanti\DataCenterDiscovery ScanEngine 4.0)
2. Open the Ivanti.DataCenterDiscovery.ScanEngine.exe.config file.
3. Locate the line beginning **<add key="DisabledStrategies**".
4. Modify the value property to contain a list of strategies to be disabled. The value must be a comma separated list with each entry taking the form:

<ProductAdapterName>:<StrategyName>.

For example, to disable the DB2 Evaluate Trace Found Application Strategy in the DB2 Database product adapter, the value DB2 Database:DB2 Evaluate Trace Found Application Strategy should be added to the DisabledStrategies list.

Basic estate - System credentials

System Credentials are the credentials used to provide access to an operating system (such as Windows or *Nix) or an operating system component (such WMI or Remote Registry).

> **Note**: Do not create credentials until a scan engine has been activated AND there is at least one scan engine attached to the location. Also, you need one or more enabled connections.

You can manage credentials locally in the underlying scan engine database or retrieve them from a configured **CyberArk** installation. The default setting when creating a credential is **Local** – this indicates the credential is managed by the scan engine. To create a **CyberArk** credential, select the **CyberArk** option from the **Managed** radio buttons. Also configure the following additional fields:

- **Safe:** The safe within the **CyberArk** vault where the **Credential** is stored. This field is optional; however, it should be noted that where no value is provided, the **CyberArk** integration component will return the first matching credential.
- **Folder**: The folder within the **Safe** where the **Credential** resides. This field is optional; however, it should be noted that where no value is provided, the **CyberArk** integration component will return the first matching credential.
- **Account name**: The name of the credential.

These types of credentials are equivalent to a real user trying to access a remote system from the scan engine device.

1. Select the top-level location.
2. Select the **Credentials** tab.
3. Click the **Create** button to add a credential.
4. The default Managed setting is **Local** – this indicates that the credential is managed by the scan engine.

5. Set the Credential Type to **UNIX Linux**.
6. Set the Name to be **UnixScan**.
7. Set the connection types to **SSH**, **SSHProxy**, and **Telnet**.
8. Type the label for this credential (e.g., UnixScanUser).
9. Provide an ordering value for this credential. This is a relative value (i.e., sequence one (1) credentials will be used before sequence two (2) credentials, and so on).
10. Type the UnixScanUser username value; this user will be used to remotely access the target devices. This can be a user specially created for the scanning process or an existing login.
11. Type the UnixScanUser user password value; this value will be encrypted for later use and will not be stored in cleartext.
12. Click **Save & Close**.
13. Check that the new credential is now associated with the location.

UNIX Linux has an additional field labelled **Child Credential,** which can be filled with an SSH Proxy credential and is optional.

In the case that a SSH Proxy credential is assigned to a UNIX Linux credential, the password field of the UNIX Linux credential becomes optional. When there is no child credential attached to a UNIX Linux credential, the password field becomes required again.

An SSH Proxy credential cannot be deleted if it's assigned to an existing UNIX Linux credential.

> **Note**: If a location has both SSH and SSH Proxy connections set, it's recommended that you use credentials with distinct usernames for each connection. If both connections share the same username, the SSH connection will be attempted first and if it fails, it will not attempt to use SSH Proxy for that username.

Repeat the process to add a **Windows** account credential:

1. Select the **Credentials** tab.
2. Click the **Create** button to add a credential.
3. View the Create a Credential dialog that is opened.
4. Set the Credential Type to **Windows**.
5. Set the Label to be **WindowsScanUser**.
6. Provide an ordering value for this credential. This is a relative value (i.e., sequence one (1) credentials will be used before sequence two (2) credentials, and so on).
7. Set the connection type to **Windows WMI**, **Windows Remote Process**, **Windows File Share**, and **Windows Remote Registry**.

8. Type the WindowsScanUser username value; this user will be used to remotely access the target devices. This can be a user specially created for the scanning process or an existing login (remember to include a domain if this is a domain account). For example, DEMODOMAIN\demouser; a local windows account should use '.' as a domain value (e.g., '.\demouser).
9. Type the WindowsScanUser user password value; this value will be encrypted for later use and will not be stored in cleartext.
10. Click **Save & Close**.
11. Check that the new credential is now associated with the location.

Basic estate - Application credentials

Detail | Scan Windows | Targets | Connections | Product Adapters | Credentials

Application credentials are credentials that are used to provide access to an application such as Oracle, SQL Server, DB2, or vSphere.

> **Note**: Do not create credentials until a scan engine has been activated AND there is at least one scan engine attached to the location. Also, you need one or more enabled connections.
>
> The ability to scan these applications is dependent on the availability of third-party client libraries. These third-party libraries must be either automatically or manually installed (see the *Data Center Discovery—Scan Engine Prerequisites Guide* for further discussion).

These types of credentials are equivalent to a real user trying to access a remote application from the scanning server.

> **Note:** The number of lockout attempts set in the Connections option will control how many times the credential will be attempted.
>
> Note that if the credential has an invalid password, a large number of configured lockout attempts may cause that user to be blocked.
>
> Make sure of your environmental authentication settings before modifying the option.
>
> Non-instance-based connections (i.e., Device Connections or vCenter), will be attempted up to the number of lockout attempts set in the Connections option.

> If the configured number of attempts fail, this credential will go into cooldown.

Follow the procedures below to set up four application accounts for:

- Oracle admin
- SQL Server admin
- Informix
- vSphere admin

This process will finish with a set of credentials that will be used as part of the scanning process.

Oracle scan credential

1. Select the **Credentials** tab.
2. Click the **Create** button to add a credential.
3. View the Create a Credential dialog that is opened.
4. Set the Credential Type to **Oracle Database**.
5. See the Connection Type set to **Oracle Database**.
6. Set the Label to **OracleScanUser**.
7. Provide a sequence value for this credential. This is a relative value (i.e., sequence one (1) credentials will be used before sequence two (2) credentials, and so on).
8. Type the OracleScanUser username value; this user will be used to remotely access the target Oracle application. This can be a user specially created for the scanning process or an existing user (e.g., IQOuser).
9. Type the OracleScanUser user password value; this value will be encrypted for later use and will not be stored in clear
10. text.
11. Set the **Connect as SYSDBA** if you require this username credential to connect to the database as SYSDBA.
12. Click **Save & Close**.
13. Check that the new credential is now associated with the location.

> **Note**: Selecting **Connect as SYSDBA** marks the Oracle credential as one with elevated permissions. Where multiple Oracle credentials are provided, if one supplied credential encounters a permissions failure, then only those credentials with the **Connect as SYSDBA** setting will be attempted.

SQL scan credential

1. Select the **Credentials** tab.
2. Click the **Create** button to add a credential.
3. View the Create a Credential dialog that is opened.
4. Set the Credential Type to **MS SQL Server**.
5. See the Connection Type set to **MS SQL server**.
6. Set the Label to **MsSqlScanUser**
7. Provide a sequence value for this credential. This is a relative value (i.e., sequence one (1) credentials will be used before sequence two (2) credentials, and so on).
8. Type the MsSqlScanUser username value; this user will be used to remotely access the target Oracle application. This can be a user specially created for the scanning process or an existing user (e.g., IQSuser).

9. Type the MsSqlScanUser user password value; this value will be encrypted for later use and will not be stored in cleartext.
10. Click **Save & Close**.
11. Check that the new credential is now associated with the location.

Informix scan credential

1. Select the **Credentials** tab.
2. Click the **Create** button to add a credential.
3. View the Create a Credential dialog that is opened.
4. Set the Credential Type to **Informix**.
5. Set the Connection Type set to **Informix**.
6. Set the Label to **InformixScanUser**.
7. Provide a sequence value for this credential. This is a relative value (i.e., sequence one (1) credentials will be used before sequence two (2) credentials, and so on).
8. Type the InformixScanUser username value; this user will be used to remotely access the target Oracle application. This can be a user specially created for the scanning process or an existing user (e.g., IQSuser).
9. Type the InformixScanUser user password value; this value will be encrypted for later use and will not be stored in cleartext.
10. Click **Save & Close**.
11. Check that the new credential is now associated with the location.

vSphere scan credential

1. Select the **Credentials** tab.
2. Click the **Create** button to add a credential.
3. View the Create a Credential dialog that is opened.
4. See the Credential Type to **VMware**.
5. Set the Connection Type set to **VMware**.
6. Set the Label to **vSphereScanUser**.
7. Provide a sequence value for this credential. This is a relative value (i.e., sequence one (1) credentials will be used before sequence two (2) credentials, and so on).
8. Type the vSphereScanUser username value; this user will be used to remotely access the target Oracle application. This can be a user specially created for the scanning process or an existing user (e.g., IQSuser).
9. Type the vSphereScanUser user password value; this value will be encrypted for later use and will not be stored in cleartext.
10. Click **Save & Close**.

11. Check that the new credential is now associated with the location.

Basic estate - Privilege escalation credentials

Privilege escalation credentials are used when special privileges are required to run a command. These credentials are used in conjunction with the enabled Use Command Prefix option and Command Prefix Code DZDO and/or SESUDO. It's important that you use all uppercase letters. For more details, see the "Basic estate – SSH Connection" section.

To set up a privilege escalation credential, for example DZDO:

1. Select the **Credentials** tab.
2. Click the **Create** button to add a credential.
3. In the Add Credential dialog, set the credential type to **Privilege Escalation**.
4. Add a label such as **DZDO Credential**.
5. Click the **DZDO Privilege** button.
6. Enter the password and click **Save**.

> **Note**: When a privilege escalation password is required during a scan, all available privilege escalation credentials will be attempted until one is found that allows access.

Basic estate - Project

A default location is provided with the standard installation. You can use this default location to encompass all of the proposed estate. Follow the instructions below:

1. Select the **Projects** icon or click the **Projects** menu in the dashboard to display the currently available projects. By default, no projects are defined.

2. Select the **Active Projects** tab.
3. Click the **Create New** button to add a project.
4. In the Create Project dialog, set the Name to **Basic Estate**.
5. Set the Description to **How to scan a basic estate**.
6. Set the Start Time to the current time.
7. Click the **Next** button.

Location

1. Select the only location available.

2. Click the **Create** button. Note that it's possible to customize product adapters, target sets, and credentials using the **Advanced** button.
3. Ensure that the new project is present in the Projects list.

Start scan

The final step of this process is to initiate a project scan. Projects are initiated from the Active Project tab.

1. Select the **Projects** icon or click the **Projects** drop-down menu.
2. Select the **Active Projects** tab.
3. Identify the **Basic Estate** project.
4. Click the **Run** button ▶ to initiate the scan operation.
5. Watch the progress bar to identify ongoing scan operations. Let the project run to completion.

Status

Additional information about the status of the scanning process is available by clicking the **Status** button.

Refer to the “Network scanning” section for details about the examination and diagnosis of the scanning operatons.

Data Center Discovery supports SNMP or network scanning, which is a standard way of monitoring and managing hardware and software from nearly any manufacturer. This enables you to determine what SNMP/network devices are deployed (for example switches, routers, firewalls, and so on), as well as what devices are connected and where.

Discover network devices

Create a location to associate with the network devices or use an existing location. Create target sets to cover the IP ranges where network devices will be scanned.

Ensure the SNMP connection protocol is **enabled** (for this location).

Ensure the network device product adapter is **enabled** (for this location).

Add the credentials necessary to connect to the SNMP targets.

For each SNMP target, the scan engine will query a series of preconfigured OIDs (Object Identifiers). These OIDs identify a set of information that is to be retrieved from the device as part of the scan operation. The data returned from each device query is stored as an XML "blob" within the scan database. The scan engine doesn't interpret all elements of the SNMP scan results but does expose top-level elements of the scan operation.

The results of the SNMP scan operation will create a new device, and this will appear in the associated Project Results screen.

Using custom OIDs

The standard SNMP queries executed by the scan engine can be supplemented with a set of customer required OIDs. These additional OIDs are queried when scanning an SNMP device.

The configuration required to add these additional OIDS is done by including a **JSON** file containing the OIDs in the **%PROGRAMDATA%\Ivanti\DCD\Adapter\NetworkDevice** folder on all scan engine servers. Data Center Discovery will identify these supplementary files at scan time and add them to the list of preconfigured OIDs. Because OID scan data is stored as XML, there is no need to modify the structure of the underlying database.

Appendix B contains information on the format and structure required for custom OID files.

Mark scan as complete

The decision to mark a project complete is one not taken by the scanning software. It's a decision determined by the administrator that needs to take into account the scan coverage of the identified estate (including the discovery of any unexpected devices/applications), any requirement to add additional scan targets, successful access to all target devices (credential coverage), and the need for rescan operations. It's typically not the case that 100% coverage on the UI is the only criterion for marking a project complete.

1. Select the **Projects** icon or click the **Projects** drop-down menu.
2. Select the **Active Projects** tab.
3. Identify the **Basic Estate** project.
4. Let the project run until it is 100% complete.
5. Click the **Status** button to identify that all elements have been sufficiently collected.
6. Click the **Actions** drop-down menu and select **Complete**.
7. Identify that the project is now in the completed state and that the project color has changed.

Additional information about the status of the scanning process is available by clicking the **Status** button.

Mark scan as archived

Once the scan project is no longer required, it can be archived.

1. Click the **Actions** drop-down menu and select **Archive**.
2. Archive the project once the scan is no longer required.

Archived projects are available under the **Projects > Archived Projects** tab.

Use case 2 - Multi-departmental estate

A **multi-departmental estate** is composed of multiple locations and/or a disjoint network infrastructure. Responsibility for the network/infrastructure resides with a single user or single group, with the additional complexity that locations are typically geographically disjointed and are also split into production and test sub-areas. Projects to execute scans are assigned as a local responsibility. However, responsibility for the infrastructure remains with the global admin group.

The scan results may be segmented into different overall projects (e.g. Oracle project results, SQL Server project results, etc.) depending on the customer use case.

Multi-departmental estate – Personnel expectations

Given the extended complexity of this coverage, it's expected that a single administrator and scan owner will not be sufficient.

Summary

The ability to segment into different overall projects (e.g. Oracle project results, SQL Server project results, etc.) is required for this use case. It's assumed that the following areas of concern must be supported:

- **Global Infrastructure**: Identification and control of infrastructure globally. This "user" is responsible for the description of the infrastructure to be scanned, which includes IP address ranges, IP address range exclusions, Scan Windows and Connection types to be used.
- **Global Project Manager:** This "user" is responsible for global identification and control of project(s).
- **EMEA Manager:** This "user" is responsible for tracking and executing EMEA projects.
- **Americas Manager**: This "user" is responsible for tracking and executing an Americas project.

To support the project as described, the following items are required:

- **2 projects:** Americas Project, EMEA Project
- **4 users:** Admin, Project.Manager, America.User, EMEA.User
- **3 roles:** Administrator, Project Manager, Project Viewer
- **1 scan engine**

Multi-departmental estate – Network infrastructure

This network is composed of a relatively open network with no major restrictions in terms of firewalls, network latency, or bandwidth. The network structure is geographically dispersed into the Americas and EMEA. Each of these locations has a production and test set of devices.

Multi-departmental estate – Responsibility & ownership

The areas of responsibility for the four users are identified in the diagram below.

Multi-departmental estate – Top-level location

Login: Admin

A default location is provided with the standard install. This default location can be used to encompass all of the proposed estate. Follow the instructions below:

Select the **Locations** icon or **Locations** drop-down menu in the dashboard. This displays the current available locations. By default, a single location called **default** is available as a root item (if it hasn't been modified in a previous session). This is the top-level grouping and cannot be deleted.

However, it's recommended that you rename it to a customer/project appropriate value.

1. Enter the details of a new default location.
2. Enter the Time Zone of this locality.
3. Ensure that **Enabled** is selected.
4. Enter the Max Scanning Count of **5** (how many concurrent jobs that can be run for targets in this location).
5. Select the scan engine's association with this locality.
6. Save your details by clicking the **Save** button.

This single location will **not** be sufficient for a multi-department project. You'll need more granular control over the elements of the estate that need to be scanned.

Multi-departmental estate – Country-level location

Login: Admin

The medium-size company is split into two regional (scan) locations. Each region can be allowed to run its own scan projects (e.g., an Oracle audit may be done on a regional level at different times). Each location is also sub-divided into production and test devices and storage infrastructure as described below:

- Americas
    - Test
    - Production

    - Storage
- EMEA
    - Test
    - Production
    - Storage

You need to add these new locations:

1. Select the **Locations** icon or **Locations** drop-down menu in the dashboard.
2. Select the top-level location.
3. Click the **Create** button to add a sub-location to the root location.

4. Provide the new Location Name **Americas**.
5. Select a suitable Time Zone for the location.
6. Click the **Create** button.
7. Select the top-level Location.
8. Repeat steps 3-6 and create a location called **EMEA** under the root location.
9. Select the **Americas** Location.
10. Repeat steps 3-6 and create three different locations called **Production, Test,** and **Storage** under Americas.
11. Select the **EMEA** Location.
12. Repeat steps 3-6 and create three different locations called **Production, Test,** and **Storage** under EMEA.

Multi-departmental estate – Scan Windows

Login: Admin

Scan Windows provides a means to limit the period when active scanning of an estate is carried out. It's assumed that the Scan Windows isn't required for the multi-departmental estate. This is a feature that would be required for a complex estate.

Multi-departmental estate – Targets

Login: Admin

It's assumed that the EMEA and Americas production and test locations have all been assigned ranges within a single subnet (this is not entirely realistic but is provided as a simple example for demonstration purposes).

Targets are used to identify the scope of scan operations. Scan operations can be targeted against a single IP address, a range of IP addresses, or a complete subnet. The location needs to have associated IP addresses to scan.

Americas-test location

1. Select the top-level location.
2. Select the **Americas** location.
3. Select the **Test** Location.
4. Select the **Targets** tab.
5. Click the **Create** button to add a new target.
6. View the **Create Target** dialog.

7. Set the Type to **Range.**
8. Set the Name to be **USTEST.**
9. Set the Start IP to 192.0.2.0.
10. Set the End IP to 192.0.2.29.
11. Clear the **Exclusion** option.
12. Click the **OK** button.
13. Check that the new range is now associated with the location.

EMEA-test location

1. Select the top-level location.
2. Select the **EMEA** location.
3. Select the **Test** Location.
4. Select the **Targets** tab.
5. Click the **Create** button to add a new target.
6. Set the Type to **Range.**
7. Set the Name to be **EMEATEST.**
8. Set the Start IP to be 192.0.2.30.
9. Set the End IP to be 192.0.2.49.
10. Clear the **Exclusion** option.
11. Click the **OK** button.

Americas-production location

1. Select the top-level location.
2. Select the **Americas** location.

3. Select the **Production** location.
4. Select the **Targets** tab.
5. Click the **Create** button to add a new target.
6. Set the Type to **Range.**
7. Set the Name to be **USPROD.**
8. Set the Start IP to 192.0.2.50.
9. Set the End IP to 192.0.2.79.
10. Clear the **Exclusion** option.
11. Click the **OK** button.

EMEA-production location

1. Select the top-level location.
2. Select the **EMEA** location.
3. Select the **Production** location.
4. Select the **Targets** tab.
5. Click the **Create** button to add a new target.
6. Set the IP Range Type to **Range.**
7. Set the Name to be **EMEAPROD.**
8. Set the Start IP to 192.0.2.80.
9. Set the End IP to 192.0.2.109.
10. Clear the **Exclusion** option.
11. Click the **OK** button.

> **Note:** Click in the various locations and identify the targets that are associated with the location. The top-level location will show the accumulation of all targets that have been specified.

> **Note: No Location** covers the additional IP addresses 192.0.2.110 - 192.0.2.254. This means that they're not considered to be targets for the scan operation. These values cover the storage targets but have not been assigned.

Multi-departmental estate – Connections

Login: Admin

Detail | Scan Windows | Targets | Connections | Product Adapters | Credentials

Connections are the means by which information retrieval is achieved by the scan engine. Each connection type is associated with one or more configuration items (such as connection time, command time out, etc.)

A connection type is a logical communication path to a target device or application. Underlying this connection is one or more physical protocols established between the scan engine and the target device that are used to execute commands that retrieve data.

1. Enable all connection types.
2. Click the **Update** button.
3. Click the **Items** icon on any row to show associated configuration items.

NavisphereCLI connection

The connection type **NavisphereCLI** is used by the storage product adapter to retrieve storage information from EMC-based devices. This product adapter is still in BETA release and subject to change.

The connection is based on the installation of the NavisphereCLI software as specified in the *Data Center Discovery—Scan Engine Prerequisites Guide*. This connection uses the third-party API to connect to and retrieve information from the remote storage device. There are specific elements of the configuration that you need to address here to allow the retrieval of this information.

Click the NavisphereCLI expand button to expand the options. The settings provided here must match those that were specified during the installation of the NavisphereCLI package.

Port: This is a secure port used to establish the SSL connection to the remote storage device. You only need to modify this if another port is being used.

Command Time Out: This time out value does not need to be modified.

Credential Scope: Credentials for NavisphereCLI software can be created globally or locally for storage. If global credentials are to be used, then set the credential scope value to **0**; if local credentials are used then set this value to **1.**

Ignore Invalid Certificate: The security associated with the NavisphereCLI client can be installed with either medium or high security settings. SSL interaction requires the exchange of certificate information and a high security setting will ensure that certificate validation must pass. This option downgrades this requirement to the medium level and allows certificate checking to be ignored.

Optional NaviClient Location: The location of the NavisphereCLI software is typically located through the use of the Windows registry. If a non-standard installation of the NavisphereCLI software was carried out, you can specify the location of the software installation directory using this option.

Multi-departmental estate – Product adapters

Login: Admin

The scan engine's unique, flexible software design means that as the product suite will continue to develop and support new technology. The scan engine was built to cover a wide range of discovery and is not exclusively tailored to any specific product. It was built to allow enterprise customers to gather the data they need from the multitude of devices and applications on their network.

The scan engine Product Adapter functionality means that additional protocols, commands, and "transformation of scanned data" can easily be added to the scan engine's core platform, which offers excellent security, credential management, data lineage, change history, user interfaces, and export APIs. The Product Adapter dialog below identifies the currently enabled product adapters:

The expand button enables you to further expand elements of the product adapter, exposing the individual strategies that you can then enable or disable. Clicking the expand button again collapses the expanded product adapter. Save any changes using the **Update** button.

To disable individual strategies, access the scan engine's configuration file:

1. Navigate to the bin folder in the install directory. (Typically C:\Program Files\Ivanti\DataCenterDiscovery ScanEngine 4.0).
2. Open the Ivanti.DataCenterDiscovery.ScanEngine.exe.config file.
3. Locate the line beginning **<add key="DisabledStrategies".**
4. Modify the value property to contain a list of strategies to be disabled. The value must be a comma separated list, with each entry taking the form <ProductAdapterName>:<StrategyName>. For example, to disable the DB2 Evaluate Trace Found Application Strategy in the DB2 Database product adapter, the value DB2 Database:DB2 Evaluate Trace Found Application Strategy should be added to the DisabledStrategies list.

Multi-departmental estate – System credentials

Login: Admin

System credentials are used to provide access to an operating system (such as Windows or *NIX) or an operating system component (such DNS, WMI, DNS, Remote Registry).

> **Note**: Do not create credentials until the scan engine has been active AND there is at least one scan engine attached to the location. Also, you need one or more enabled connections.

These types of credentials are equivalent to a real user trying to access a remote system from the scan engine device.

Because the credentials are closely tied to the infrastructure, it's assumed that they're handled by the administration role that also handles the targets and location information.

For the purposes of scanning, it's possible that an administrator will create an estate-wide set of credentials to be used exclusively for scanning operations. Alternatively, existing credentials can be used. A final alternative is to provide a mixture of these two approaches.

The second approach will be used for the multi-departmental estate with company-wide OS credentials provided at the top-level location and specific credentials provided at lower levels.

Global system credential

System credentials are used to provide access to an operating system (such as Windows or *NIX) or an operating system component (such DNS, WMI, DNS, Remote Registry).

You can manage credentials locally in the underlying Data Center Discovery scan engine database or retrieve them from a configured CyberArk installation. The default setting when creating a credential is **Local** – this indicates the credential is managed by the scan engine. To create a CyberArk credential, select the **CyberArk** option from the **Managed** radio buttons.

Also configure the following additional fields:

- **Safe:** The safe within the **CyberArk** vault where the **Credential** is stored. This field is optional; however, it should be noted that where no value is provided, the **CyberArk** integration component will return the first matching credential.
- **Folder**: The folder within the **Safe** where the **Credential** resides. This field is optional; however, it should be noted that where no value is provided, the **CyberArk** integration component will return the first matching credential.
- **Account name**: The name of the credential.

These types of credentials are equivalent to a real user trying to access a remote system from the scan engine device.

1. Select the top-level location.
2. Select the **Credentials** tab.
3. Click the **Create** button to add a credential.

4. Set the Credential Type to **UNIX Linux**.
5. Set the connection type to **SSH**, **SSHProxy**, and **Telnet**.
6. Type the label for this credential (e.g., UnixScanUser).
7. Provide an ordering value for this credential. This is a relative value (i.e., sequence one (1) credentials will be used before sequence two (2) credentials, and so on).
8. Type the UnixScanUser username value; this user will be used to remotely access the target devices. This can be a user specially created for the scanning process or an existing login.
9. Type the UnixScanUser user password value; this value will be encrypted for later use and will not be stored in cleartext.
10. Click the **Save & Close** button.
11. Check that the new credential is now associated with the location.

Repeat the process to add a **Windows** account credential:

1. Select the **Credentials** tab.
2. Click the **Create** button to add a credential.
3. View the Create a Credential dialog that is opened.
4. Set the Credential Type to **Windows**.
5. Type the Label as **WindowsScanUser**.
6. Provide an ordering value for this credential. This is a relative value (i.e., sequence one (1) credentials will be used before sequence two (2) credentials, and so on).
7. Set the connection type to **Windows WMI**, **Windows Remote Process**, **Windows File Share**, and **Windows Remote Registry**.
8. Type the WindowsScanUser username value; this user will be used to remotely access the target devices. This can be a user specially created for the scanning process or an existing login (remember to include a domain if this is a domain account). For example, DEMODOMAIN\demouser; a local windows account should use '.' as a domain value (e.g., '.\demouser).
9. Type the WindowsScanUser user password value; this value will be encrypted for later use and will not be stored in cleartext.
10. Click the **Save & Close** button.
11. Check that the new credential is now associated with the location.

Multi-departmental estate – Application credentials

Login: Admin

Application credentials are used to provide access to an application such as Oracle, SQL Server, DB2, or vSphere. It's assumed that EMEA and Americas use application-specific credentials that are not shared.

> **Note**: Do not create credentials until the scan engine has been active AND there is at least one scan engine attached to the location. Also, you need one or more enabled connections.

These types of credentials are equivalent to a real user trying to access a remote application from the scanning server. Follow this section to set up four application accounts for each location (Americas and EMEA):

- Oracle admin
- SQL Server admin
- vSphere admin
- Informix admin

Americas application credentials

Login: Admin

This sequence establishes application credentials for the Americas location. Application credentials are used to provide access to an application such as Oracle, SQL Server, Informix, or vSphere.

> **Note:** The ability to scan these applications is dependent on the availability of third-party client libraries. These third-party libraries must be either automatically or manually installed (see the *Data Center Discovery—Scan Engine Prerequisites Guide* for further discussion).

These types of credentials are equivalent to a real user trying to access a remote application from the scan engine device.

In this section, set up four application accounts:

- Oracle admin
- SQL Server admin
- Informix admin
- vSphere admin

Americas Oracle scan credential

1. Select the **Americas** location.
2. Select the **Credentials** tab.
3. Click the **Create** button to add a credential.
4. View the Create a Credential dialog that is opened.
5. Set the Credential Type to **Oracle Database**.
6. See the Connection type set to **Oracle Database**.
7. Set the Label to be **USOracleScanUser**.
8. Provide a sequence value for this credential. This is a relative value (i.e., sequence one (1) credentials will be used before sequence two (2) credentials, and so on).
9. Type the USOracleScanUser username value; this user will be used to remotely access the target Oracle application. This can be a user that has been specially created for the scanning process or an existing user e.g. IQOuser.
10. Type the USOracleScanUser user password value; this value will be encrypted for later use and will not be stored in cleartext.
11. Check **Connect as SYSDBA** if you want this connection to connect as SYSDBA.
12. Click the **Save & Close** button.
13. Check that the new credential is now associated with the location.

> **Note**: Selecting **Connect as SYSDBA** marks the Oracle credential as one with elevated permissions. Where multiple Oracle credentials are provided, if one of the supplied credentials encounters a

> permissions failure, then only those credentials with the **Connect as SYSDBA** setting will be attempted.

Americas SQL scan credential

1. Select the **Americas** location.
2. Select the **Credentials** tab.
3. Click the **Create** button to add a credential.
4. View the Create a Credential dialog that is opened.
5. Set the Credential Type to **MS SQL Server.**
6. See the Connection type set to **MS SQL server**.
7. Set the Label to be **USMsSqlScanUser**.
8. Provide a sequence value for this credential. This is a relative value (i.e., sequence one (1) credentials will be used before sequence two (2) credentials, and so on).
9. Type the USMsSqlScanUser username value; this user will be used to remotely access the target Oracle application. This can be a user that has been specially created for the scanning process or an existing user e.g. IQSuser.
10. Type the USMsSqlScanUser user password value; this value will be encrypted for later use and will not be stored in cleartext.
11. Click the **Save & Close** button.
12. Check that the new credential is now associated with the location.

Americas Informix scan credential

1. Select the **Americas** location.
2. Select the **Credentials** tab.
3. Click the **Create** button to add a credential.
4. View the Create a Credential dialog that is opened.
5. Set the Credential Type to **Informix**.
6. Set the Connection type set to **Informix**.
7. Set the Label to be **USInformixScanUser**.
8. Provide a sequence value for this credential. This is a relative value (i.e., sequence one (1) credentials will be used before sequence two (2) credentials, and so on).
9. Type the USInformixScanUser username value; this user will be used to remotely access the target Oracle application. This can be a user that has been specially created for the scanning process or an existing user e.g. IQSuser.
10. Type the USInformixScanUser user password value; this value will be encrypted for later use and will not be stored in cleartext.
11. Click the **Save & Close** button.
12. Check that the new credential is now associated with the location.

Americas vSphere scan credential

1. Select the **Americas** location.
2. Select the **Credentials** tab.
3. Click the **Create** button to add a credential.
4. View the Create a Credential dialog that is opened.
5. See the Credential Type to **VMware**.
6. Set the Connection type set to **VMware**.
7. Set the Label to be **USvSphereScanUser**.

8. Provide a sequence value for this credential. This is a relative value (i.e., sequence one (1) credentials will be used before sequence two (2) credentials, and so on).
9. Type the USvSphereScanUser username value; this user will be used to remotely access the target Oracle application. This can be a user that has been specially created for the scanning process or an existing user e.g. IQSuser.
10. Type the USvSphereScanUser user password value; this value will be encrypted for later use and will not be stored in cleartext.
11. Click the **Save & Close** button.
12. Check that the new credential is now associated with the location.

EMEA application credentials

This sequence establishes application credentials for the EMEA location.

Application credentials are used to provide access to an application such as Oracle, SQL Server, DB2, or vSphere.

> **Note:** The ability to scan these applications is dependent on the availability of third-party client libraries. These third-party libraries must be either automatically or manually installed (see the *Data Center Discovery—Scan Engine Prerequisites Guide* for further discussion).

These types of credentials are equivalent to a real user trying to access a remote application from the scan engine device.

In this section, set up four application accounts:

- Oracle admin
- SQL Server admin
- Informix admin
- vSphere admin

EMEA Oracle scan credential

1. Select the **EMEA** location.
2. Select the **Credentials** tab.
3. Click the **Create** button to add a credential.
4. View the Create a Credential dialog that is opened.
5. Set the Credential Type to **Oracle database**.
6. See the Connection type set to **Oracle database**.
7. Set the Label to be **EMEAOracleScanUser**.
8. Provide a sequence value for this credential. This is a relative value (i.e., sequence one (1) credentials will be used before sequence two (2) credentials, and so on).
9. Type the EMEAOracleScanUser username value; this user will be used to remotely access the target Oracle application. This can be a user that has been specially created for the scanning process or an existing user e.g. IQOuser.
10. Type the EMEAOracleScanUser user password value; this value will be encrypted for later use and will not be stored in cleartext.
11. Check **Connect as SYSDBA** if you want this connection to connect as SYSDBA.
12. Click the **Save & Close** button.
13. Check that the new credential is now associated with the location.

> **Note**: Selecting **Connect as SYSDBA** marks the Oracle credential as one with elevated permissions. Where multiple Oracle credentials are provided, if one of the supplied credentials encounters a permissions failure, then only those credentials with the **Connect as SYSDBA** setting will be attempted.

EMEA SQL scan credential

1. Select the **EMEA** location.
2. Select the **Credentials** tab.
3. Click the **Create** button to add a credential.
4. View the Create a Credential dialog that is opened.
5. Set the Credential Type to **MS SQL Server**.
6. See the Connection type set to **MS SQL server**.
7. Set the Label to be **EMEAMsSqlScanUser**.
8. Provide a sequence value for this credential. This is a relative value (i.e., sequence one (1) credentials will be used before sequence two (2) credentials, and so on).
9. Type the EMEAMsSqlScanUser username value; this user will be used to remotely access the target Oracle application. This can be a user that has been specially created for the scanning process or an existing user e.g. IQSuser.
10. Type the EMEAMsSqlScanUser user password value; this value will be encrypted for later use and will not be stored in cleartext.
11. Click the **Save & Close** button.
12. Check that the new credential is now associated with the location.

EMEA Informix scan credential

1. Select the **EMEA** location.
2. Select the **Credentials** tab.
3. Click the **Create** button to add a credential.
4. View the Create a Credential dialog that is opened.
5. Set the Credential Type to **Informix**.
6. Set the Connection type set to **Informix**.
7. Set the Label to be **EMEAInformixScanUser**.
8. Provide a sequence value for this credential. This is a relative value (i.e., sequence one (1) credentials will be used before sequence two (2) credentials, and so on).
9. Type the EMEAInformixScanUser username value; this user will be used to remotely access the target Oracle application. This can be a user that has been specially created for the scanning process or an existing user e.g. IQIuser.
10. Type the EMEAInformixScanUser user password value; this value will be encrypted for later use and will not be stored in cleartext.
11. Click the **Save & Close** button.
12. Check that the new credential is now associated with the location.

EMEA vSphere scan credential

1. Select the **EMEA** location.
2. Select the **Credentials** tab.
3. Click the **Create** button to add a credential.
4. View the Create a Credential dialog that is opened.
5. See the Credential Type to **VMware**.
6. Set the Connection type set to **VMware**.

7. Set the Label to be **EMEAvSphereScanUser**.
8. Provide a sequence value for this credential. This is a relative value (i.e., sequence one (1) credentials will be used before sequence two (2) credentials, and so on).
9. Type the EMEAvSphereScanUser username value; this user will be used to remotely access the target Oracle application. This can be a user that has been specially created for the scanning process or an existing user e.g. IQSuser.
10. Type the EMEAvSphereScanUser user password value; this value will be encrypted for later use and will not be stored in cleartext.
11. Click the **Save & Close** button.
12. Check that the new credential is now associated with the location.

Multi-departmental estate – User roles

Login: Admin

The control of access to projects is now not centralized around a single individual or group; you need to create specific roles and login users to support the distribution of control.

To support the project as described, the following user-related items are required:

- **3 roles:** Administrator, Project Manager, Project Viewer
- **4 users:** Admin, Project.Manager, America.User, EMEA.User

Create roles

Login: Admin

The new roles that need to be added are Project Manager and Project Viewer. The Administrator role already exists by default and doesn't require any specific handling.

Project_Manager role

1. Select the **Administration** icon or click the **Administration** drop-down menu.
2. Select the **User Settings > Manage Role Permission** tab.
3. Click the **Add New** button.
4. Insert **Project_Manager** into the role name.
5. Insert a short description for this role, such as Project Creation and Modification.
6. Select the **Project Dashboard** permission.
7. Select the **Project Admin** permission.
8. Click the **Create** button.

Project_Viewer role

1. Select the **User Settings > Manage Role Permission** tab.
2. Click the **Add New** button.
3. Insert **Project_Viewer** into the role name.
4. Insert a short description for this role, such as Project Viewing Only.
5. Select the **Project Dashboard** permission.
6. Click the **Create** button.

Create users

Login: Admin

You need to add these new users:

- Project.Manager
- America.User
- EMEA.user

The Administrator already exists and does not require any specific handling.

Project.Manager user

1. Select the **Administration** icon or click the **Administration** drop-down menu.
2. Select the **User Settings > Manage User** tab.
3. Click the **Create A New User** button.
4. Clear the **AD user** checkbox; this is not an Active Directory user.
5. Insert **Project.Manager** into the Username field.
6. Insert **Project** in the Firstname field.
7. Insert **Manager** in the Lastname field.
8. Provide an email address for the receipt of emails.
9. Insert a password and confirm the password value.
10. Select the **Project_Manager** permission for this user.
11. Click the **Create** button.

America.user user

1. Select the **User Settings > Manage User** tab.
2. Click the **Create A New User** button.
3. Clear the **AD user** checkbox; this is not an Active Directory user.
4. Insert **America.user** into the Username field.
5. Insert **America** in the Firstname field.
6. Insert **America** in the Lastname field.
7. Provide an email address for the receipt of emails.
8. Insert a password and confirm the password value.
9. Select the **Project_Viewer** role for this user.
10. Click the **Create** button.

EMEA.user user

1. Select the **User Settings > Manage User** tab.
2. Click the **Create A New User** button.
3. Clear the **AD user** checkbox; this is not an Active Directory user.
4. Insert **EMEA.user** into the Username field.
5. Insert **EMEA** in the Firstname field.
6. Insert **EMEA** in the Lastname field.
7. Provide an email address for the receipt of emails.
8. Insert a password and confirm the password value.
9. Select the **Project_Viewer** role for this user.

10. Click the **Create** button.

Multi-Departmental Estate – Project EMEA

Login: Project.Manager

The project manager is responsible for the definition of all projects, including the EMEA scan project. The administrator is responsible for the definition of the infrastructure used by the project (for example, locations and credentials that will be defined for use).

> **Note:** The Projects icon and drop-down menu are the only options available to the Project.Manager user.

Follow the instructions below:

1. Click the **Projects** icon or **Projects** drop-down menu. This displays the currently available projects. By default, no projects are defined.

2. Select the **Active Projects** tab.
3. Click the **Create New** button to add a project.
4. View the Create Project dialog that is opened.
5. Set the Name to **MultiDeptEMEA**.
6. Set the Description to **Project Shared Between Multiple Users and Roles**.
7. Set the Start time to the current time.

8. Click the **Next** button.

Locations tab

1. Select the EMEA location.
2. Click the **Next** button.

Product Adapters tab

1. Leave all the Product Adapters enabled.
2. Click the **Next** button.

Targets tab

1. Ensure that the targets associated with the EMEA location are enabled.
2. Note that only targets that have been associated with the EMEA location are listed. The association of locations to targets has been provided by the admin user.

3. Click the **Next** button.

Credentials tab

1. Ensure that all credentials are set to **On**.
2. Click the **Next** button.

Multi-departmental estate – Project Americas

Login: Project.Manager

Follow the instructions below:

> **Note:** The Projects icon and drop-down menu are the only options available to the Project.Manager user.

1. Click the **Projects** icon or **Projects** drop-down menu.

2. Select the **Active Projects** tab.
3. Note that the previously created EMEA project is available.
4. Click the **Create New** button to add a project.
5. View the Create Project dialog that is opened.
6. Set the Name to **MultiDeptAmericas**.
7. Set the Description to **Amercias Project Shared Between Multiple Users and Roles**.
8. Set the Start Time to the current time.
9. Click the **Next** button.

Locations tab

1. Select the **Americas** location.

2. Note that all the sub-areas are also selected.
3. Click the **Next** button.

Product Adapters tab

1. Leave all the Product Adapters enabled.
2. Click the **Next** button.

Targets tab

1. Ensure that the targets associated with the Americas are enabled.
2. Note that only targets that have been associated with the Americas location are listed. The association of locations with targets was provided by the admin user when describing the infrastructure.

3. Click the **Next** button.

Credentials tab

1. Ensure that all credentials are set to **On**.
2. Click the **Next** button.
3. Click the **Create** button.
4. Ensure that the new project is present in the Projects list.

Multi-departmental estate – Operations

This section shows how the operation scans are configured and started.

Start EMEA scan

Login: EMEA.user

The final step of this process is to initiate a project scan. If the licensing for this scan engine has not been previously set up, you'll need to do this before starting the scan. This is done under the **Administration > System Settings** tab. See the "System Settings - Activation" section of this document for more information.

Once all the configuration information has been identified (infrastructure by the Admin User and projects by the Project.Manager), the EMEA.user is then responsible for the day-to-day running of the EMEA project. Projects are initiated from the **Active Project** tab.

1. Click the **Projects** icon or **Projects** drop-down menu.
2. Select the **Active Projects** tab.
3. Identify the **MultiDeptEMEA** project.

4. Click the **Run** button ▶.
5. Watch the progress bar to identify ongoing scan operations. Let the project run until it is 100% complete.

Start Americas scan

Login: America.user

The final step of this process is to initiate a project scan. You need to have previously set up the licensing for this scan engine before starting the scan. This is done under the **Administration > System Settings** tab. See the "System Settings - Activation" section of this document for more information.

Once the configuration information has been identified (infrastructure by the Admin User and projects by the Project.Manager), the America.user is then responsible for the day-to-day running of the Americas project. Projects are initiated from the **Active Project** tab.

1. Click the **Projects** icon or **Projects** drop-down menu.
2. Select the **Active Projects** tab.
3. Identify the **MultiDeptAmericas** project.

4. Click the **Run** button ▶.
5. Watch progress bar to identify ongoing scan operations. Let the project run until it is 100% complete.

Status Americas scan

Login: America.user

Additional information about the status of the scanning process is available by click the **Status** button.

The examination and diagnosis of the scanning operations is discussed in a later chapter.

Status EMEA scan

Login: EMEA.user

Additional information about the status of the scanning process is available by clicking the **Status** button.

The examination and diagnosis of the scanning operations is discussed in a later chapter.

Americas mark scan as complete

The decision to mark a project as “complete” is one not taken by the scanning software. It’s a decision made by the administrator that needs to take into account the scan coverage of the identified estate (including the discovery of any unexpected devices/applications), any requirement to add additional scan targets, successful access to all target devices (credential coverage), and the need for rescan operations. It’s (typically) not the case that 100% coverage on the UI is the only criterion for marking a project complete.

Login: America.user

1. Click the **Projects** icon or **Projects** drop-down menu.
2. Select the **Active Projects** tab.
3. Identify the **MultiDeptAmericas** project.
4. Let the project run until it is 100% complete.
5. Use the Status button to identify that all elements have been sufficiently collected.
6. Click the **Actions** drop-down menu and select **Complete**.
7. Identify that the project is now in the Completed state and that the project color has changed.

Additional information about the status of the scanning process is available by clicking the **Status** button. The examination and diagnosis of the scanning operations is discussed in a later section.

EMEA mark scan as complete

The decision to mark a project as “complete” is one not taken by the scanning software. It’s a decision made by the administrator that needs to take into account the scan coverage of the identified estate (including the discovery of any unexpected devices/applications), any requirement to add additional scan targets, successful access to all target devices (credential coverage), and the need for rescan operations. It’s (typically) not the case that 100% coverage on the UI is the only criterion for marking a project complete.

Login: EMEA.user

1. Click the **Projects** icon or **Projects** drop-down menu.
2. Select the **Active Projects** tab.
3. Identify the **MultiDeptEMEA** project.
4. Let the project run until it is 100% complete.
5. Click the **Status** button to identify that all elements have been sufficiently collected.
6. Click the **Actions** drop-down menu and select **Complete**.
7. Identify that the project is now in the completed state and that the project color has changed.

Additional information about the status of the scanning process is available by clicking the **Status** button. The examination and diagnosis of the scanning operations is discussed in a later section.

Use case 3 – Complex estate

A **complex estate** is composed of multiple locations and/or disjoint network infrastructures. Responsibility for the network/infrastructure resides with a single person or single group with the complexity that locations are typically geographically disjointed and are also split into production and test sub-areas. Projects to execute scans are assigned as local responsibility. However, responsibility for the infrastructure remains with the global admin group.

The scan results may be segmented into different overall projects (e.g. Oracle project results, SQL Server project results, etc.) depending on the customer use case.

Additional aspects to a complex estate (which are distinct from the multi-department estate) are:

- A requirement for load balancing of scanning operations (that is, more than one scanning engine is required to carry the CPU load). The results of the scanning operation are written back to a shared scan engine database.
- Scan Windows that identify when scanning operations are permitted within the estate.

Complex estate – Personnel expectations

Given the extended complexity of this coverage, it's expected that a single administrator and scan owner will not be sufficient.

Summary

The ability to segment into different overall projects (e.g. Oracle project results, SQL Server project results, etc.) is required for this customer use case. It's assumed that the following areas of concern must be supported:

- **Global Infrastructure**: Identification and control of infrastructure globally. This "user" is responsible for the description of the infrastructure to be scanned, which includes IP address ranges, IP address range exclusions, Scan Windows and Connection types to be used.
- **Global Project Manager**: This "user" is responsible for global identification and control of project(s).
- **EMEA Manager**: This "user" is responsible for tracking and executing a EMEA project.
- **Americas Manager**: This "user" is responsible for tracking and executing an Americas project.

To support the project as described, the following items are required:

1. **2 projects:** Americas project, EMEA project
2. **4 users:** Admin, Project.Manager, America.User, EMEA.User
3. **3 roles:** Administrator, Project Manager, Project Viewer
4. **2 scan engines:** Follow the installation guide to install multiple scan engines.

Complex estate – Network infrastructure

This network is composed of a relatively open network with no major restrictions in terms of firewalls, network latency, or bandwidth. The network structure is geographically dispersed into Americas and EMEA. Each of these locations has a production, test, and storage device.

Complex estate – Responsibility & ownership

The dashed line identifies the areas of responsibility for four users within the scan engine.

Installation of primary and secondary scan engine

It's possible to associate multiple scan engines with a single scan configuration. This allows separate scan engine resources to be assigned to subsections of an estate configuration.

The registration of a secondary scanning server is achieved by installing the scan engine software on a new device (see the *Data Center Discovery—Scan Engine Installation Guide*), on a new scanning server, and specifying the name of the scan engine database provided during the first installation.

The installation of the second scanning server using the shared database ensures that the configuration information for the estate is known to both.

Complex estate – Top-level location

Login: Admin

A default location is provided with the standard install. This default location can be used to encompass all of the proposed estate. Follow the instructions below:

Select the **Locations** icon or **Locations** drop-down menu in the dashboard. This displays the current available locations. By default, a single location called **default** is available as a root item (if it hasn't been modified in a previous session). This is the top-level grouping and cannot be deleted.

However, it can be renamed and it's recommended that you rename it to a customer/project-appropriate value.

1. Enter the details of your new default location.
2. Ensure that **Enabled** is selected.
3. Enter the Time Zone of this locality. Enter the Max Scanning Count of **5.** (The number of concurrent jobs that can be run for targets in this location. A locality could be associated with targets accessible over a slow data connection, and for this reason large numbers of concurrent jobs is not advisable.)
4. Select the scan engines associated with this locality.
5. Click the **Save** button to save your details.

This single location is **not** sufficient for a medium project, as it's necessary to have more granular control over elements of the estate that need to be scanned.

Complex estate – Country-level location

Login: Admin

The complex company is split into two regional (scan) locations. Each region could be allowed to run its own scan projects (e.g., an Oracle audit may be done on a regional level at different times). Each location is also sub-divided into production, test, and storage device infrastructure as described below:

- Americas
  - Test
  - Production
  - Storage
- EMEA
  - Test
  - Production
  - Storage

These new locations need to be added:

1. Select the **Locations** icon or **Locations** drop-down menu in the dashboard.
2. Set up the complex estate with the following localities. See the “Multi-departmental estate – Country-level locations” section.

3. Click the top-level location.
4. Enable both scan engines for that default location.

5. Click the **Americas** Location.
6. Enable the first scan engines for the Americas location.
7. Disable the second scan engines for the Americas location.
8. Click the **EMEA** Location.
9. Enable the second scan engines for the EMEA location.
10. Disable the first scan engines for the EMEA location.

The result of this configuration is that projects that make use of locations will abide by the association of a scan engine to each of the locations. If additional areas are added under the top-level location, these will have both scan engines available to projects.

The rest of the items in the complex estate configuration are similar to the configuration of a medium-sized company. For that reason, references to the medium-sized company configuration are provided below at the end of this section.

Complex estate – Scan Windows

Scan Windows provides a means to limit the period when active scanning of an estate is carried out. For mission-critical enterprises, the possibility of additional network traffic or CPU is viewed as a risk. For this reason, specific time periods may be specified for scanning. For a complex estate, it's assumed that two restrictions will be applied. Scanning cannot occur during working hours (9-5) weekdays. Secondly, the weeks from Thanksgiving to January are also excluded for Financial Season.

1. Click the **Create** button.
2. Type **Not Working Hours** in the Name box.
3. Select **9.00am** in The Recurring Time box.
4. Type **480** (mins) in the Duration box.
5. Click the **Daily** radio button.
6. Click the **Exclusion** box.
7. Click the **Recur Every Weekday** radio button.
8. Click the **Create** button to save the scan window.

Secondly, the weeks from Thanksgiving to January are also excluded for Financial Season.

1. Click the **Create** button.
2. Type **Financial Season** in the Name box.
3. Select **00.00am** in The Recurring Time box.

4. Type **1440** (mins) in the Duration box.
5. Click the **Weekly** radio button.
6. Click the **Exclusion** box.
7. Click the **Recur Every 1 week** radio button.
8. Select every day of the week.
9. Click the **Create** button to save the scan window.

The Scan Windows exclusions will be displayed.

Complex estate - Configurations

The configuration of the complex estate from this point on is similar to the multi-departmental estate. For this reason, references are provided to the previous sections to continue the configuration.

Complex estate section	Equivalent multi-departmental estate section
Complex estate – Targets	See Multi-departmental estate – Targets
Complex estate - Connections	See Multi-departmental estate – Connections
Complex estate – Product Adapters	See Multi-departmental estate – Product Adapters
Complex estate – System Credentials	See Multi-departmental estate – System Credentials
Complex estate – Global System Credentials	See Multi-departmental estate – Global System Credentials
Complex estate – Application Credentials	See Multi-departmental estate – Application Credentials
Complex estate – Americas Application Credentials	See Multi-departmental estate – Americas Application Credentials
Complex estate – EMEA Application Credentials	See Multi-departmental estate – EMEA Application Credentials
Complex estate – Users & Roles	See Multi-departmental estate – Users and Roles
Complex estate – Create Users	See Multi-departmental estate – Create Users
Complex estate – Create Roles	See Multi-departmental estate – Create Roles
Complex estate – Project EMEA	See Multi-departmental estate – Project EMEA
Complex estate – Project Americas	See Multi-departmental estate – Project Americas

Complex estate – Start EMEA Scan	See Multi-departmental estate – Start EMEA Scan
Complex estate – Start Americas Scan	See Multi-departmental estate – Start Americas Scan
Complex estate – Status EMEA Scan	See Multi-departmental estate – Status EMEA Scan
Complex estate – Status Americas Scan	See Multi-departmental estate – Status Americas Scan
Complex estate – Americas Mark Scan as Complete	See Multi-departmental estate - Americas Mark Scan as Complete
Complex estate – EMEA Mark Scan as Complete	See Multi-departmental estate - EMEA Mark Scan as Complete

Network scanning

Data Center Discovery supports SNMP or network scanning, which is a standard way of monitoring and managing hardware and software from nearly any manufacturer. Network scanning enables you to determine what SNMP/network devices are deployed (for example, switches, routers, firewalls, and so on), as well as what devices are connected and where.

Discover network devices

Create a location to associate with the network devices or use an existing location. Create target sets to cover the IP ranges where the network devices will be scanned.

Ensure the SNMP connection protocol is **enabled** (for this location).

Ensure the network device product adapter is **enabled** (for this location).

Add the credentials necessary to connect to the SNMP targets.

For each SNMP target, the scan engine will query a series of preconfigured OIDs (Object Identifiers). These OIDs identify a set of information that is to be retrieved from the device as part of the scan operation. The data returned from each device query is stored as an XML “blob” within the scan database. The scan engine doesn’t interpret all elements of the SNMP scan results but does expose top-level elements of the scan operation. The results of the SNMP scan operation will create a new device, and this will appear in the associated Project Results screen.

Using custom OIDs

The standard SNMP queries executed by the scan engine can be supplemented with a set of customer required OIDs. These additional OIDs are queried when scanning an SNMP device.

The configuration required to add these additional OIDS is done by including a **JSON** file containing the OIDs in the **%PROGRAMDATA%\Ivanti\DCD\ Adapter\NetworkDevice** folder on all scan engine servers. Data Center Discovery will identify these supplementary files at scan time and add them to the list of preconfigured OIDs. Because OID scan data is stored as XML, there is no need to modify the structure of the underlying database.

Appendix B contains information on the format and structure required for custom OID files.

Project scan analysis

You can analyze the scanning operation from the UI interface. The analysis is carried out on a project-by-project basis. Under **Active Projects**, identify the project of interest.

Click the **Status** button to open the top-level Project Summary window.

Project summary

This window identifies the total number of targets, number of unique devices identified, the overall progress of the project scan, and a breakdown for all locations in the project with a scan progress for each of the locations.

Additional detail is available for each target by clicking the **More** button, which displays the project Target Diagnostics window.

Project diagnostics target – No credential(s) attempt

For a credential failure, the diagnostics are split into the connection history and stage history as shown above.

The **Connection history** identifies that a connection was made to the target using protocols available within the project. The connection history identifies that there is a section where connections were attempted (without any credentials being used). Eight attempts were made to various ports on the target; one was successful over the ICMP Provider, which is the remote target ping operation.

The **Stage history** only has a **TargetVerification** stage. This identifies attempts that were made to identify if a target exists on the IP address selected. Click the Banner line **(>)** to expand the elements that were attempted during the target verification stage.

Stage History

TargetVerification

Show entries Search:

Product Adapter	Strategy	Attempt Date	Duration	Outcome	Message	
Device Discovery	TCP Discovery	5/4/2016 12:07:51 PM	0	Skipped	Skipping Strategy because of missing Protocol connection TCP (audit=Discovery@TV.1:DeviceDiscoveryTCP)	Show

Three strategies were available to check if this target could be discovered:

- The first strategy attempted to perform packet analysis of network traffic to identify that the target is active, but the necessary protocol connection to support this was not available to the scan engine.
- The lack of a TCP connection to the target meant that the second strategy was **skipped**.
- The third strategy attempted to ping the target IP address but returned a **strategyFailure** (i.e., a response wasn't received within the time limit).

Additional information for each strategy is available by clicking the **Show** button associated with the strategy.

Project diagnostics target – Valid credential

For a credential success, the diagnostics are split into additional stages that identify the additional operations carried out on the device. The connection history still identifies the establishment of a connection to the target using protocols available within the project as with the failure case. Each successful credential usage is identified.

The stage history now has a series of additional stages that have been attempted based on the availability of valid credentials for a target. This summarizes the strategies that were run on the target. Click any Banner line **(>)** to expand the elements that were attempted during the stage.

Stage History

- DeviceUniqueness
- ApplicationDiscovery
- DeviceDiscovery
- ApplicationUniqueness
- DeviceScanning
- TargetVerification

Target verification

The **target verification** identifies the two successful strategies that were used to identify the presence of a target.

TargetVerification

Show 25 entries Search:

Product Adapter	Strategy	Attempt Date	Duration	Outcome	Message	
Device Discovery	Packet Analysis Discovery	23/09/2015 13:52:39	21013	NoResult	Strategy did not return a result" (audit=Discovery@TV.1:DeviceDiscoveryPacketAnalysis)	Show
Device Discovery	TCP Discovery	23/09/2015 13:52:39	0	Success	Strategy returned a valid result (audit=Discovery@TV.1:DeviceDiscoveryTCP)	Show
Device Discovery	Ping Discovery	23/09/2015 13:52:39	0	Success	Strategy returned a valid result (audit=Discovery@TV.3:DeviceDiscoveryPing)	Show

Showing 1 to 3 of 3 entries First Previous 1 Next Last

Device discovery

The **device discovery** stage identifies the outcomes of the strategies that retrieve initial information related to a target (e.g., the hostname of the target).

DeviceDiscovery

Show 25 entries Search:

Product Adapter	Strategy	Attempt Date	Duration	Outcome	Message	
Device Discovery	Packet Analysis Open Ports	23/09/2015 13:52:40	1017	StrategyFailure	Strategy failed (audit=Discovery@DD.2:PortDiscoveryPacketAnalysis)	Show
Device Discovery	TCP Open Ports	23/09/2015 13:52:51	0	Success	Strategy returned a valid result (audit=Discovery@DD.2:PortDiscoveryTCP)	Show
Device Discovery	Certificate Discovery	23/09/2015 13:53:14	0	Success	Strategy returned a valid result (audit=Discovery@DD.4:CertificateDiscovery)	Show
Network Device	SNMP Device Identification	23/09/2015 13:53:14	0	Skipped	Skipping Strategy because of missing Protocol connection SNMP (audit=NETWORK@DD.0:DeviceDiscovery)	Show
Storage Product Adapter (Beta)	EMC NavisphereCLI device discovery	23/09/2015 13:53:14	0	Skipped	Skipping Strategy because of missing Protocol connection NavisphereCLI (audit=Storage@DD.1:DeviceDiscovery)	Show
Storage Product Adapter (Beta)	embedded SMI-S WBEM Server on a Device Discovery	23/09/2015 13:53:14	0	Skipped	Skipping Strategy because of missing Protocol connection WBEM (audit=Storage@DD.1:SMISDeviceDiscovery)	Show
Unix Variant	SSH/Telnet Hostname Identification	23/09/2015 13:53:15	0	Success	Strategy returned a valid result (audit=UNIX@DD.0:DeviceDiscoveryHostname)	Show
Windows Variant	Windows Device RP ProductClass	23/09/2015 13:53:15	0	Skipped	Skipping Strategy because of missing Protocol connection RemoteProcess (audit=WINDOWS@DD.10:WindowsDeviceRPProduct)	Show
Windows Variant	Windows Device RR ProductClass	23/09/2015 13:53:15	0	Skipped	Skipping Strategy because of missing Protocol connection RemoteRegistry (audit=WINDOWS@DD.30:WindowsDeviceRRProduct)	Show

The example above identifies that the UNIX Variant product adapter successfully retrieved device discovery information over the SSH Telnet strategy. Clicking the **Show** button identifies the command that was executed.

Device uniqueness

The **device uniqueness** stage ensures that duplicates of a target are not generated. Each target is uniquely identified using attributes associated with the target.

DeviceUniqueness

Show 25 entries Search:

Product Adapter	Strategy	Attempt Date	Duration	Outcome	Message	
ESX	ESX Virtual Device Discovery windows(WMI)	23/09/2015 13:53:15	0	Skipped	Skipping Strategy because of missing Protocol connection WMI (audit=ESX@DU.1:ESXAmIVirtualWindows1)	Show
Hyper-V	HyperV Am I Windows	23/09/2015 13:53:15	0	Skipped	Skipping Strategy because of missing Protocol connection RemoteRegistry (audit=HyperV@DU.1:HyperVAmIVirtuaWindows)	Show
Network Device	Network Device Hostname	23/09/2015 13:53:15	0	Skipped	Skipping Strategy because of missing Protocol connection SNMP (audit=NETWORK@DU.1:NetworkDeviceDeviceHostname)	Show
Network Device	Network Device SNMP Entity Model	23/09/2015 13:53:15	0	Skipped	Skipping Strategy because of missing Protocol connection SNMP (audit=NETWORK@DU.3:NetworkDeviceEntityModel)	Show
Network Device	Network Device SNMP PManufacturer	23/09/2015 13:53:15	0	Skipped	Skipping Strategy because of missing Protocol connection SNMP (audit=NETWORK@DU.1:NetworkDeviceSNMPManufacturer)	Show
Network Device	Network Device Product	23/09/2015 13:53:15	0	Skipped	Skipping Strategy because of missing Protocol connection SNMP (audit=NETWORK@DU.1:NetworkDeviceProduct)	Show
Network Device	Network Device Network Info	23/09/2015 13:53:15	0	Skipped	Skipping Strategy because of missing Protocol connection SNMP (audit=NETWORK@DU.1:NetworkDeviceNetworkInfo)	Show
Unix Variant	SSH/Telnet OS & DNS Identification	23/09/2015 13:53:16	0	Success	Strategy returned a valid result (audit=UNIX@DU.0:SSHOSDNSIdentification)	Show
Unix Variant	HP-UX Strong Uniqueness - method 1	23/09/2015 13:53:16	0	Success	Strategy returned a valid result (audit=UNIX@DU.1:Uniqueness1)	Show
Unix Variant	Device Hostname	23/09/2015 13:53:17	0	Success	Strategy returned a valid result (audit=UNIX@DU.2:DeviceHostname)	Show
Unix Variant	HP-UX Device Operating System Information	23/09/2015 13:53:18	0	Success	Strategy returned a valid result (audit=UNIX@DU.2:DeviceOperatingSystemInformation)	Show
Unix Variant	HP-UX Strong Uniqueness - method 2	23/09/2015 13:53:18	0	NoResult	Strategy did not return a result" (audit=UNIX@DU.2:Uniqueness2)	Show

The example above identifies that the UNIX Variant product adapter successfully retrieved device uniqueness information over the SSH Telnet strategy. Clicking the **Show** button identifies the command(s) that were executed.

Device scanning

The **device scanning** stage retrieves information about the target device (DNS name, FQDN, domain-name, list of folders, system uptime, memory, process information, etc.).

DeviceScanning

Show 25 entries Search:

Product Adapter	Strategy	Attempt Date	Duration	Outcome	Message	
Informix	Informix Windows Pre Discovery	23/09/2015 13:53:32	0	Skipped	Skipping Strategy because of missing Protocol connection SMB (audit=INFORMIX@DS.2:InformixWindowsPreDiscovery)	Show
ISO 19770 Tag Read	ISO 19770 folder discovery strategy - Windows	23/09/2015 13:53:32	0	Skipped	Skipping Strategy because of missing Protocol connection SMB (audit=ISO 19770 Tag Read@DS.2:FolderDiscovery)	Show
ISO 19770 Tag Read	ISO 19770 ProgramData folder discovery strategy - Windows	23/09/2015 13:53:32	0	Skipped	Skipping Strategy because of missing Protocol connection SMB (audit=ISO 19770 Tag Read@DS.1:ProgramDataFolderDiscovery)	Show
Unix Variant	SSH DNS Identification	23/09/2015 13:53:34	0	Success	Strategy returned a valid result (audit=UNIX@DS.0:DeviceDiscovery)	Show
Unix Variant	Targetted Unix Variant Folders Index	23/09/2015 13:56:36	181271	GeneralFailure	Exception in strategy (audit=UNIX@DS.1:TargettedFolderIndex)	Show
Unix Variant	HP-UX Device Uptime	23/09/2015 13:56:36	0	Success	Strategy returned a valid result (audit=UNIX@DS.1:HPUXUptime)	Show
Unix Variant	HP-UX Device FQDN	23/09/2015 13:56:37	0	Success	Strategy returned a valid result (audit=UNIX@DS.1:HPDeviceFQDN)	Show
Unix Variant	HP-UX Device Domain Name	23/09/2015 13:56:37	664	StrategyFailure	Strategy failed (audit=UNIX@DS.1:HPDeviceDomainName)	Show
Unix Variant	HP-UX Process ProxyPort Information	23/09/2015 13:56:39	612	StrategyFailure	Strategy failed (audit=UNIX@DS.1:ProcessPorts)	Show
Unix Variant	HP-UX Device Information	23/09/2015 13:56:39	0	Success	Strategy returned a valid result (audit=UNIX@DS.1:DeviceInformation)	Show
Unix Variant	HP-UX Physical Memory DIMM Information	23/09/2015 13:56:51	0	Success	Strategy returned a valid result (audit=UNIX@DS.1:PhysicalMemoryBank)	Show
Unix Variant	HP-UX Process Information	23/09/2015 13:56:52	0	Success	Strategy returned a valid result (audit=UNIX@DS.1:Processes)	Show

The example above identifies that the UNIX Variant product adapter successfully retrieved device artifacts over the SSH Telnet strategy. Clicking the **Show** button identifies the command(s) that were executed.

Application discovery

The **application discovery** stage identifies the outcome of the strategies that retrieve initial application information related to a target (e.g. the presence of an application on a target device).

ApplicationDiscovery

Show 25 entries Search:

Product Adapter	Strategy	Attempt Date	Duration	Outcome	Message	
Active Directory	Identifies if the current device is a domain controller	23/09/2015 14:00:57	0	Skipped	Skipping Strategy because of missing Protocol connection WMI (audit=AD@AD.1:DomainControllerDiscovery)	Show
Apache HTTP	Apache HTTP folder discovery - Windows	23/09/2015 14:00:57	0	Skipped	Skipping Strategy because of missing Protocol connection WMI (audit=Apache HTTP@AD.4:ApacheFolderWin)	Show
Cognos TM1	Cognos TM1 process discovery - NIX	23/09/2015 14:01:03	0	Success	Strategy returned a valid result (audit=Cognos TM1@AD.1:CognosTM1ProcessNIX)	Show
Cognos TM1	IBM Cognos TM1 global registry file discovery - NIX	23/09/2015 14:01:03	0	Success	Strategy returned a valid result (audit=Cognos TM1@AD.3:CognosTM1RegistryFile)	Show
Cognos TM1	IBM Cognos TM1 validation strategy	23/09/2015 14:01:03	0	Success	Strategy returned a valid result (audit=Cognos TM1@AD.10:CognosTM1Validation)	Show

The example above identifies that the Cognos TM1 product adapter successfully identified application information. Clicking the **Show** button identifies the command that was executed to perform the application discovery.

Application uniqueness

The **application uniqueness** stage ensures that duplicates of an application on a target are not generated by ensuring that each application is uniquely identified using attributes associated with the application.

ApplicationUniqueness

Show 25 entries Search:

Product Adapter	Strategy	Attempt Date	Duration	Outcome	Message	
Active Directory	Domain unique identifier	23/09/2015 13:58:16	0	Skipped	Skipping Strategy because of missing Protocol connection LDAP (audit=AD@AU.1:LDAPUniqueIdentifier)	Show
Apache HTTP	Apache HTTP Uniqueness - Windows	23/09/2015 13:58:16	0	Skipped	Skipping Strategy because of missing Protocol connection WMI (audit=Apache HTTP@AU.1:ApacheUniquenessWin)	Show
Apache HTTP	Apache HTTP Uniqueness - NIX	23/09/2015 13:58:16	513	Success	Strategy returned a valid result (audit=Apache HTTP@AU.1:ApacheUniquenessNix)	Show
Cognos TM1	IBM Cognos TM1 Uniqueness - Windows	23/09/2015 13:58:16	0	Skipped	Skipping Strategy because of missing Protocol connection WMI (audit=Cognos TM1@AU.1:CognosTM1UniquenessWin)	Show
Content Manager	Content Manager Uniqueness - Windows	23/09/2015 13:58:16	0	Skipped	Skipping Strategy because of missing Protocol connection WMI (audit=CONTENTMANAGER@AU.1:ContentManagerUniquenessWin)	Show

The example above identifies that the UNIX Variant product adapter successfully retrieved application uniqueness information using the Apache HTTP Uniqueness (UNIX) strategy.

Log files

The UI is the normal method for the examination of scanning operations. A (text) log file can prove useful for a remote diagnosis of a scan engine problem. The log files provide a detailed list of what is happening while the scan is running. Any errors that have occurred can be found there.

The log files are broken down into two types:

1. Scan service logging
    - **Filename**: Service.log
    - **Additional overflow filename**: Service.log.N (where is N is a number between 1 and 10).
    - **Content**: The logs associated with the running/scheduling scan operation. When a file gets too large, a new file is created, and the original file is renamed to Service.log.N
    - **Contains**: Entries associated with the scan itself only; no target-specific logging.

> **Note**: Before this release, target-specific logging was also included in the Service.log. This type of logging is no longer included, and thus reduces the overhead of large service logging files.

2. Individual target-specific logging
    - **Filename**: Target-W.X.Y.Z.log (where W.X.Y.Z is an IP address of the target).
    - **Additional overflow filename**: N/A
    - **Content**: The logs associated with the execution of individual commands of the scan operation.
    - **Contains**: Entries associated with the operations applied on an individual target.

To access these log files, go to this location:

Local Disk (C:) > **\ProgramData\Ivanti\DataCenterDiscovery ScanEngine 4.0\Logs**

Projects status – Project summary

The **Project > Active Projects > Status > Project Summary** tab identifies the overall statistics of the scan project.

Projects status – Project results

The **Project > Active Projects > Status > Project Results** tab provides a breakdown of the scan results associated with each target device linked with the project. The difference between the Project Activity and Project Results dialogs is that project activity relates to all IP addresses identified within a target range; the project results only deal with items that have information associated with the IP address.

The results of the scan are broken down into four categories:

- **Found Device:** A device that was identified as a potential target for scanning.
- **Device:** A confirmed device that has been promoted to the status of a full device; this device exists and will be subject to an examination for installed applications.
- **Found Application:** The application that was identified as a potential target for scanning.
- **Application**: A confirmed application that has been promoted to the status of a full application; this application exists and is subject to an examination for installed applications.

Each category is available as a separate tab for further examination, and each provides additional action buttons:

Button	Action
Search	Filter the results on a specific string value.
	Refresh the results window to get a more up-to-date list.
	(Column select) Enable or disable specific columns within the results tables.
	(Download) Save the results as a CSV file.

Found devices

This is a device that was identified as a potential target for scanning (i.e., this is more than just an IP address that forms a range of IP addresses). It's believed to exist as a real device, but it's not confirmed that this device represents a device that is distinct from all other devices (uniqueness).

The basic information that has been identified for the device is displayed: The hostname/IP address, number of open ports on the device, suspected operating system, the number of times the device has been scanned, last scan date, last outcome of a scan operation, and finally if the device has been fully scanned (i.e., is a full device). A link to the fully scanned information is provided, which identifies the case when a found device has been promoted to device status.

Devices

This is a successfully scanned device. This device is known to exist and will be subject to an examination for installed applications. This tab identifies the top-level hardware components of the device:

- Physical or virtual flag
- Operating system
- CPU count
- CPU speed
- RAM
- Manufacturer

Found applications

This is an application that was identified as a potential target for scanning. It's believed to exist as a real application but it is not confirmed that this application represents an application that is distinct from all other applications (uniqueness).

Applications

This is a successfully scanned application that represents an application that's distinct from all other applications (based on uniqueness).

Project reports

This is a centralized location for downloading both network and computer reports. Currently available reports include network device interface, MAC address, VLAN, and network-to-network mapping.

To download a report, click its link in the Report name column.

Project status – Diagnostics

If you want to see a page that summarizes the results of target scans, do so on the Diagnostics page.

To diagnose a project

1. Click the **Projects** drop-down menu at the top of any page and select the **Active Projects** tab.
2. On the resulting Projects page, select the project you want to diagnose, and click its **Status** button.
3. Click the **Diagnostics** tab near the top of the page.

Note the three tabs under Diagnostics—**Targets, Device Scan Attempts,** and **Application Scan Attempts**.

All three tabs have a Location and Target field, which enable you to filter the displayed data and refresh the displayed charts and data tables below them. The Location field displays the same list of Leaf Locations as seen in the drop-down on the Project Summary page. None of these tabs will display any rows until scanning has commenced.

The **Targets** tab summarizes the targets for which scans were attempted and identifies different statuses such as waiting, in-progress, detected, not detected, error, and other:

- *Waiting* and *in-progress* are for non-completed targets.
- *Detected*, *not detected*, *error*, and *other* are for scan-completed targets.

Clicking any of the status types causes the table contents to refresh and display corresponding targets for that specific status.

If a target is rescanned, it's changed from a **completed** target status to an **incomplete** status. The target in the data table will reappear with the latest start time stamp and current target status.

If a target is excluded, then the Targets tab shows a status of **other** and a status of target **excluded**. If the target is then **included**, the Status and Phase fields will not update until the target is rescanned.

These summary figures are pre-aggregated and refreshed every 10 minutes to maintain UI interactivity. Hover over the information icon to see how long since the data was last refreshed.

The **Device Scan Attempts** tab summarizes the results of device target scans:

The charts give you an overview of the scan results and can be used to drill down further into particular categories by clicking the various elements.

Chart 1 (the pie chart on the left) is the Status chart, which tells you how many *scanned* and *unscanned* results there are. The table can be further filtered by clicking on a colored slice.

The Unscanned section on the right shows further details for the *unscanned* devices:

- **Chart 2** (the bar chart in the center) is the Reasons chart and gives the reasons for unsuccessful scans. You can click on each reason bar in this chart to filter the results based on this reason. The two pie charts will change to show only these devices, and the table below will be filtered also.
- **Chart 3** (the pie chart on the right) is the Type chart and gives the suspected OS of the unscanned devices. You can click on this chart to filter the results, filtering the other two charts and the table below.

The listing table at the bottom of the page summarizes the scan results for each individual target. This table lists all the targets on which a scan has been attempted and summarizes how the scan went.

Things to note are:

- The **Status column** tells you whether the target has been scanned or is unscanned. If a target hasn't been detected, then this information will be displayed on the **Targets** tab.
- The **OS (Scanned/Suspected) column** shows you either the suspected OS if the target is unscanned, or the scanned OS if it has been scanned.
- The **Ports column** (hidden by default) lists all ports with a successful connection which a found device or device detected.
- The **Reason column** gives the reason a target was not scanned
- **Scan Count** gives the number of times a target has been scanned.
- There are also columns that show how many Found Devices, Devices, Found Applications, and Applications have been found as part of the scan.
- The **More** link will take you to the Device details page in the case of scanned rows, or the Found Device details page in the case of unscanned rows.

The **Application Scan Attempts** tab gives the same type of summary for applications.

Note the differences from the Devices tab:

- The suspected OS chart instead shows the different applications.
- If the application was scanned as part of a device scan, the **Device** column shows a link to the Device details page of the device the application was found on.

System activity

The **System Activity** section of the dashboard provides a means to assess the current running activity of the scan engine and its associated components.

System performance

The **System Performance** tab provides general statistics on the scan engines under the control of the dashboard. Since the dashboard is composed of a backend database that stores scan data and one or more scan engines, the system performance is broken into these two sections. Statistics are provided on current I/O rates, memory usage, CPU, and so on.

Scanning activity

The **Scanning Activity** tab provides in-depth feedback on the scanning operations run against each of the targets identified in the scanning ranges (not just the active devices in the ranges). Each row of the table identifies a single target.

The search field allows a list of targets to be restricted. This search field is “freeform,” that is, a value of **0.1** will identify targets such as 192.2.0.1, 192.3.0.10, 192.4.0.11, etc.

> **Note:** Additional information on any target row can be identified by clicking the **More** button.

System audit log

The system audit log enables you to track all major modifications made to the scan engine configuration. The audit log tracks the modifications down to the individual configuration attributes within the configuration setup. A search option enables you to retrieve modifications in specific area(s). You **must** click the **Go** button to retrieve the audit log entries for the time period specified.

Changed Date	Username	Change Type	Object Type	Field Name	Old Value	New Value
16/12/2015 11:50	admin	Update	Location	Servers		IQINC(25/80%/80%/8...
16/12/2015 11:50	admin	Insert	LocationConnection...	IsEnabled		False
16/12/2015 11:50	admin	Insert	LocationConnection...	ConnectionConfigura...		Certificate Analysis P...
16/12/2015 11:50	admin	Insert	LocationConnection...	IsEnabled		False
16/12/2015 11:50	admin	Insert	LocationConnection...	ConnectionConfigura...		DB2
16/12/2015 11:50	admin	Insert	LocationConnection...	IsEnabled		False
16/12/2015 11:50	admin	Insert	LocationConnection...	ConnectionConfigura...		DNS Provider
16/12/2015 11:50	admin	Insert	LocationConnection...	IsEnabled		False
16/12/2015 11:50	admin	Insert	LocationConnection...	ConnectionConfigura...		ICMP Provider
16/12/2015 11:50	admin	Insert	LocationConnection...	IsEnabled		False

Tracing log

The tracing log is provided for dashboard diagnostics. If errors occur within the dashboard, information identified within this tab will be requested by Ivanti support to aid in further analysis.

You can download the log to the local device using the **Download Log File** button.

Administration

Administration of the scan engine enables you to establish global settings for the scanning process.

Scanning servers

A single dashboard can support multiple servers. To access a scanning server's configuration details, select a server from the drop-down list.

You can configure these items, which are intended to provide a form of system "throttling" to ensure that system resources are not overloaded on the scan engine server.

- **Max Disk IO Usage Percent**: Identifies the percentage of the available disk I/O to be used by the scan engine before throttling is applied.
- **Max Memory Usage Percent**: Establishes the percentage of the available memory to be used by the scan engine before throttling is applied.
- **Max CPU Usage Percent**: Establishes the percentage of the available CPU to be used by the scan engine before throttling is applied.
- **Max Network IO Usage Percent**: Establishes the percentage of the available network I/O to be used by the scan engine before throttling is applied.
- **Max Active Jobs**: The maximum number of scanning jobs that will be held as active within the scan engine. If the current number of jobs is higher than this value, then no additional jobs will be requested.
- **Job Polling Count**: The number of jobs the scan engine will start at any one time. The scan engine will continue polling this number of jobs until it has reached the max active jobs value.

The disk I/O, memory, CPU, and network I/O usage of the scanning server is constantly monitored. If, at any point, the average value over 5 minutes for one or more of these metrics exceeds the configured limit, the scanning server will stop serving additional jobs.

Job serving will resume when average values (over 5 minutes) for all metrics fall below the configured levels. Although serving of new jobs will be paused, existing jobs will run to completion

and will continue to consume resources. In some cases, depending on the complexity and breadth of the jobs in progress, the level of resource usage may be sustained and may actually increase.

System settings

System settings cover all aspects of the scanning process. All scan engines associated with this dashboard are governed by these settings (i.e., the settings have global implications).

Product adapter manager

This tab provides the ability to enable and disable product adapters across an entire scan estate. This global setting affects all locations and projects that attempt to use a specific product adapter.

A product adapter can be disabled for a number of reasons. The primary reason would be that a specific product is not present in an estate; attempting to locate the product wastes scanning resources.

Activation

Accessing the scanning service requires an activation license. This license is provided by Ivanti support or through an online activation website.

Provide the license email and license key values and click the **Activate All Servers** button. Projects can now be allowed to execute.

CyberArk

You can configure the scan engine to retrieve credential passwords and (optionally) usernames from CyberArk. This screen allows the registration of one or more CyberArk vaults.

The **Display name** is a label used in the Credentials screen to distinguish between multiple vault setups.

The **Endpoint** is the URL of the Cyberark Application Identity Manager Central Credential Manager Web Service. This is typically http://<Address>/AIMWebService/V1.1/AIM.asmx.

The **App ID** is the name of the application account set up for the scan engine to use.

See the *Data Center Discovery—Scan Engine Prerequisites Guide* for CyberArk prerequisite details.

Configuration

You can modify the following configuration settings.

Job Serving

- **Enable Job Logging**: When set to ON, job serving diagnostics are written to the jobs.t_Log table. OFF indicates no diagnostic information will be written.

- **Auto Deleted Job Log**: When set to ON, job serving diagnostic data in the jobs.t_Log table is automatically deleted once job logging is disabled. Use OFF to keep this data after job serving logging has been disabled.
- **Target Expand Rate**: Determines the total number of IPs (from range and subnet target sets) to add to the queue upon execution of queue step 1. This stops the queue from becoming flooded when ranges are expanded much more quickly than they can be served.
- **Max Count Multiple To Queue**: Determines the number of jobs to queue for each scan engine. The default is 1.5, which means that for a scan engine with a MAX JOBS limit of 100, 150 jobs (100 x 1.5) will queue for that server. This is to keep the scan engines operating at full capacity.
- **Min Queued Threshold**: When the number of jobs queued for a server is below a certain percentage of its MAX JOBS setting, more jobs are queued for it. This prevents the queue from becoming flooded if the server has multiple long-running jobs.
- **Save Target XML**: When set to ON, the XML for each target is saved in the job table. Saving target XMLs results in massive data bloat, so this option is set to OFF by default.

Scanning

- **Jobs Timeout**: Applies a time limit to each scan job. After the time limit expires, the job is terminated, and any artifacts already discovered will be saved to the database. The job is assigned a status indicating it was completed after a timeout. The value of 0 indicates that no time limit should be applied to the job. The default value is 60 (mins).
- **Keep Connection History**: When set to ON, no connection history will be deleted. Due to the amount of data captured, enabling this setting can cause significant database growth. It's intended as a diagnostic aid only. The default value is OFF.
- **Keep Command History**: When set to ON, no command history will be deleted. Due to the amount of data captured, enabling this setting can cause significant database growth. The default value is ON. Changing this value to OFF will affect reports for LMS Windows and Nix hardware on the REST API.
- **Allow Project Overrides**: When set to ON, the tabs Product Adapters, Target Sets, and Credentials will display in Advanced Configure Project settings. OFF will disable these tabs.
- **Allow Project Modification After Start**: This setting only applies to a project that is not new. Using ON will allow modification of the whole project. OFF will make the tabs Locations, Product Adapters, Targets, and Credentials read-only.

Password Expiry

- **Password Expiration Period**: Determines the number of days after which a password expires. When the value is 0, password expiration is disabled. If a user's password expires, they will be presented with a Change Password pop-up on login, where they will need to provide both their old and new password.

User settings

The User Settings options enable you to create, delete, and edit existing and new user identities. The scan engine supports the use of locally managed or Active Directory user accounts. In addition, you can assign roles to users that apply a scope limiting the operations allowed.

Manage user (local)

This tab provides the ability to create and modify users associated with the dashboard. By default, an installation provides a single user called **admin** with a password of **password**.

For additional security, it's recommended that you reset the default password for the admin user.

To change the password

1. Click the **Reset Password** button.
2. Provide the new password.
3. Click the **Update** button.

To edit the profile

1. Select the admin user.
2. Click the **Edit Profile** option.
3. Provide a first and last name for the administrator.
4. Provide an email address for the administrator.

5. Click **Update** to save new information.

Manage user (Active Directory)

The scan engine also supports the use of Windows accounts to access the dashboard. Unless it was explicitly enabled during installation, Active Directory authentication is disabled by default. To use Active Directory accounts where this option was *not* selected at installation, it's necessary to configure IIS to allow Windows Authentication.

To create a user

1. Select the **Is Active Directory User** option.
2. Provide the domain name.
3. Provide the username.
4. Provide the first and last name, and email (optional).
5. Select the Permissions.

To edit the profile

1. Select the AD user that needs to be modified.

2. Click the **Edit Profile** option.
3. Made the corresponding changes.
4. Click **Update** to save new information.

Manage role permission

Roles allow for subsets of the functionality (provided by the dashboard) to be enabled or disabled on a per-user basis. This process also ties in with the creation of users described in the previous section. You can define a role that limits the dashboard functionality. Users can then be assigned this role and thereby acquire specific privileges.

To create a role with permissions

1. Click **Add New** button to create a new role.

2. Provide a role name, such as Project.Manager.
3. Provide a description of the role.
4. Select permissions for the role, such as Project Administrator permissions.
5. Click **Create** to save the role.
6. Assign a role to a user under the **Manage User** Tab. This is covered in the use-cases examples provided in this document.

Device deletion

> **Warning:** Scanning should not be in progress when devices are being deleted from the database. This can lead to unintended consequences, leaving the database in an inconsistent state.

On the **Project Status > Project Results** screen, you can select one or multiple devices to submit for deletion. Note that when deleting a device that is part of a cluster, all the devices in that cluster (plus their associated applications) will also be deleted.

On submission to delete, a confirmation alert displays.

Once submitted for deletion, the devices are highlighted on the Project Results screen as follows.

Device deletion status can be tracked on the **System Activity > Deleted Devices** screen.

Data explorer

You can review the results of a scan in both visual and report form. Static reports are provided under the **Data Explorer > Reports** menu. The visualization tool is provided under the **Data Explorer > Visualize** menu.

Reports

To run a report, you need to click the report link on the **Reports** page. Clicking that link will display (after a short delay) a Save dialog requesting a location to save the generated the .CSV file.

The reports are classified into three groups:

- Oracle LMS reports
- Oracle LMS Utilities
- Diagnostic reports

Oracle LMS reports

These reports are intended to provide information about Oracle products; some of them have preconfigured formats specified by the Oracle LMS group:

- **ORCL_OVERVIEW**: Oracle LMS has defined explicit data fields to be collected by a third-party tool when measuring Oracle software usage. Each field in the table represents the data point that needs to be collected by Ivanti. This report details the discovered Oracle database technology within the scanned estate. It reports information on version, edition, options and packs, and virtualization technologies. This file must be provided in .CSV format. This report provides a user-readable view of the scanned estate for Oracle software deployment. Column format is specified by Oracle.

> **Note:** The **ORCL_OVERVIEW** report contains mandatory and optional fields. If the mandatory field data isn't provided, it will be replaced with column-specific default values. Be aware that these default values can affect the overall Oracle license position and costs.

- **ORCL_DETAIL (LMS Internal Use)**: Identifies the details of the hardware upon which the Oracle database is installed. This information is not intended for general user consumption. This file must be provided in .CSV format. Column format is specified by Oracle.
- **ORCL_V$LICENSE (LMS Internal Use)**: Reports information about license limits for Oracle databases. This information is not intended for general user consumption. This file must be provided in .CSV format. Column format is specified by Oracle.
- **ORCL_OPTIONS (LMS Internal Use)**: Reports the results of specific Oracle-defined queries. This information is not intended for general user consumption. This file must be provided in .CSV format. Column format is specified by Oracle.
- **ORCL_V$SESSION (LMS Internal Use)**: Lists information for each current session connected to the database when the data retrieval queries are executed. This file must be provided in .CSV format. Column format is specified by Oracle.
- **ORCL_DBA_USERS (LMS Internal Use)**: Contains information about users associated with Oracle databases. This information is not intended for general user consumption. This file must be provided in .CSV format. Column format is specified by Oracle.
- **ORCL Hardware report (LMS Internal Use)**: Is available but cannot be downloaded from this page. A future version of the UI will allow you to retrieve this report directly from this page. The Hardware report is composed of multiple individual files (in a ZIP file) that provide a picture of the hardware deployment within the estate. All LMS reports (including those listed above) are available from the REST API provided by Ivanti. The LMS Hardware report is **only** retrievable from the REST API by entering the following URL:
  http://<*host*>/api/v1/reports/oracle/lms_vmhw

  If prompted for a password, use the same password that is used to access the UI. Note that the LMS hardware strategies are not executed by default. They must be enabled prior to the scan operation. Contact Ivanti support if you require additional details for how to achieve this.
- **ORA-001 (Ivanti-defined)**: Details the discovered Oracle technology products within the scanned estate. This report supports Oracle licensing requirements and the Oracle Server Worksheet (OSW) population. It reports information on version, edition, options and packs, and virtualization and clustering technologies. This report displays only those instances of Oracle associated with device instances, but the same device may appear twice on the report if it participates in a cluster. This file must be provided in .CSV format. Column format is specified by Ivanti.

Oracle LMS utilities

You can download these editable reports, then import and save them to the database.

Editable ORCL_OVERVIEW Report: This link downloads an editable version of the ORCL_OVERVIEW Report and allows you to provide values for the following user-editable columns:

- **GROUP**: A non-mandatory text field
- **AGGREGATION_LEVEL**: A non-mandatory text field
- **ORACLE_CSI**: A non-mandatory text field
- **DATABASE_EDITION**: A mandatory text field

- **LICENCE_METRIC**: A mandatory text field
- **APPLICATION_NAME**: A non-mandatory text field
- **ENVIRONMENT_USAGE**: A mandatory text field
- **USER_COUNT_APPLICATION**: A non-mandatory numeric field

> **Note:** The **Editable ORCL_OVERVIEW** report contains mandatory and optional fields. If the mandatory field data isn't provided, it will be replaced with column-specific default values. Be aware that these default values can affect the overall Oracle license position and costs.

Load ORCL_OVERVIEW Report: This link imports the user-supplied data in the user-editable columns. The user-provided data undergoes appropriate validation before saving to the database.

Diagnostic reports

These reports return data useful for diagnosing issues related to devices and applications.

- **Device Diagnostics**: This report provides a summary of the scan activities for all the devices present within the scan. It's used for diagnostics, as the report identifies the success or failure status for device scanning operations.
- **Application Diagnostics**: This report provides a summary of the scan activities for all the applications present within the scan. It's used for diagnostics, as the report identifies the success or failure status for application scanning operations.

Deleting reporting data

Data in the Reporting tables can accumulate over time. If you're expecting an Oracle audit, or creating a new project, you may want to purge this data. In order to rebuild the data in the Oracle LMS reports and the Diagnostics reports, the existing data in the Reporting tables should be cleared down before the new scan or rescan. An admin can delete the data from the aggregate tables by executing the following stored procedure:

```
EXEC [Reporting].[ClearReportingData]
```

This will clear down all of the aggregate tables in the Reporting schema in the database. After this, the Oracle LMS reports will be empty, and the Diagnostics reports will be incomplete.

> **Note**: To repopulate the reports, you must rescan the targets.

Visualize

The visualize option is provided as an experimental feature that displays the connectivity of the configuration items (CIs) that have been scanned graphically. This feature doesn't work effectively when the number of CI nodes exceeds 3000.

The default view identifies all object types and the relationships between them.

To limit the displayed CI types and relationships, select the required CI types from the left panel. Each selected CI type will visually display in the right panel, along with the associated relationships. If needed, you can further restrict the list of relationships.

Clearing all selections will display all CI types and relationships.

Configuration item information

You can click each item within the visualization panel to retrieve additional information about it. This information is displayed in the pop-up CI Details panel on the right.

Appendix A: Key terms, emails, and links

Term	Description
CSV	Comma separated values
IIS	Internet Information Services
Ivanti support	https://www.ivanti.com/support/ivanti-support
Microsoft support for KB932370	https://support.microsoft.com/kb/932370
NETSTAT	A command on the command prompt to access ports.
Oracle Licensing Management Services (LMS)	Oracle LMS is an organization that promotes the management, governance, and awareness of the proper use and distribution for Oracle systems through expert services. *as defined by Oracle
Oracle Rac	Real Application Cluster
Partitioning (Hard)	Hard partitioning physically segments a server and separates it into distinct smaller systems, typically with its own CPUs, operating system, separate boot area, memory, input/output subsystem, and network resources. *as defined by Oracle
Partitioning (Soft)	Soft partitioning segments the operating system using OS resource managers. The operating system limits the number of CPUs where an Oracle database is running by creating areas where CPU resources are allocated to applications within the same operating system. *as defined by Oracle
PS Command	A command on UNIX boxes to display active processes.
Remote Registry	Allows Windows authenticated users to remotely modify registry settings on a device.
SID	Security identifier
WMI	Windows Management Instrumentation

Appendix B: Custom OID files

> **Important:** In the following examples, all quotation marks (“), commas (,), braces ({ and }), and square brackets ([and]) are essential to the file format. Care should be taken when creating files, as the unexpected absence (or presence) of these characters can invalidate the entire file.
>
> The use of white space (i.e., carriage returns, tabs, and spaces) doesn’t impact the interpretation or validity of the file. It’s recommended that the contents of the JSON file are passed through a JSON validation tool to ensure that they contain no errors in content or formatting before using this extension mechanism.
>
> While custom OID files can have any file name, they **must** have a **.json** extension. The file contents must start with left brace ({) and end with right brace (}). The custom OIDs appear in the main body of the file as a **comma separated** list. There are two different formats of entry which are documented below.

Format 1: Simple string value retrieval

This is the simplest form of custom OID entry and takes the form of a name and an OID value where **name** is any **unique** value identifying the query, and **OID** is the OID to be queried against the SNMP device.

Format:

```
name : OID
```

Example:

```
“sysdesc” : "1.3.6.1.2.1.1.1.0"
```

When the above entry is processed, the SNMP query **get|1.3.6.1.2.1.1.1.0** will be executed against the SNMP device. The returned results of this command will appear in the device XML “blob” as follows:

```
<value name="sysdesc" oid="1.3.6.1.2.1.1.1.0" type="string">
  Cisco IOS Software
</value>
```

Format 2: Complex table value retrieval

The second type of entry, for more complex queries, allows a query to be restricted to devices that are made by specific vendor(s), and also allows the query to retrieve only specific columns of data. This assumes that the OID in question is associated with a table result.

Format:

```
name:
{
      oid :       oidvalue
      vendors :   listofvendors,
      cols :      listofcolumns
}
```

The elements in this entry are as follows:

- **name:** As with the previous example, name can be any **unique** text identifying the query to be executed. Where the same **name** is used multiple times in the file, the last entry will be used.
- **oid:** The OID to be interrogated.
- **vendors:** A comma separated list of vendors. The OID will be interrogated on devices manufactured by vendors in the specified list only. Where this list is left empty, the OID will be queried on **all** devices.
- **cols:** A comma separated list of columns to include in the results. Where this list is left empty, all available columns will be included in the saved results.

Example:

```
    "vtpMaxVlanStorage" :
    {
        "oid" : "1.3.6.1.4.1.9.9.46.1.1.2.0",
        "vendors" : ["cisco","ibm"],
        "cols" : ["ifDescr","ifType","ifOperStatus"]
    },
```

When the above entry is processed on a Cisco or IBM device, it results in the execution of the SNMP query **walk|1.3.6.1.4.1.9.9.46.1.1.2.0**. The query isn't executed for other devices.

The results will appear in the device XML as a table with the specified name, with only values for the columns specified in the **cols** property appearing in the results.

```
<table name="vtpMaxVlanStorage" oid="1.3.6.1.2.1.2.2">
    <col name="ifDescr" />
    <col name="ifType" />
    <col name="ifOperStatus" />
    <row index="1">
      <value>VLAN1</value>
      <value>6</value>
      <value>1</value>
    </row>
    <row index="2">
      <value>FastEthernet0/1</value>
      <value>6</value>
      <value>1</value>
    </row>
</table>
```

The following sample shows a file containing multiple custom OIDs in both formats. Note in particular:

- File begins with a left brace ({) and ends with a right brace (}) character.
- Individual entries are separated by commas.

- Vendor and column lists begin with left a square bracket ([) and end with a right square bracket (]).
- Where the vendor or cols list are empty, the value is **[""]** (with no space between the quotation marks).

Example JSON file:

```
{
  "sysUpTime" : "1.3.6.1.2.1.1.3.0",
  "vtpVlanTable" :   {
        "oid" : "1.3.6.1.4.1.9.9.46.1.3.1",
        "vendors" : ["cisco", "ibm"],
        "cols" : [""]
  },
  "vtpVersion" : "1.3.6.1.4.1.9.9.46.1.1.1.0",
  "vlanTrunkPorts" : {
        "oid" : "1.3.6.1.4.1.9.9.46.1.6.1",
        "vendors" : [""],
        "cols" : ["vlanTrunkPortIfIndex",
                  "vlanTrunkPortManagementDomain",
                  "vlanTrunkPortEncapsulationType",
                  "vlanTrunkPortVlansEnabled"]
  }
}
```