

# **SHOWCASE® Image Center Administrator's Guide**

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The ShowCase Image Center is designed to receive and store millions of DICOM images sent from imaging machines. Images may then be accessed locally or remotely using ShowCase Premier or Workstation or the ShowCase Image Viewer for iPad (ShowCase ViP). Images are stored in their native DICOM format, exactly as received. The Image Center is designed to accommodate large image archives of 20TB or more containing millions of DICOM images and data files.

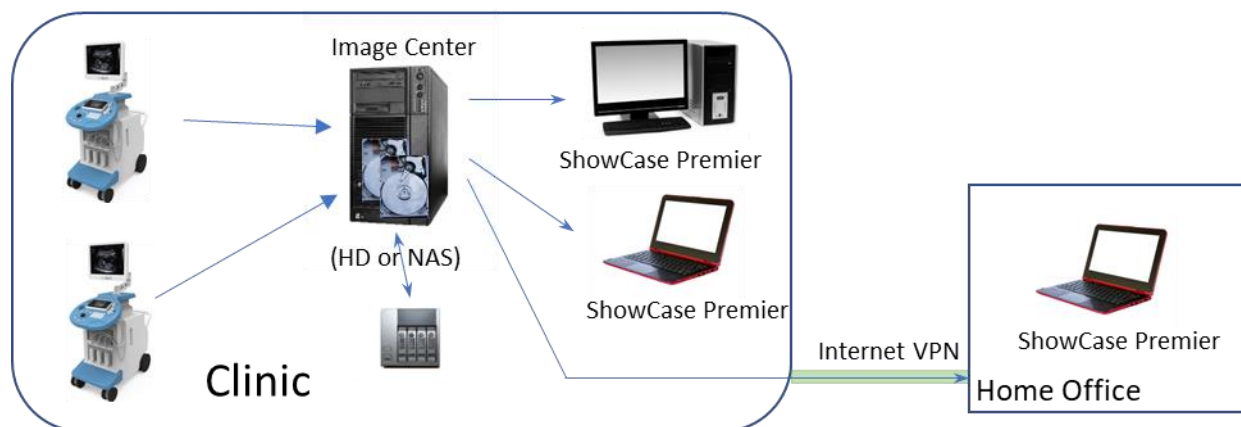
This guide references other documents, which may be found at: <https://www.triltech.com/documents.html>

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## Deployment

The following is a sample single clinic deployment:



The Image Center software is installed on a computer in the clinic, typically one that is left on all the time. This can be anything from a laptop to a full server to a VM, depending on the needs of the clinic. Plenty of disk space should be available to the Image Center computer, either in the form of dedicated, large, internal hard drives or NAS.

Images, clips, and other DICOM objects are sent using standard DICOM protocols to the Image Center. The Image Center stores the incoming DICOM files in folders called Image Directories. If the Image directory is configured for use with ShowCase ViP, iPad compatible images and clips are generated. When an Image Directory runs out of space, a new Image Directory can be added to the system to store more studies. It is not uncommon for Image Directories to use many terabytes of storage.

**Local (LAN) ShowCase Deployment:** ShowCase is configured to access all studies in all Image Directories through the LAN. You can search for studies by patient name, referring physician, etc. Image display performance is typically instantaneous on a 100T or better LAN.

**Remote (VPN) ShowCase Deployment:** ShowCase is configured to access an Image Center in “remote mode”. This special mode was designed to accommodate the modest speeds of standard business internet connections. Accessing the list of studies is fast. Studies are then brought over for viewing to a local cache folder for viewing at full diagnostic quality. This can be done automatically, with ShowCase configured to periodically poll the Image Center for new studies, and download these studies in the background for immediate access when the physician sits down to read. This is done through a windows service, so ShowCase does not have to be running. Automated cleanup of the locally cached studies is an option.

**Remote/Local ShowCase ViP Deployment:** ViP can be configured to download images automatically, or images can be downloaded manually. Search is provided, like in desktop ShowCase. ShowCase ViP displays iPad-ready images, which are created by the Image Center. These are reference quality images, not intended for diagnostic use. The iPad-ready images take time to generate, so there may be some lag between when the DICOM images arrive and they are available on the iPad. This can take several minutes depending on the speed of your CPU and disk IO subsystems. If the system gets backed up trying to process images because they are coming in faster than it can process, the wait time can be considerably longer. Much depends on the number of studies being done simultaneously by your modalities. ShowCase ViP can only be configured to access one Image Center at a time.

This is but one example of a typical practice deployment. Comprehensive examples of the many ways ShowCase and Image Center can be deployed can be found in the *ShowCase and Image Center Deployment* guide at <https://www.triltech.com/documents.html>.

## Installation

Installation is as simple as double-clicking on the installer, agreeing to the license and following the prompts. When the installer is done (which may take a few minutes), the Image Center will start under a 30-day trial license. Detailed, step-by-step installation and configuration guides are available.

The installer requires that there are no pending restarts or pending Windows updates, and sometimes it is necessary to reboot your computer several times before the installer will run.

## Software installed by the Image Center

The Image Center uses SQL Server Express to store study information. You will see this application appear in your task manager after an Image Center installation.

## Virtual Machines

The Image Center works on virtual machines and is tested regularly on VMWare and Windows Hyper-V. It is likely the Image Center will work in most virtual machines, but we do not test outside VMWare and Hyper-V.

## Uninstalling

Uninstalling the Image Center does not remove any of your configuration files, license files, or study data stored in your Image Directories. The database is also left completely intact. This allows an Image Center to be un-installed and re-installed for upgrades or patches.

## Licensing

The Image Center license is on a per-machine basis. If the Image Center needs to be moved to new hardware, the license can be easily transferred by the customer.

### Premier Licensing

ShowCase Premier requires a license for each PC it is installed on. Licenses can be shared, under certain conditions. Any copy of ShowCase Premier version 6.5 or higher can connect to an Image Center.

### ViP Licensing

There is no licensing required to use the ShowCase Viewer for iPad.

### Number of Ultrasound Machines (or other imaging devices / DICOM SCUs)

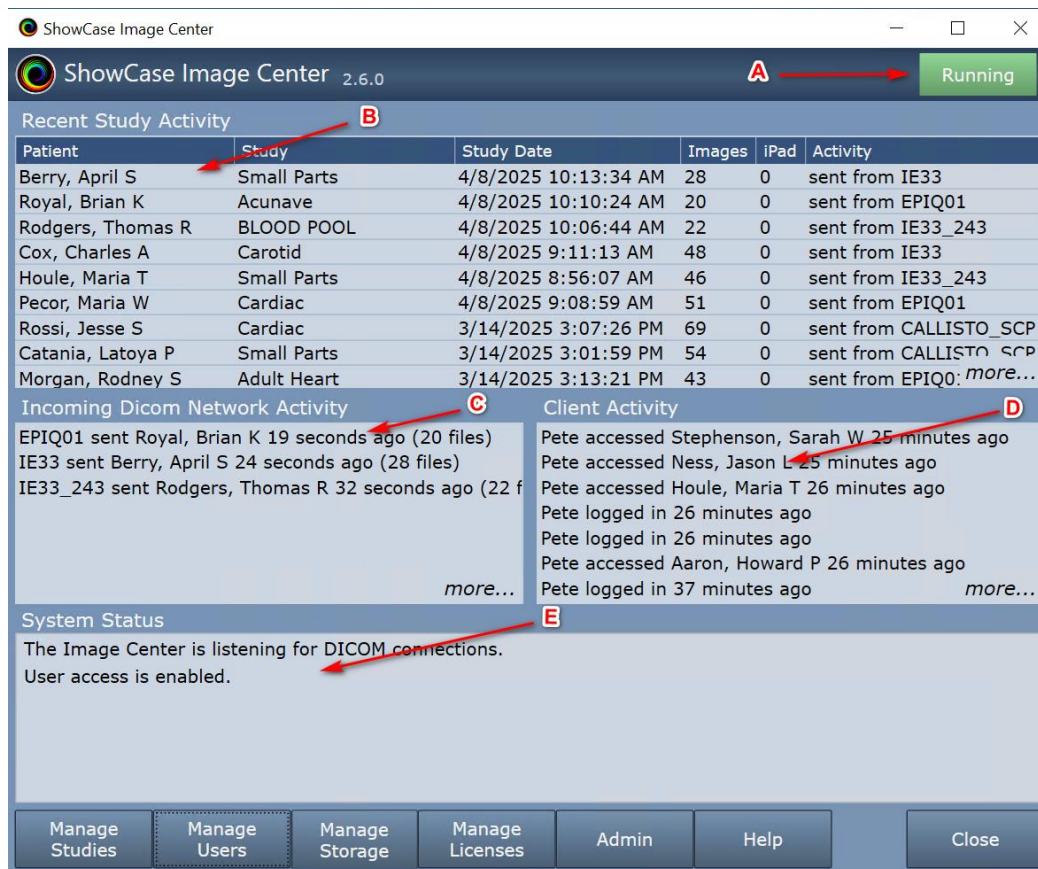
The number of imaging devices or other DICOM SCUs sending images to the Image Center is licensed. The default is two. Additional licenses can be purchased at any time.

See the *Image Center Licensing* and *ShowCase Licensing* guides for specifics on how to license your products.

## Operation

The Image Center runs as three Windows Services: ShowCase Image Center Service, ShowCase Image Center SCP, and ShowCase Image Center Web Service. All services are configured to auto-restart in the event of critical errors. The Image Center and Image Center Web services depend on the SQL Server (SQLIMAGECENTER) service.

Control and configuration of the Image Center is through an application called the Image Center Console, which you will find in the start menu of the machine where your Image Center has been installed.



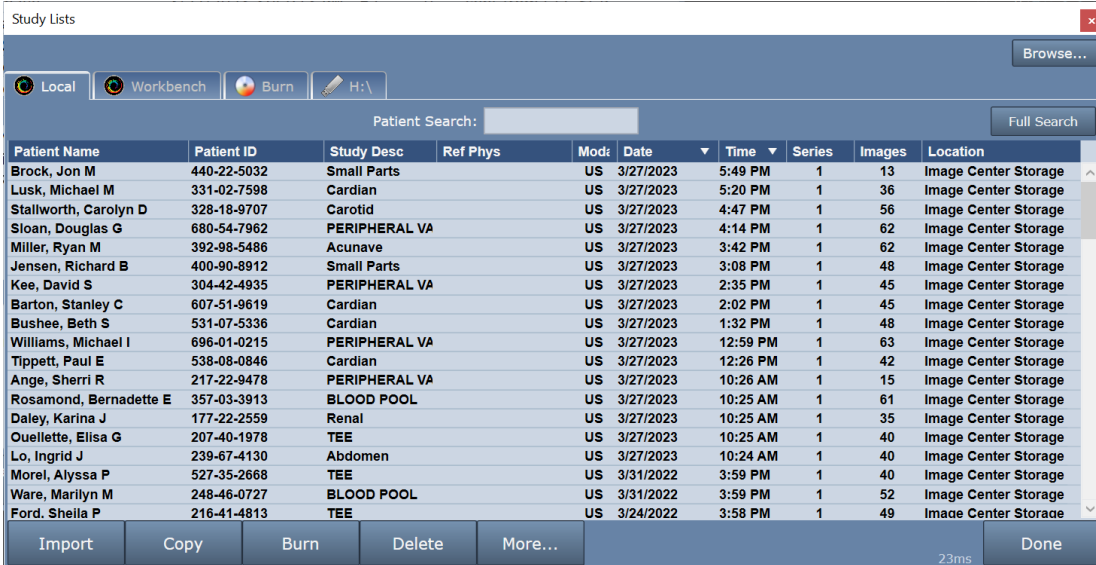
A quick overview of the console system status:

- A) The green “Running” light in the upper right corner tells you if the Image Center is running, stopped, or unlicensed. You can Stop the Image Center at any time, which will halt processing of any DICOM files, by pressing the Stop button.
- B) The **Recent Study Activity** window gives you a list of studies that have come in from an ultrasound machine via the SCP or imported from the Manage Studies windows. It also lists studies that have been copied, saved, or deleted in ShowCase. This is a good place to look if you want to see if a study has recently arrived from an ultrasound machine. The *more...* opens a detailed window with a much longer history.
- C) The **Incoming Studies** window is a list of all of the ultrasound machines (or other modalities) that are sending data to the Image Center. There’s one line for each machine, listing its AE title and the last activity it had with the Image Center. This is a good place to look if you’re trying to diagnose connectivity issues with the ultrasound machine. Click *more...* to access detailed DICOM logs.
- D) **Client Activity** tells you which copies of Premier have been accessing the Image Center and what studies they have accessed. A full log of all client access is available through the *more...* button.
- E) The Image Center Status window tells you if there are any errors, and will also warn you if you are low on disk space. If there are error, a *more...* link appears next to it to look into the details.

The console does not have to be running for the Image Center to work. All work is done in the Image Center services. Along the bottom of the Image Center are a set of buttons. Here is what they do.

## Manage Studies

The Manage Studies button brings up a Study List for the Image Center. This study list has the same functionality as the ShowCase Workstation's study list, with one notable exception: you cannot use it to view studies. (That requires a ShowCase Viewer)



The 'Study Lists' window displays a table of patient studies. The table has columns for Patient Name, Patient ID, Study Desc, Ref Phys, Mod, Date, Time, Series, Images, and Location. The data is as follows:

| Patient Name           | Patient ID  | Study Desc    | Ref Phys | Mod | Date      | Time     | Series | Images | Location             |
|------------------------|-------------|---------------|----------|-----|-----------|----------|--------|--------|----------------------|
| Brock, Jon M           | 440-22-5032 | Small Parts   |          | US  | 3/27/2023 | 5:49 PM  | 1      | 13     | Image Center Storage |
| Lusk, Michael M        | 331-02-7598 | Cardian       |          | US  | 3/27/2023 | 5:20 PM  | 1      | 36     | Image Center Storage |
| Stallworth, Carolyn D  | 328-18-9707 | Carotid       |          | US  | 3/27/2023 | 4:47 PM  | 1      | 56     | Image Center Storage |
| Sloan, Douglas G       | 680-54-7962 | PERIPHERAL VA |          | US  | 3/27/2023 | 4:14 PM  | 1      | 62     | Image Center Storage |
| Miller, Ryan M         | 392-98-5486 | Acunave       |          | US  | 3/27/2023 | 3:42 PM  | 1      | 62     | Image Center Storage |
| Jensen, Richard B      | 400-90-8912 | Small Parts   |          | US  | 3/27/2023 | 3:08 PM  | 1      | 48     | Image Center Storage |
| Kee, David S           | 304-42-4935 | PERIPHERAL VA |          | US  | 3/27/2023 | 2:35 PM  | 1      | 45     | Image Center Storage |
| Barton, Stanley C      | 607-51-9619 | Cardian       |          | US  | 3/27/2023 | 2:02 PM  | 1      | 45     | Image Center Storage |
| Bushee, Beth S         | 531-07-5336 | Cardian       |          | US  | 3/27/2023 | 1:32 PM  | 1      | 48     | Image Center Storage |
| Williams, Michael I    | 696-01-0215 | PERIPHERAL VA |          | US  | 3/27/2023 | 12:59 PM | 1      | 63     | Image Center Storage |
| Tippett, Paul E        | 538-08-0846 | Cardian       |          | US  | 3/27/2023 | 12:26 PM | 1      | 42     | Image Center Storage |
| Ange, Sherri R         | 217-22-9478 | PERIPHERAL VA |          | US  | 3/27/2023 | 10:26 AM | 1      | 15     | Image Center Storage |
| Rosamond, Bernadette E | 357-03-3913 | BLOOD POOL    |          | US  | 3/27/2023 | 10:25 AM | 1      | 61     | Image Center Storage |
| Daley, Karina J        | 177-22-2559 | Renal         |          | US  | 3/27/2023 | 10:25 AM | 1      | 35     | Image Center Storage |
| Ouellette, Elisa G     | 207-40-1978 | TEE           |          | US  | 3/27/2023 | 10:25 AM | 1      | 40     | Image Center Storage |
| Lo, Ingrid J           | 239-67-4130 | Abdomen       |          | US  | 3/27/2023 | 10:24 AM | 1      | 40     | Image Center Storage |
| Morel, Alyssa P        | 527-35-2668 | TEE           |          | US  | 3/31/2022 | 3:59 PM  | 1      | 40     | Image Center Storage |
| Ware, Marilyn M        | 248-46-0727 | BLOOD POOL    |          | US  | 3/31/2022 | 3:59 PM  | 1      | 52     | Image Center Storage |
| Ford, Sheila P         | 216-41-4813 | TEE           |          | US  | 3/24/2022 | 3:58 PM  | 1      | 49     | Image Center Storage |

At the bottom of the window, there are buttons for Import, Copy, Burn, Delete, and More... On the right side, there is a 'Done' button and a '23ms' indicator.

The Study List gives you access to the studies on the Image Center under the “Local” tab. You can set up access to other Image Centers or PACS, for automatically forward incoming studies to these remote nodes. You can access DICOM file folders and burn studies to CD/DVD/USB with an optional onboard viewer.

### The Local Tab

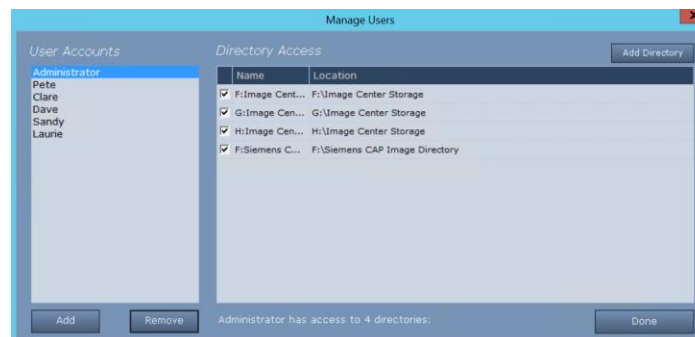
An important feature of the Local tab is the **Import** button, which allows you to **Import** studies into the Image Center. Click the Import button, select a folder, and click through the dialogs. All DICOM files in that folder (and any subfolders) will be imported into the Image Center. For complete details on importing files, see the *Importing Studies Into Image Center* guide at <https://www.triltech.com/documents.html>.

### Configuration of the Study List

Configuring the tabs for this study list is done through the Admin button on the Image Center main console.

## Manage Users

The Image Center uses Windows User accounts for login verification. The Users button brings up the user configuration screen:



Click on a user on the left. The Directory Access pane shows you which Image Directories that user is allowed to access. Check or uncheck directories to allow or restrict access.

To add a user to the Image Center, click the Add button...



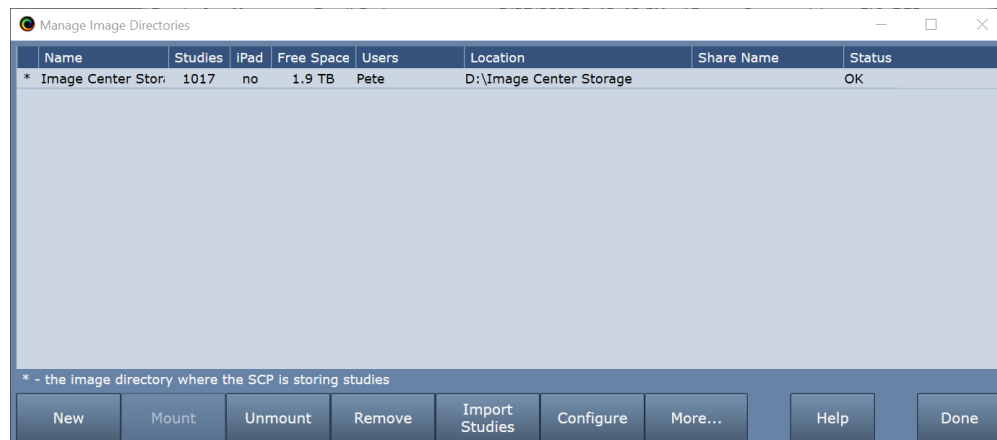
... and enter the user's Windows login. Domains are supported.

## Manage Storage

Manage Storage is where you manage your Image Directories, Storage Archives, and Storage Tasks.

### Manage Directories

The Manage Directories option is where you create and maintain your Image Directories.



Key things to note on this screen:

- The \* on the left is the image directory that will be receiving incoming images from the DICOM SCP.
- The “Shared” column gives you the share name for the Image Directory. This is a good place to look and see if your Image Directories are properly shared for local Premier viewing. If this field is blank, your folder is not shared (as shown in this example).

The Image Center stores your DICOM images and DICOM data in folders called Image Directories. A single Image Directory can easily manage many terabytes of data, i.e. 200,000+ studies with millions of images.

This study data is vitally important to your practice. Most states require that you maintain an archive of this data for 7 years or more, so the choice of where and how you store your data is important. It's so important that we created a special guide just for this purpose, the **Image Directory Creation and Maintenance** guide, which you can find at <https://www.triltech.com/documents.html>. Please read through and follow the guidelines in that guide before you set up any Image Directories.



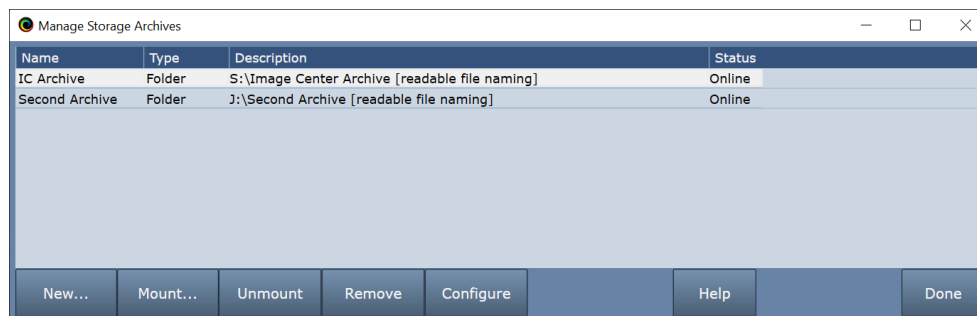
### Please Be Careful

The Image Center maintains an index of all the files in your Image Directories in a SQL Server database. If this gets out of sync with what is in the Image Directories on disk, recovery is a very tedious process. As a result, it is important that you follow the recommendations in the following paragraph:

**Warning:** Image Directories are managed solely by the Image Center. **Do not** move, delete, or modify the files stored in an Image Directory, or you may lose all access to your studies or even experience permanent loss of your study data. **Do not** “Browse” to an Image Directory using ShowCase; Instead, configure access through the Image Center Settings in the ShowCase Edit menu. **Do not** move an image directory without following the instructions outlined in the *Image Directory Creation and Maintenance* guide.

### Manage Storage Archives

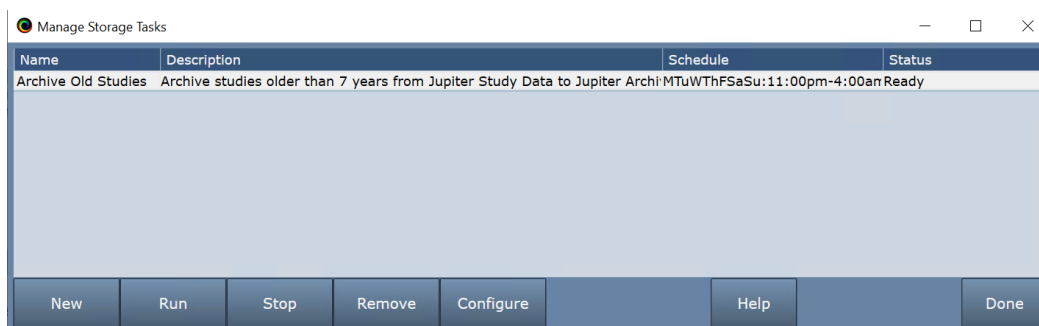
The **Manage Storage Archives** option brings up the Archives dialog:



It provides a list of your archives, their Name, Type, Description, and Status. If you're having trouble with an archive this is the first place to go – look at the Status column to see if there are indications of what might be wrong. For more details on using Archives see the *Image Center Study Data Management* guide and the *Storage Archives and Storage Tasks* guide.

### Manage Storage Tasks

The **Manage Storage Tasks** option brings up the Storage Tasks dialog:



It provides a list of your Storage Tasks, their Name, Description, Schedule, and Status. For more details on setting up and using Storage Tasks see the *Image Center Study Data Management* guide and the *Storage Archives and Storage Tasks* guide.

### Manage Licenses

Use this screen to license the Image Center or manage the licenses in the Image Center. See the *Image Center Licensing* guide, which you can find at <https://www.triltech.com/documents.html>, for details.

## Admin

The Admin button brings up the Admin screen:

The screenshot shows the 'Image Center Settings' window with the 'Server' tab selected. The window is divided into several sections:

- User Access:** Includes a toggle switch set to 'On', an 'Image Access Port' field with the value '8080', and a 'Stop' button.
- Incoming Studies (DICOM SCP):** Includes a toggle switch set to 'On', an 'AE Title' field with the value 'ICPETE\_SCP', a 'Listening Port' field with the value '104', a 'Store Images To' dropdown menu set to 'Image Center Storage', a 'Timeouts' section with 'Send' and 'Receive' fields both set to '5000 ms', an 'IP Address' field, and a 'Stop' button.
- Studies Indexing and Processing:** Includes a toggle switch set to 'On', a 'Stop' button, and a list of statistics: '# Users: 1', '# Image Directories: 1', '# Studies: 1,017', '# Series: 1,077', '# Images: 49,812', '# iPad Images: 0', '# Reports: 60', '# Misc. Dicom: 0', and '# Active Associations: 0'. It also shows the 'Last backup: Thursday, April 20, 2023 1:15:02 AM' and the status of the 'Import Queue', 'iPad Queue', and 'Delete Queue'. An 'About' button is located at the bottom right of this section.
- Database Backup (does not back up images):** Includes a 'Backup Location' field with the value 'C:\ProgramData\TrilTech\ImageCenter\Backup', an 'Automatic Backup' checkbox checked, an 'Every Day At' field with the value '1:15 AM', and 'Backup' and 'Restore' buttons.

At the bottom of the window, there is a legend indicating that a yellow square represents a 'required field', and 'Apply' and 'Cancel' buttons.

## Server Tab

### User Access

At the top of the Admin screen you can change the Image Center's image access port used by ShowCase and ViP. You may also disable Image Center user access by clicking the "Stop" button.

### Incoming Studies

This is the configuration for the Image Center's DICOM SCP, AE title and port. This is also where you designate which of your Image Directories will store incoming images.

### Studies Indexing and Processing

This is the heart of the image center that indexes your DICOM data for quick access through ShowCase. There are a number of statistics presented on the status of the Image Center.

### Database Backup

This is where you can set where your backups go, as well as a daily backup time. As noted in the screen, this only backs up your Image Center database, not the data in the Image Directories. The Backup and Restore functions are covered in detail in the *Backing Up Your Image Center and its Data* section, later in this document.



## Other Image Centers Tab

This tab allows you to configure access to other Image Centers. This allows you to do things like automatically forward studies to another Image Center. To set this up, please see the *Image Center Study Forwarding to Remote Image Center* guide you will find at <https://www.triltech.com/documents.html>.

## Remote PACS

This tab allows you to configure access to a PACS system. This allows you to do things like automatically forward studies coming into the Image Center to that PACS. To set this up, please see the *Image Center Study Forwarding to PACS* guide you will find at <https://www.triltech.com/documents.html>.

## Backing Up Your Image Center and its Data

It is **very** important to back up your Image Center and your Image Directory data. We strongly recommend using an off-site service like iDrive or Carbonite to protect against catastrophe like a ransomware attack or a fire. Most practices are required by law to keep their image data for a minimum of seven years, sometimes longer.

Some backup tips:

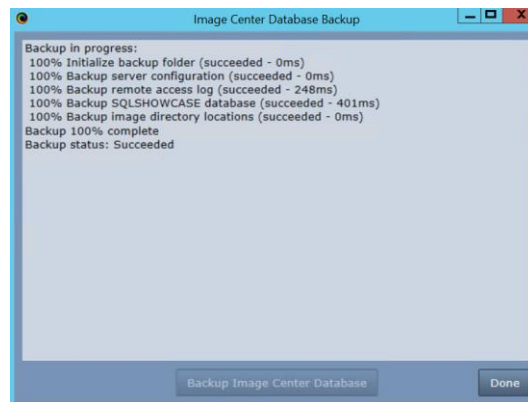
- Backups should *always* be automatic. If your backup strategy requires someone to regularly copy files or run backup software you can pretty much be guaranteed to lose data in the event of a catastrophe.
- You should have an off-site backup, firewalled against a ransomware attack.

The Image Center's own backup mechanism only backs up the Image Center database and a few key operational files to a folder you specify in the Admin screen. This folder needs to then be backed up using your backup software. This folder doesn't contain that much data, especially compared to the size of your Image Directories.

Image Directories are not backed up by the Image Center and need to be backed up using your backup software.

## Manually Forcing a Backup

1. Click the **Admin** button.
2. Click the **Backup** button. A dialog will appear.
3. Click the **Backup Image Center Database** button. This is what the dialog will look like if it succeeds:



You do not have to stop or disable the Image Center during a backup.

## Automatic Backup

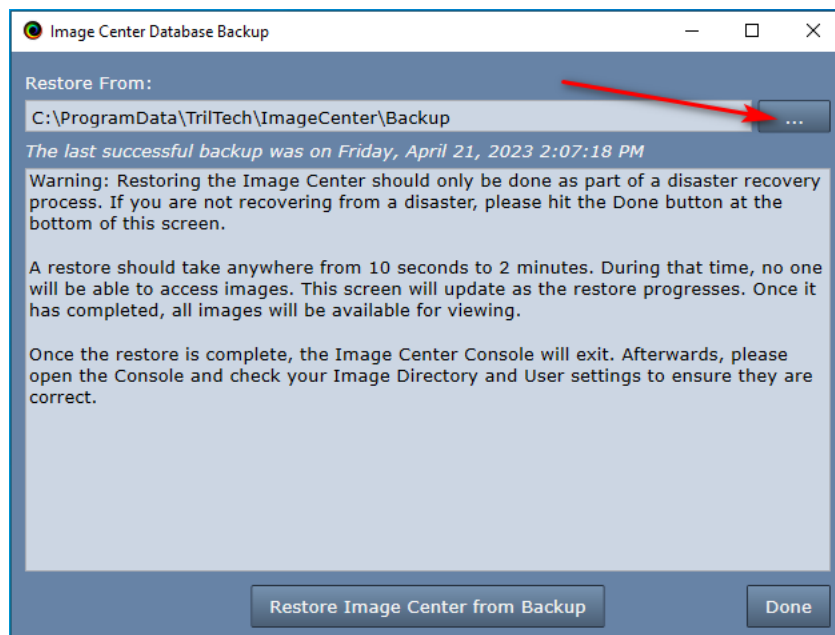
The Image Center comes with automatic backup turned on by default. We do not recommend turning it off. It's best to schedule automatic backups during idle hours.

## Recovery from Backup

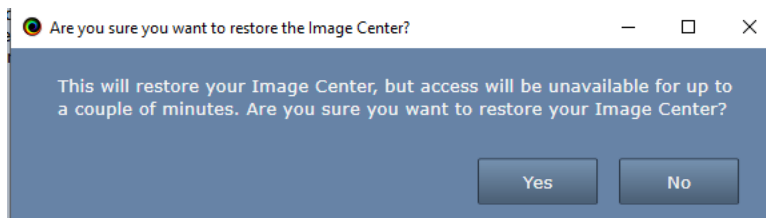
### Scenario 1: Full Restore From Backups

In this case, your Image Center PC has been completely destroyed, along with all disks associated with it, except for offsite backup copies. You have been making automatic offsite backups of your Image Directories (through some other mechanism) and running the Image Center automatic backup nightly, and saving those backup files offsite.

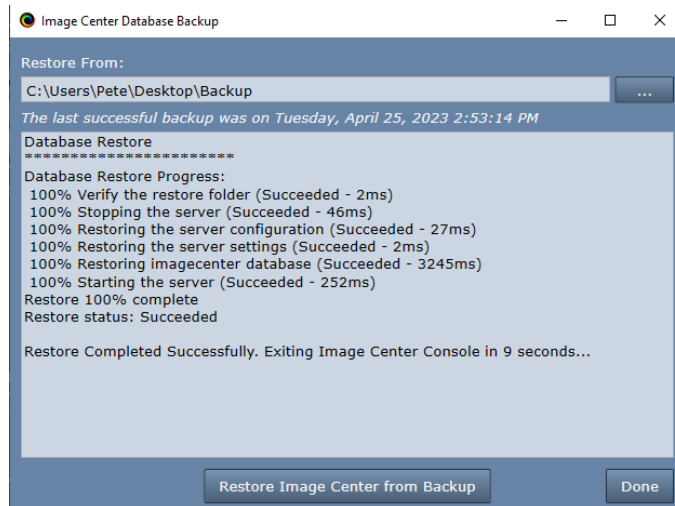
1. In Windows, re-create the user accounts if they were lost when the machine crashed.
2. It's likely that your Image Center computer had a fixed IP address. It would be a good idea to restore that to this computer. Otherwise, you'll likely end up also reconfiguration your ultrasound machines.
3. Install and License the Image Center. Be sure to use the same version of Image Center that you were running prior to the disaster.
4. Locate your Image Center backup folder in your backup software and copy it to your desktop. This folder contains the following files: access\_log.csv, backup\_status.txt, database.backup, dicom\_config.xml, image\_center\_config.xml, study\_list\_config.xml, study\_list\_settings.xml.
5. Click the **Admin** button on the Image Center console. At the bottom of the Admin screen, click the **Restore** button. A dialog will appear.



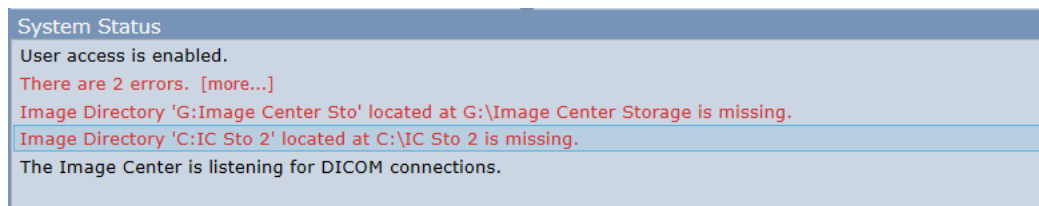
6. Click the ... button on the upper right and select the folder you copied to your desktop in step 3. After you've selected that folder, click the **Restore Image Center from Backup** button. A dialog will pop up asking if you want to restore your Image Center.



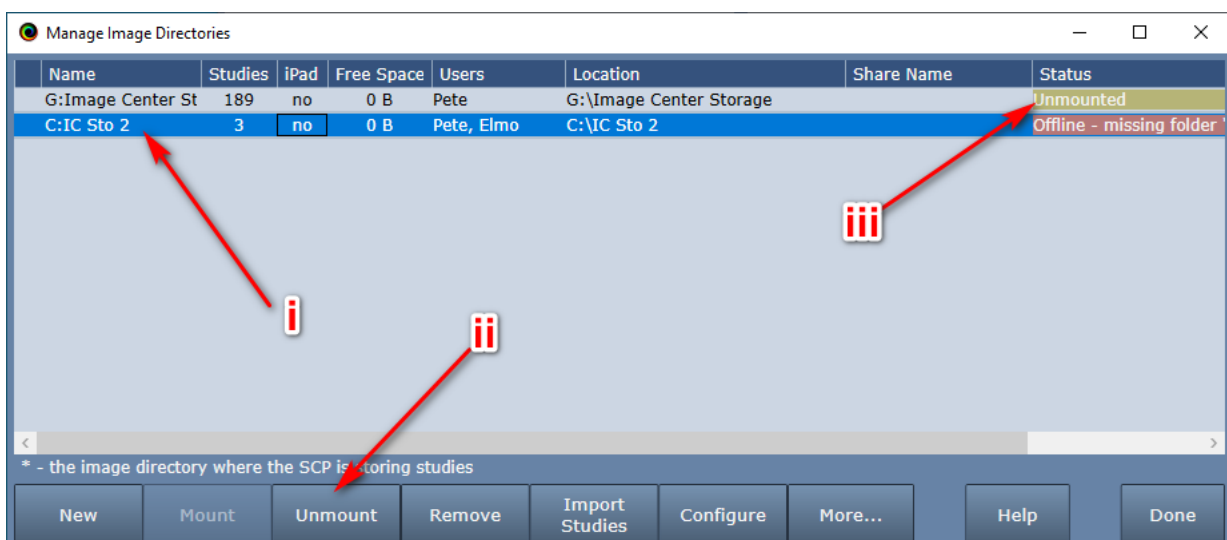
- a. Click Yes. If the restore was successful, you will see this:



- b. Wait for the Image Center Console to exit. There is a countdown on the screen.
7. Reopen the Image Center Console. Unless you happened to have restored your Image Directories to the exact same locations that you had them before, with the same permissions, you will see messages telling you they are missing.



8. Service Log Ons: The ShowCase Image Center Service, ShowCase Image Center Web Service, and ShowCase Image Center SCP Service *may* have had special Log On users set up to allow them access to your Image Directories. If they did, hopefully your IT person kept notes somewhere as to what they were. You will need to set the Log On users for each service to what it was before the crash.
9. Now it's time to restore your Image Directories. Click the **Manage Directories** button on your main console. A dialog will appear.



- a. Start by unmounting all Image Directories. For each Image Directory:
    - i. Select the Directory.
    - ii. Click the **Unmount** button.
    - iii. The Status should change from *Offline* to *Unmounted*.
  - b. Using your backup software, restore each Image Directory to its original location. This is probably going to take a while. Here's a few things you may need to consider:
    - i. Permissions: The restored Image Directory folder needs the same permissions as the original.
    - ii. Sharing: The restored Image Directory folder will have to be shared like it was in the past so ShowCase viewers can access it.
  - c. When the Image Directory has been fully restored, select it in the Manage Directories dialog show above and click the **Mount** button.
10. Once you've restored all your Image Directories to their original locations and they are mounted, click the **Admin** button. In the *Incoming Studies* section, select the dropdown after *Store Images To* and select which of the Image Directories incoming studies should be stored to.

Go back to the main Image Center Console screen. Try sending a study from your ultrasound machine. If it doesn't go, then it's time to consult the *Image Center Study Transfer Troubleshooting* guide.

## Scenario 2: Full Restore by Rebuilding the Image Center

This recovery is pretty much an 'install from scratch and reload all my data' scenario. It can be more time-consuming, but sometimes it's the easier path to take if your old Image Center was backed up by someone else and you don't know all the details behind how it was set up. Or maybe you had an older version of the Image Center and that old version is no longer available for download and you have to move to a newer one.

This scenario still requires that your Image Directories were backed up.

The upside of this approach is it's a fresh start. Another upside is that you can start scanning and sending studies to the Image Center almost immediately. The downside of this approach is that you'll have to restore your Image Directory from backup to a temporary volume, and then import those studies into freshly created Image Directories.

1. Install and License the Image Center.
2. Configure the Image Center following the guidelines in the *Image Center Configuration* guide. Things you will want to address:
  - a. You will probably want this computer to have the same fixed IP address as the original. If you don't know what that was, go to the configuration screen on one of your imaging devices and see how it was configured.
  - b. You will likely want the same Windows users that you had configured in the original Image Center. If you don't know what those were, go to each ShowCase Viewer and check its *Edit =>*

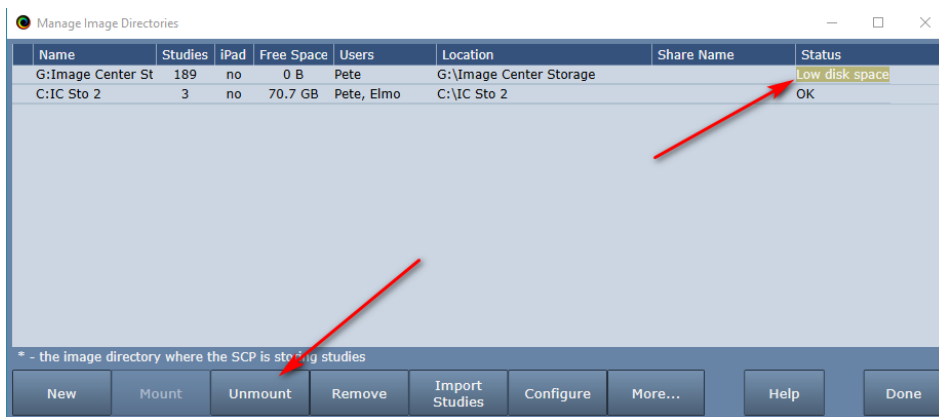
*ShowCase Settings...* menu, under the Image Centers tab. The Windows username will be in the Login field.

3. Create a fresh Image Directory (or directories) capable of holding all your backed up studies. *Do not try to restore the backup data to this folder.* It won't do what you hope it will. You must import the backed up studies into the new Image Directory.
4. Send a study to the Image Center from your ultrasound machine or other imaging device. If it doesn't show up, go through the *Image Center Study Transfer Troubleshooting* guide to resolve the problem.
5. Follow the steps in the *Importing Studies Into Image Center* guide for each of your backed up Image Directories to get your studies back into the Image Center.

### Scenario 3: Image Directory Drive Crash

In this case, one or more of your Image Directories have had a hard drive crash. You've got your Image Directory in a backup set, and need to get it back into the Image Center.

1. Open the Image Center Console.
2. Click the Manage Directories button. Find the bad Image Directory. It may say it's Offline, it may say it's Low disk space. Sometimes it's hard for the system to figure out the status of a bad disk.



3. Select the Image Directory.
4. Click the **Unmount** button. The status will change to Unmounted.
5. Buy a replacement for the drive that crashed. You want at least as much space as you had before, but it might be a good time to increase your storage capacity. Prices keep falling.
6. Restore your Image Directory from backup to that replacement drive.
7. Go back to the Manage Directories screen.
8. Select the Image Directory that you unmounted in step 4.
9. Click the **Mount** button.
10. Using the Browse for Folder dialog that appears, browse to the folder you restored in step 6 and click OK.
11. The status of the Image Directory should change to OK.

Try sending a study to the Image Center and make sure it's working. You may have to check the Admin screen's *Store Image To* field under the *Incoming Studies (DICOM SCP)* section to make sure it's got an Image Directory selected.

## Migrating to a New Server

Please see the *Image Center Migration* guide, which can be found at <https://www.triltech.com/documents.html>.

## Image Directory Creation and Maintenance

Please see the *Image Directory Creation and Maintenance* guide.

## Long Term Archival of Old Studies and Study Data Maintenance

Please see the *Image Center Study Data Management* guide for information and recipes for managing growing archives.

## Hardware, Performance, and Load

The Image Center is designed to run on everything from a laptop (for a small practice) to a dedicated server (for a large practice) to a VM. In general, we recommend quality hardware, with server-grade hardware preferred for reliability. The Image Center should be installed on a computer that is left on, so it can always receive studies from the imaging machines.

### Hardware and Software Requirements

- 2.0 GHz or better CPU, 4 GB RAM
- Disk Space: Typically 1 to 20 TB, depending on your practice's patient volume
- 64 bit OS: Windows 10, 11 and Server 2012R2, 2016, 2019, 2022
- Static IP address
- 100T LAN, 1000T network
- VPN required for remote access

### CPU

Quad core recommended. The Image Center's greatest CPU demands comes from SQL Server and the iPad image compressor. If you will be running the iPad image creation, definitely go for a fast, quad core CPU.

### Memory

4-8 GB is recommended. Adding more memory will not necessarily improve performance. If the Image Center will be sharing the server with other high-demand software, start with 8G and go up.

### Storage

For a detailed discussion of storage, see the *Image Directory Creation and Maintenance* guide, which can be found at <https://www.triltech.com/documents.html>. It's very likely you will need many terabytes of storage for your study data.

The **type** of storage you use also depends, somewhat, on the size of your storage. For smaller clinics, regularly backed up internal hard drives will do just fine. If you have a very large, multi-terabyte archive, then a minimum of RAID 1 (mirroring) is recommended, with RAID 5 or RAID 10 worth considering. Image Center works well with high-performance network drives (NAS) or other distributed storage systems.

Avoid the use of low-cost external hard drives, as these are known to have poor reliability and may fail completely and without warning after only a year or two of use.

In all cases, we recommend an external, off-site backup in case of catastrophe (fire, ransomware, equipment theft, etc.). If you decide to use a "cloud" backup solution, it should be PHI/HIPAA compliant.

## Local Area Network (LAN)

1000T is recommended, although 100T will work. Wireless networks will work, but beware: their performance may quickly drop when there are multiple devices on the network. The network is the primary determining factor when there are performance issues viewing studies.

## Remote Network (VPN Recommended)

Network bottlenecks occur at the “weakest link” in the network chain from the Image Center to the remote computer. This is typically your site’s outbound internet connection and/or VPN performance, and not the Image Center itself or the network hardware in the server. When it comes to understanding the actual speed of the network entering and leaving your office, don’t trust estimates or published numbers: measure it. ShowCase has special solutions for addressing the modest speed of most business internet connections.

## Security

### Login

The user accesses the Image Center using a login name and password. The Image Center uses existing Windows logins and passwords on the computer it is installed on. Credentials are encrypted and cached on the client, getting rid of the need to ‘log in’ every time you want to use the software. Logins must be ‘added’ to the Image Center as users. Domain logins are supported.

Some sites create an account for every individual workstation (for tracking purposes) while others create a single “remote user” account, (for easier administration). Accounts must have a password. Accounts do not need administrator privileges.

### Web Service Security

The Image Center presents a secure web service interface using a variation of the OAUTH protocol for all transactions. Passwords are always encrypted. The system uses a transaction specific authorization token with a limited lifetime. As such, the client and server’s clocks cannot be off by more than 15 minutes. The system uses universal time and works across time zones. Authentication and access is secure, but transmission of data is not encrypted. Use of a VPN is recommended. HTTPS is not supported.

### Network Security

When accessing remotely outside your local area network (via the internet), a VPN is required.

### Firewall

There are two ports you will need to allow through the firewall, both of which are configured on the Admin screen in the Image Center:

**ShowCase/ViP access (default 8080)** - This is the port used by the ShowCase desktop application and ShowCase Viewer for iPad clients to retrieve studies from the Image Center.

**Incoming DICOM SCP (default 104)** - This is the port that ultrasound machines or other DICOM SCUs will use to send studies to the Image Center via the DICOM protocol.

### Local Data Security - ShowCase Remote Deployment

Remote deployment of ShowCase caches DICOM data locally for responsive offline viewing. If local storage of image data is a concern, it is recommended to encrypt the file system where the DICOM images are stored using



Windows. Remote deployment can be configured to automatically clean up data after an interval specified by the customer.

Local deployment of ShowCase does not cache data.

## Local Data Security - ShowCase ViP

ShowCase ViP caches iPad-ready images locally for offline viewing. It is recommended to configure your iPad to use a Passcode.

## User Access Logging

The Image Center logs all access activity. The log tracks logging in and individual study access, noting the time, login, device, patient, and IP address. The log can be exported in .csv format for use in spreadsheets, like Microsoft Excel.

### How to Track Multiple Users Sharing One Computer

Let's say you have ShowCase installed on one computer that is used by several people in your clinic, and you need to track who is accessing studies by who is logged into the computer.

1. Add all of the users that will be using the computer to the Image Center through the Manage Users screen.
2. Go to the computer where ShowCase is installed. You will need to log into each person's Windows account to configure their access to the Image Center.
3. For each login on that computer:
  - a. Log in to the computer.
  - b. Start ShowCase
  - c. Configure access to the Image Center following the instructions in either the *Configuring Premier For Local Image Center Access* or *Configuring Premier For Remote Image Center Access* guides, but...
    - i. ...instead of entering a User Name, check the **Make this configuration only available to the current windows login** option. The User Name will be automatically filled in with the current Windows login.
    - ii. If you are configuring remote access, make sure each login uses its own local storage. *Do not try to re-use the same folder. This will not work.*
  - d. Test the connection.
  - e. Click the Done button.
  - f. Check the study list to make sure you're seeing the Image Center tab.
  - g. Exit ShowCase
  - h. Log out of the computer.
  - i. Repeat.

## Using Your Own SQL Server with Image Center

Image Center 2.1 and later can be configured to use your own SQL Server installation, instead of the embedded SQL Server Express installer built into the full Image Center installer. SQL Server 2014 or later is supported.

**Note:** The Image Center is a high performance system, performing hundreds of database transactions a second under peak loads. It is designed to work with a local SQL Server installation. Issues with performance or behavior may result if your SQL Server installation is not properly configured to handle that level of activity. Issues with customer SQL Server integration are purely the responsibility of your IT group to solve should they occur.

## Prerequisites

You will need SQL Server 2014 or later installed and configured with SA authentication, password of your choosing.

## Installation

Use this procedure if you are installing on a machine that has never had the Image Center installed on it before.

1. Download the Image Center No Database installer from <http://www.triltech.com/download.html>. You will find a link for it near the bottom of the web page.
2. Run the installer.
3. When prompted, enter the Server Name and SA password for the database server.
4. Click "Test SA Password" to verify your server is accessible and your password is good.
5. Click OK

The installation should complete and your Image Center should start working as soon as you license it.

## Some DICOM Details

The Image Center can function as a DICOM SCP for C-STORE and C-ECHO and as a DICOM SCU for C-STORE, C-ECHO, C-FIND, and C-MOVE.

As an SCP, the Image Center will accept and store nearly any DICOM file sent to it: images, key notes, structured reports, raw data objects, etc. All DICOM is stored exactly as sent, as true part-10 DICOM files inside of Image Directories. It does not support Storage Commit.

The Image Center does not re-compress or change any image storage formats or alter any of the incoming image or DICOM meta-data information, with the exception of the group 0x0002 header information that it must fill in to create the part 10 file. What you send is what we store.

As an SCU, the Image Center can be used to manually or automatically send studies to DICOM SCPs. It can also be used to Query/Retrieve studies from other SCPs into local folders for burning to media, or for copying into the Image Center main store.

See the *Image Center DICOM Conformance Statement* for specifics on DICOM conformance.

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