How to Configure SHOWCASE® Image Center to Automatically Forward Studies to a PACS

Your ShowCase Image Center can be configured to automatically forward studies to a PACS. Most PACS require some configuration before they can receive studies from external sources, so you will want to talk to your PACS administrator before starting, and likely get them involved in the configuration of the Image Center.

This guide is in two parts:

First, you will set up and configure access to the PACS.
**Second**, you will test and troubleshoot your setup.

Before You Start: Make sure ShowCase Image Center is installed and licensed and can receive studies from your imaging devices. Make sure your PACS has been configured to accept DICOM CSTORE events from this Image Center.

How PACS Forwarding Works

When you set up the connection to your PACS in Image Center, you specify a local cache (temporary) folder. When a study is sent to the Image Center, it lands in two places: the primary Image Center storage and the local cache folder you specified in your PACS configuration. Forwarding is done using the study in the local cache, not the main Image Center store. After the forwarding is complete, and the 'clean up cached studies more than XX days old' interval has transpired, the study is removed from the local cache. If it helps, you can think of the local cache as your 'outbound queue'. If you're having problems sending studies, you'll go to the PACS tab in Manage Studies window to diagnose the issue.

Configure Forwarding to the PACS

1. Launch the Image Center Console
2. Click the **Admin** button
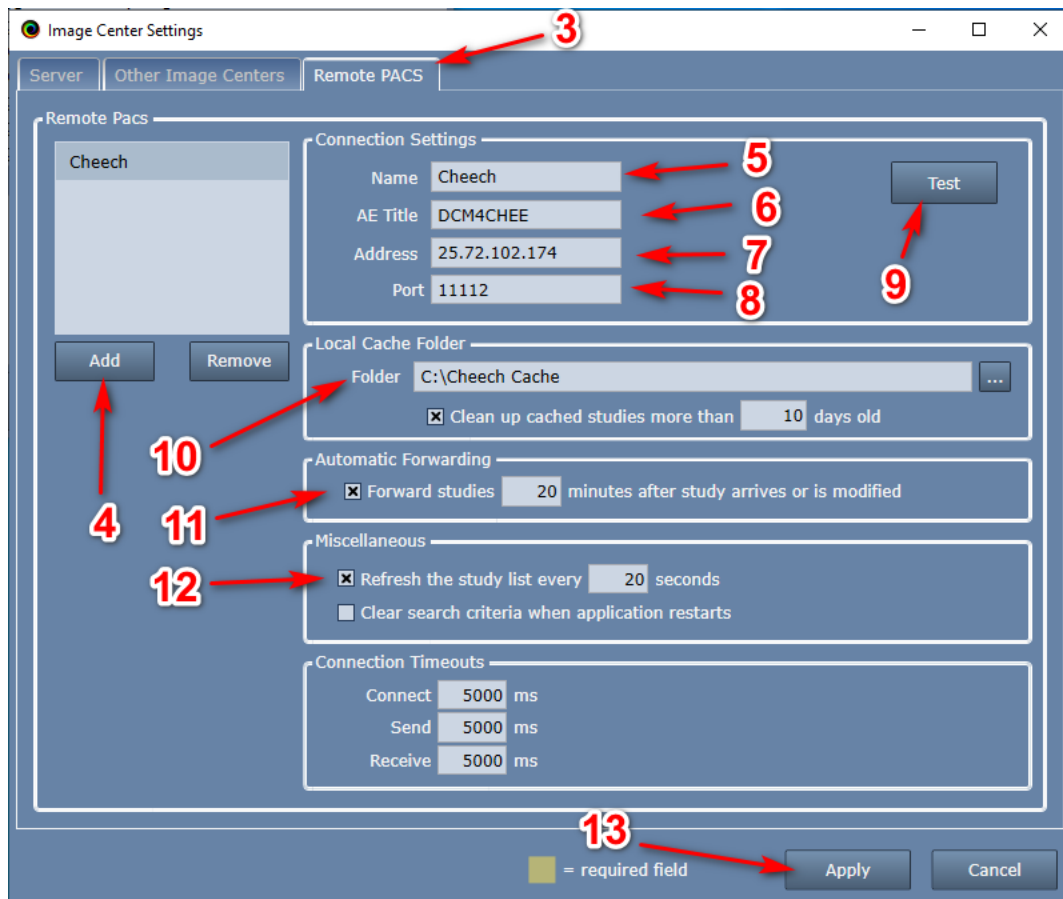
3. Select the **Remote PACS** tab
4. Click the **Add** button. A new Remote PACS entry will be created named "New PACS 1":
5. Enter a name for your PACS in the **Name** field. It can be any name that is helpful for users.
6. Enter the PACS's AE Title in the **AE Title** field. You should get this from your PACS administrator.
7. Enter the PACS's IP address in the **Address** field. You should get this from your PACS administrator.
8. Enter the PACS's DICOM **Port**. You should get this from your PACS administrator.
9. Click the **Test** button to see if the Image Center can contact your PACS.
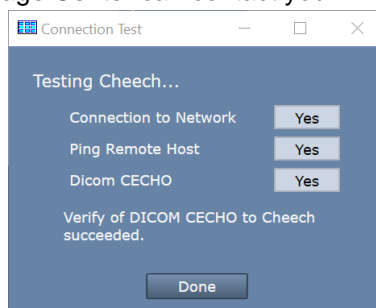
(If the tests do not all say "Yes", see the Troubleshooting section at the end of this guide.)

10. Set Up A Local Cache Folder to receive studies
    a. Click on the "…" button on the right and select a local folder. The folder should be a fresh, empty folder. It should also be on an internal hard drive with about 300G of free space. Do not try to use network shares or external hard drives as these can often cause problems.
    b. Check the "Clean up cached studies more than XX days old" if you'd like to have this folder automatically clean up studies that have been forwarded to the remote PACS. **Note:** Studies are only automatically cleaned up if they have been successfully sent to the PACS.

c. Set the number of days before the studies are automatically cleaned up by entering the number of days.

11. Enable Forwarding
    a. Check the box next to "**Forward studies *NN* minutes after the study arrives**"
    b. Change ***NN*** minutes to be the amount of time to wait before forwarding shall begin *after* the last image arrives for the study.

12. Enable Automatic Study List Refresh
    a. Check the **Refresh the study list every *nn* seconds** option.
    b. Set ***nn*** to be 20 seconds.

13. Click the **Apply** button in the lower right to save these settings. A new tab will appear in your study list, with the name you entered from step 5.
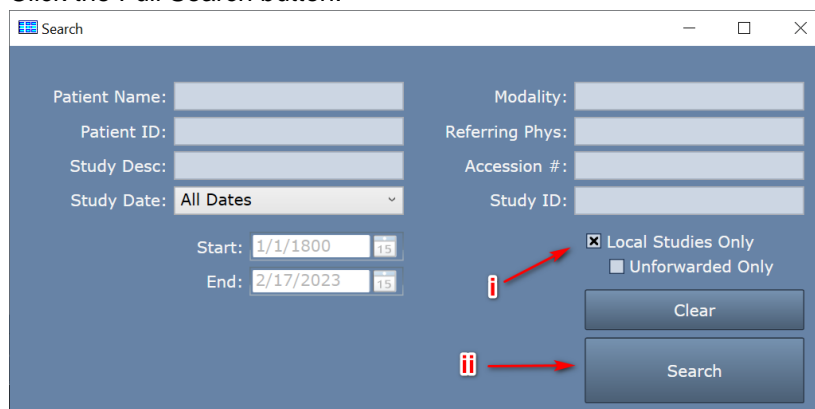
Testing

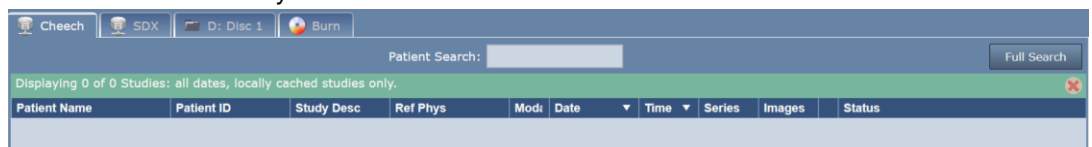## Test Sending Studies to the Image Center from the Imaging Machine

1. Click on the Study List tab you just set up.
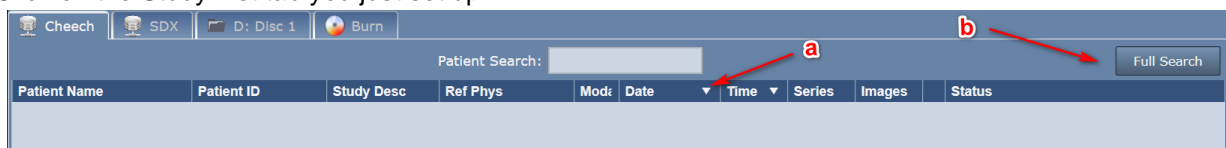
   a. Click on the Date column until the arrow is pointing down, which means the newest studies will appear at the top of the study list.
   b. Click the Full Search button.

      i. Check the Local Studies Only option.
      ii. Click Search. The study list will look like this:

2. Go to your ultrasound machine and send a study to the Image Center. Your study should appear in the study list.
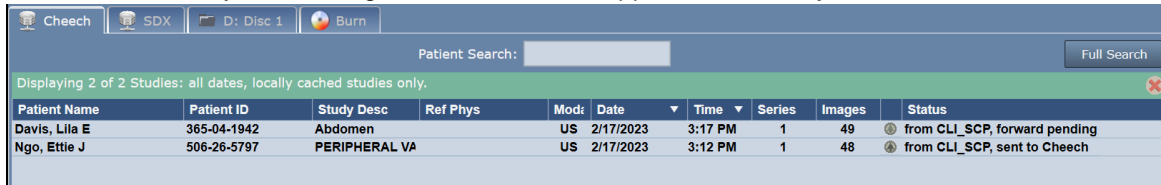

   If the study does not show up, see the Study Transfer Troubleshooting section below.

Testing Sending Studies to the Remote PACS Manually

1. Select the study you just received in the Study List and press the **Send** button. The study status should change to "send pending" and then immediately start sending the study.
    a. If you get an error, see if the error message gives any hint as to what is wrong.
    b. Click the **More…** button at the bottom of the study list and select **Test Connection**.
2. If the study transfers, you are ready to test automatic forwarding. Go to the next test.

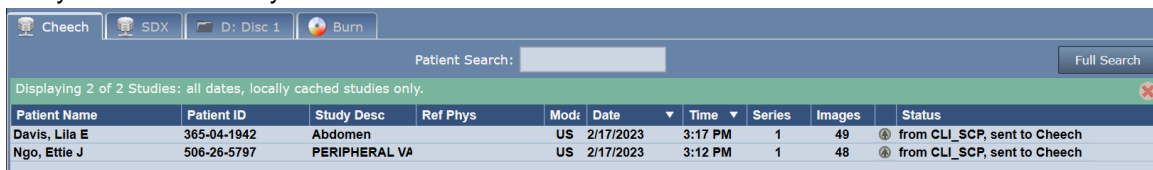## Testing Automatic Forwarding of Incoming Studies

1. Send another study to the Image Center. It should appear in the study list.

Note that the **Status** will say 'forward pending' for that study.
2. Wait for one minute past the wait time you specified in step 11 above, where you set the forwarding delay.
3. You should see the study's **Status** change to 'send pending' and then 'sent to <pacs name>' after the study has automatically been sent to the Remote PACS.

Troubleshooting

Trouble Connecting to the PACS

If you're having trouble connecting to your PACS, it would be a good idea to get your PACS administrator involved. PACS often require a PACS administrator to configure the PACS to receive studies from your Image Center. If it looks like your PACS is properly configured, and you are still unable to connect to your PACS follow the steps below to try and ascertain where your problem lies.

1. From the **Image Center Console**, click the **Admin** button.
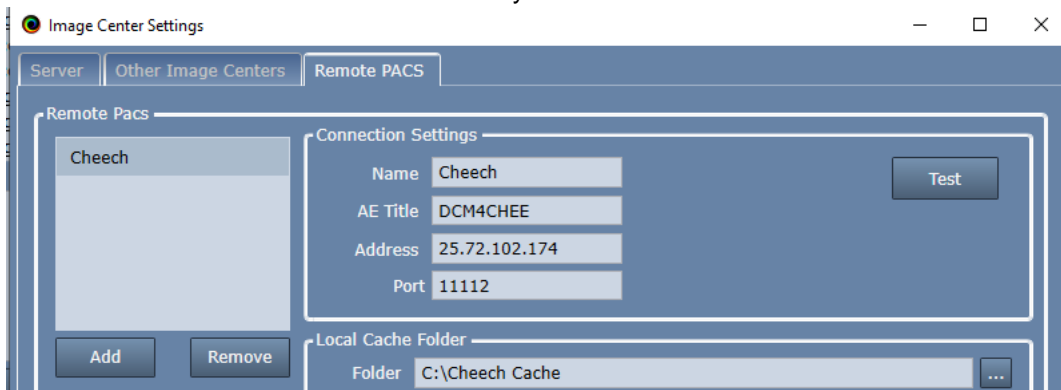2. Click on the **Remote PACS** tab and select your PACS

    a. Check that the **AE Title**, **Address**, and **Port** for the PACS are correct
    b. Click the **Test** button. A test dialog will appear.
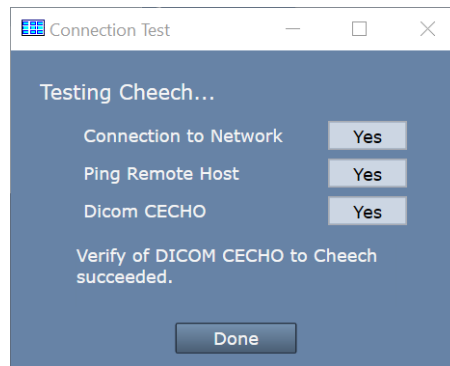
Look for clues in the messages in this dialog if any of these tests fail. Here is some further insight as to what may cause each test to fail. You may find that you need assistance from your IT group to resolve these issues.

Connection to Network failed – Means that the Image Center computer cannot find any networks connected to your computer.
  ▪ Can other applications connect to the network, e.g. Chrome?

Ping Remote Host failed – Means that the Image Center computer cannot ping the PACS computer with a conventional ethernet ping.
  ▪ Is the firewall on the PACS properly configured?
  ▪ Is the IP address of the PACS correct?
  ▪ Is the PACS computer configured to respond to Ping?

*DICOM CECHO failed* – Means that the Image Center computer was unable to send a DICOM CECHO to the PACS.
  ▪ Is the firewall on the PACS configured to allow DICOM traffic on the specified port?
  ▪ Is the port of the PACS correct?
  ▪ Is the AE Title of the PACS correct?
  ▪ In the PACS: Is the AE Title for the Image Center correct?
  ▪ Is the PACS configured to respond to DICOM CECHO from this Image Center's AE Title?

Trouble Receiving Studies from the Imaging Device

So, you sent a study to your Image Center but nothing showed up in the study list. Here's how to troubleshoot that.

1. **Is there a red bar at the top of the study list with an error message?**
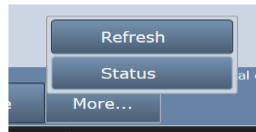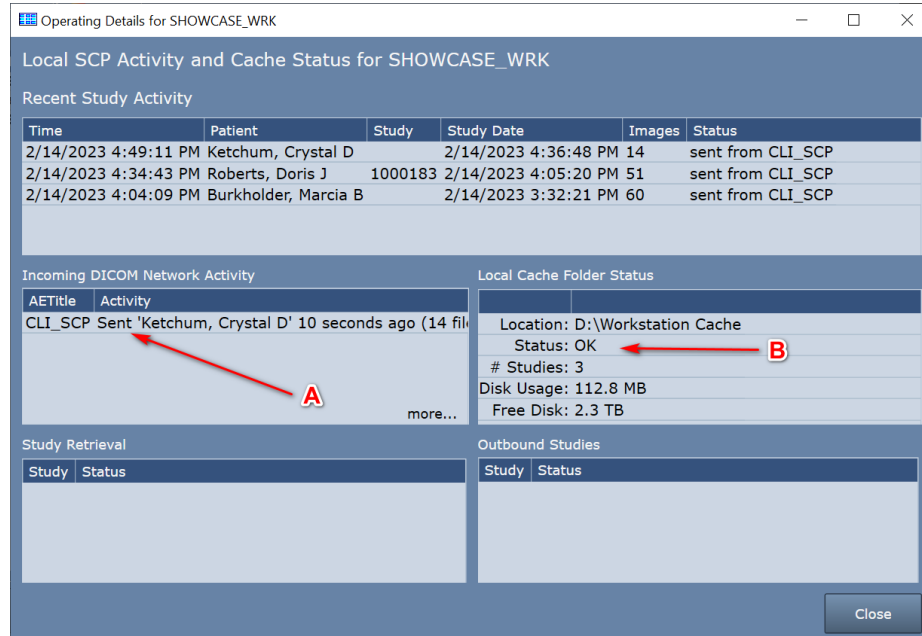   If there is, it will look like this:
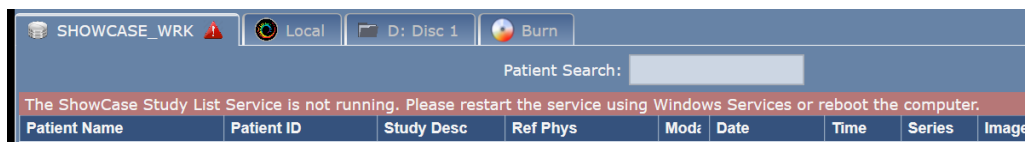
   To resolve this, read the error message and follow the instructions there. There might be a *[click here for help]* option, which you can click to read more about resolving the error shown.

2. **No Red Bar?**
   Click the **More…** button at the bottom of the study list and select **Status.**

An Operating Details screen will appear:

A. The first thing to check is the **Incoming DICOM Network Activity** window. It lists incoming DICOM activity from imaging machines sending studies to the Image Center.
    a. Try sending a study to the Image Center
    b. If you don't see any activity for AE Title of the machine that sent the study, then no DICOM network messages are making it to the Image Center. Try the following:
        i. Turn off the firewall on the Image Center computer. Try sending a study. If that doesn't fix the problem, leave the firewall off and continue.
        ii. Check that the ultrasound machine is configured with the correct IP address for the Image Center computer. At the Image Center Console, click the **Admin** button. Do the settings there match the AE title and port configured at the ultrasound machine?
        iii. Check the imaging machine's DICOM logs for errors.
        iv. Clear the DICOM queues on the imaging machine.
        v. Reboot the imaging machine.
        vi. Reboot the Image Center computer.
        vii. Do a DICOM CECHO on the imaging machine and see what it tells you.
        viii. Turn the firewall back on if it was turned off earlier.
    c. If you do see activity from the imaging machine, but some studies are not coming across, click *more…* and the DICOM messaging log will appear. Look for errors in this log (highlighted in red). If you need help interpreting the errors, press the **Help** button on the Image Center Console and submit a support request.
B. The second thing to check is the **Local Cache Folder Status**.
    a. Does the Status: field say anything but OK? If it does, you have problems with your local cache and the Image Center will be unable to receive studies until the problem is resolved. Here are some possible local cache problems:

i. **Cache full, limit is 1000 studies** – When this happens you will need to clean up studies in your cache. If you don't have automatic cleanup enabled, it's a good idea to do so.

ii. **Out of Disk Space** – This happens when your disk is full. Free up space on your disk or migrate your cache to a new location.

iii. **Cache almost full, limit is 1000 studies** – This will not prevent studies from transferring but is alerting you to the fact that you're about to hit the 1000 study limit of your cache.

iv. **Low Disk Space** – This will not prevent studies from transferring but it is alerting you to the fact that pretty soon you won't have enough disk space available to receive studies.

v. **Cache Folder Missing** – Your cache folder was removed and you will need to set up a new folder in the settings screen. Or, if you can, restore the original cache folder.

Other Things to Check

- If Storage Commitment and/or MPPS are being proposed by the imaging machine, turn it off.
- Check for conflicts on the IP Address and/or Image Center listening port (default 11112), change the port number to a number above 1000; the port number must be changed in both Image Center and imaging machines.
- Check for hardware problems by replacing network cables, using different ports on the network switch and replacing network cards
- Check to make sure multi-frame images (clips) are being compressed. Transferring huge uncompressed clips can aggravate network problems.

Trouble Sending Studies to the PACS

If you test your PACS connection and all of the tests come back "Yes" but when you try to send a study you get errors, you will definitely want to get your PACS administrator involved.

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