Xrdp Remote Desktop Solution Evaluation Report

2016

Version 2.0

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A. Document History

Entire Document	0.1	11/18/2015	Created Document	S. Litzinger
Test Plan	0.2	12/14/2015	Added Section	S. Litzinger
Updating Test Results	1.0	02/11/2016		Team
Updating Evaluation	1.5	3/11/2016		Team
Entire Document	1.75	3/21/2016	Rewrite	P. Enstrom
Entire Document	2.0	4/1/2016	Review and Revise	Team

B. Document Scope

This document is the evaluation report for the functional evaluation of xrdp. The results of the evaluation and the collected information here are intended for the benefit of the XSEDE project and the general eScience community.

C. Executive Summary and Recommendation

Xrdp was selected for evaluation to determine if it met the XSEDE users' requirements to open and maintain an interactive graphical session to a remote resource for a period of at least several days. It was also evaluated to determine if it was able to connect multiple users to the same server at the same time with each user having their own, individual desktop session. Desktop sharing (Remote Assistance) was also evaluated.

The evaluation was performed on xrdp, which is an open source remote desktop program that allows a user to interact with a machine as if they were sitting in front of it. Xrdp server version 0.9.0-4 was evaluated. Xrdp uses the remote desktop protocol (RDP) which is a proprietary protocol developed by Microsoft. Any client which uses RDP can connect to the xrdp server. Windows machines come with a remote desktop application which acts as an RDP client.

In general, xrdp worked well allowing multiple users to connect to a single server each with their own, independant desktop. Long duration connections were not a problem on a local network but did not work well over slower or less reliable networks. Sound support is not included in xrdp and requires the use of additional client/server software that are independent of xrdp and were not evaluated.

We do not recommend xrdp as a remote desktop application unless they are either using it on a local network or aren't using it to display video. It will meet the user's requirements over a local network but does not perform well over remote networks.

D. Introduction

The members of the evaluation team were Peter Enstrom and Susan Litzinger.

Xrdp is server software that runs on Linux systems and provides a remote desktop solution that allows users to view and control their desktop from remote locations. It allows users to run their graphical applications on a remote machine's desktop through clients that use Microsoft's RDP protocol. Xrdp displays an X windows desktop to the user. All Windows systems running Windows XP or newer operating systems come with a remote desktop application that can work with Xrdp.

Xrdp remains under active development, its source is maintained under GitHub.

E. Prerequisites

Xrdp requires VNC to be installed on the server in order to supply the display for it. Xrdp is compatible with multiple different VNC software packages. This evaluation used tightvncserver.

F. Evaluation Details

The requirements for this evaluation were:

1. Run for at least 1 week uninterrupted
2. Have a very high degree of reliability for maintaining open sessions
3. Support audio and video
4. Maintain a responsive, steady network connection
5. Update the screen reasonably quickly
6. Low latency mouse tracking and scrolling
7. Allow file transfers between the server and client machine
8. Support single user, multiple sessions to same server
9. Support multiple users, concurrent login

Testing took place on servers at NCSA and PSC. A server at NCSA ran the xrdp server software and clients at NCSA, PSC, and Florida were tested with it.

Test 1 : Basic Functionality

In this section we tested routine actions a user would expect to be able to perform on their desktop. In order to test how responsive the update of the desktop was, we used a browser to display video with audio. This allowed us to easily detect any sluggishness in the output. We also tested cut and paste from the Xrdp server window to a native window on the client machine and vice versa. Also tested was Xrdp's ability to transfer files between the server and the client.

<u>**Steps for test 1**</u>

1. Select a test server, machine A, with Linux installed.
2. Select 2 machines, B and C, running Windows to act as the clients.

3. Create accounts for 2 users, "tis" and "tis2" on the server (note, use different passwords).
4. Install xrdp on the server.
5. Edit the /etc/xrdp/xrdp.ini file on the server.
6. Connect a Windows machine to a Linux server and exercise xrdp.
7. Connect to the same server through two different machines connecting as the same user.
8. Connect to the same server through two different machines connecting as the same user on the same port.
9. Connect to the same server through two different machines connecting as different users.
10. Attempt to connect to the same server through two different machines connecting to the same port as different users.

Results

File transfer from the server to the client worked fine with copy and paste from the server desktop to the client desktop. Attempting to copy a file back the other direction failed. A message was displayed "The file or folder /to_stroit does not exist".

Copying and pasting text between client/server machines worked without any problems both from the client to the server and back the other direction.

Playing video over a local network connection worked fine but no sound was played. It is documented that xrdp does not serve the audio. A separate, independent piece of client/server software would need to be installed and configured to provide audio. Attempting to play video over a non-local network did not work very well. Over a slow/unreliable network it was unusable.

Connecting to the same machine as either the same or different users resulted in each connection getting it own, independent desktop. A desktop could be shared if both connections were made to the same port and if the second connection used the same password. It didn't matter what username was specified for the second connection, it was ignored. As long as the password matched the connection was allowed. No indication was given to the first connection that someone else was now able to see/use their desktop.

Test 2 : Advanced Functionality

In this section, we tested features beyond the basic set and how it would handle induced error conditions and report the problems to the user.

We tested reconnecting to an existing session and tested its functionality. We tested connecting a large number of different users to the same server at once. The network was interrupted briefly to see how xrdp handled the interruption. A longer interruption was then tested as well. We tested attempting to connect with a non-existent user and to an inactive port. We tested rebooting the server while a connection was active.

Steps for test 2

1. Select a test server, machine A, with Linux installed.
2. Select a machine B running Windows to act as the client.

3. Create an account for user "tis" on the server.
4. Install xrdp on the server.
5. Edit the /etc/xrdp/xrdp.ini file on the server.
6. Reconnect to a session and exercise xrdp.
7. Briefly interrupt the network while connected, see if it recovers.
8. Interrupt the network for several minutes then restore.
9. Attempt to connect through xrdp with a non-existent login.
10. Attempt to connect to xrdp with a port that is not active in xrdp.
11. Connect multiple users to the same server at once.
12. Reboot the server while an xrdp connection is active.

Results

A brief network interruption paused the video but the video resumed when the connection was reestablished. The generic error message "An internal error has occurred" was displayed and the connection was terminated after the network connection was interrupted for several minutes or more. Reconnecting to the port the session is running on manually does work after the interruption is over but it doesn't attempt to reconnect automatically.

Attempts to connect to an xrdp server that failed gave adequate messages regarding the problem with the connection. Although attempting to connect to a port not in use by xrdp gives a generic message "VNC error - problem connecting, some problem".

Using a desktop through xrdp on one connection while someone else is connected through another worked fine but was disconcerting if they weren't aware of the other connection. There is no indication on the desktop that there is another active, remote xrdp client controlling it.

Working with other testers to open multiple sessions to the same server as different users worked well. 16 simultaneous connections were opened to the same server from 3 different client machines where 2 were on the same LAN and one across the country. The connections all were made successfully and each connection had its own desktop on the server. The process of making the connection slowed a lot as more connections were added.

A problem was encountered with the xrdp server where sometimes it would get into a state where a connection to a specific user from a specific client machine that should have been allowed would be rejected. When it was in this state that user could still log in from another machine or as a different user from the client that was not being allowed to connect with the original user. The rejected combination could not log in until the xrdp server was restarted.

Test 3: Remote/Long-term Connection

In this test, we exercised long-distance, long-duration connections between clients and servers. Server machines were at NCSA and client machines were at NCSA and PSC. Server machines

were running YouTube videos in a loop to continually update the display to make it easy to verify that the connection was still active. Clients were connected to the servers and the connections were left alive for 7 days. We checked on the connections every day during the 7 days to make sure connections between the clients and servers were still active.

Steps for test 3

1. Select a test server, machine A, with Linux installed.
2. Select 2 machines, B and C, running Windows to act as the clients.
3. Test machines A and B should be on the same LAN.
4. Test machine C should be off site.
5. Create accounts for user "tis" on the machines.
6. Install xrdp on the server.
7. Test a week long connection between machines on the same LAN.
8. Test a week long connection between machines not on the same LAN.

Results

On the local LAN a connection stayed up for 6 days, the connection terminated on the 7th day when another tester rebooted the machine. A later test confirmed that the connection stayed active for a full 7 days on a local connection.

Despite numerous attempts, we were rarely able to keep a connection up for 7 days. Xrdp seemed unable to maintain a stable connection for a week or more. Video and audio did not play well remotely. No error messages were displayed and no log entries could be found to explain why the connections were dropped. The sessions could be reconnected to if the active port that it was running on was specified.

G. Installation Information

The documentation on the xrdp website was not very helpful for installing. Other websites have instructions for installing and building xrdp.

OpenSUSE:

```
#          yum          -y          install          xrdp          tigervnc-server
#                       systemctl                    start                    xrdp.service
# systemctl enable xrdp.service
```

CentOS:

```
#          yum          -y          install          xrdp          tigervnc-server
#                       service                      xrdp                      start
#                       chkconfig                    xrdp                      on
# chkconfig vncserver on
```

H. Usage Information

Once the xrdp server is running it can be connected to by using client software that communicates using the Window's RDP protocol. On a Windows machine, searching for "remote desktop connection" brings up application that allows you to specify the server and login name/password to use to connect to the server running xrdp.

I. Evaluation Result

We recommend xrdp for use connecting multiple users to a single server, each with their own independent desktop. It worked well allowing users to suspend sessions and either resume it from the same client or grab it on a different one. While it's performance was acceptable over a local LAN, it performed poorly streaming videos and maintaining a long connection over remote networks. We do not recommend it for these uses.

The project is currently under active development.

J. Suggestions for Evaluation Procedure Revisions

None