



2025 Spring Final Summary

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Final Summary Spring 2025

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Specifics about our Concerto implementation/s

1. System Specifications:

a. System: Raspberry Pi 4

i. Onboard RAM: 8 GB

1. Check with `grep -oP '^MemTotal:\s+\K\d+'`

```
/proc/meminfo | numfmt --from=auto --from-unit=1024 --  
to=iec
```

ii. Storage (removable Micro SD card): 68 GB

1. Check with `df --total -h`

iii. OS: Raspberry Pi OS (based on Debian)



Specifics about our Concerto implementation/s

2. Installation sites:

a. Lally Hall:

- i. Lally Hall's Raspberry Pi is attached to a ceiling mounted TV screen, which is located in the entryway.



b. Amos Eaton Hall:

- i. Amos Eaton Hall's Raspberry Pi will be attached to a ceiling mounted TV screen, which is located in the entryway.



How to interact with Concerto

1. As a project member:

a. Concerto GitHub Organization:

i. Go to <https://github.com/RCOSConcerto>

1. After selecting the *People* tab, select a profile (such as *IsaiahCQ*) and then send a message requesting to join. Once accepted, create a fork from

https://github.com/RCOSConcerto/RCOS_concerto

b. Interacting with the Raspberry Pi:

i. Ways to connect to the Raspberry Pi: (Only for Lally's Pi since the Amos Eaton Pi isn't active yet.)

1. SSH:

- a. Open your Linux environment and login after executing this command: `ssh concerto-admin@128.113.96.1`

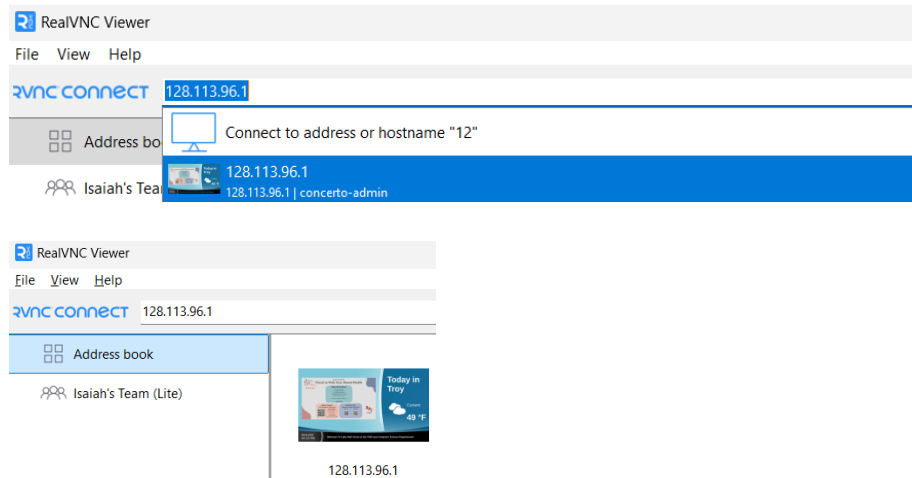
```
concerto-admin@concerto-la x + v
quatt1@DESKTOP-DRU3Q8H:~$ ssh concerto-admin@128.113.96.1
concerto-admin@128.113.96.1's password:
Warning: No xauth data; using fake authentication data for X11 forwarding.
Linux concerto-lally.cs.rpi.edu 6.6.74+rpt-rpi-2712 #1 SMP PREEMPT Debian 1:6.6.74-1+rpt1 (2025-01-27) aarch64

The programs included with the Debian GNU/Linux system are free software;
the exact distribution terms for each program are described in the
individual files in /usr/share/doc/*/copyright.

Debian GNU/Linux comes with ABSOLUTELY NO WARRANTY, to the extent
permitted by applicable law.
You have new mail.
Last login: Sat Apr 19 17:41:06 2025 from 128.213.67.230
```

2. Remote Desktop (RDP):

- a. Download [RealVNC](#) and create an account. Then open RealVNC Viewer and enter the Pi's IP address into the *RVNC CONNECT* text box. Next time you launch RealVNC Viewer, just click the available screen.



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What I've done this semester

3. How to connect to the Pi when you're not on campus:

- a. Follow the instructions at <https://itsc.rpi.edu/hc/en-us/articles/360008783172-VPN-Installation-and-Connection> and then SSH/RDP.

ii. Important Scripts:

1. Launch Concerto: `/home/concerto-admin/concerto_startup.sh`

- a. This script launches Concerto and is executed from within the `.bashrc` upon startup.

```
#!/bin/bash
# This is the concerto startup script
cd /home/concerto-admin
current_ip=$(ip addr | grep 'state UP' -A2 | tail -n1 | awk '{print $2}' | cut -f1 -d '/')
cd ~/concerto

RAILS_ENV=development bundle exec rails server &

sleep 30

chromium --kiosk --noerrdialogs --disable-infobars "concerto-lally.cs.rpi.edu/frontend/3" &
```

2. Postfix:

- a. `main.cf` and the logging directory (Use `sudo` to access):
 - i. `/etc/postfix/main.cf` (Contains Postfix's settings)
 - ii. `/var/log/mail.log`
- b. Send an email and check the email queue:
 - i. Send an email : `echo -e "Subject: Test Email\n\nThis is a test email." | sendmail test@rpi.edu`
 - ii. Check the email queue: `mailq`

3. `.bashrc`: `/home/concerto-admin/.bashrc`

- a. A `.bashrc` is a file that executes commands (using bash script) whenever a terminal is launched. It can be used to customize your terminal's settings (color, text size, etc.), create variables, and much more. Below is the portion of `.bashrc` that launches Concerto.

```
# Checks to see if Concerto is running, and lanches it if it isn't.
# This works in tandem with concerto_startup_master (which is called by ~/.config/autostart/concerto_startup.desktop)
# in order to launch Concerto if the Pi reboots.
if ! pgrep -f "ruby" > /dev/null; then
  echo "Launching Concerto from within .bashrc:"
  bash /home/concerto-admin/concerto_startup.sh
fi
```

iii. Concerto's wiki and a Google group for Concerto:

1. Wiki: <https://github.com/concerto/concerto/wiki>
2. Google group: <https://groups.google.com/g/concerto-digital-signage/>

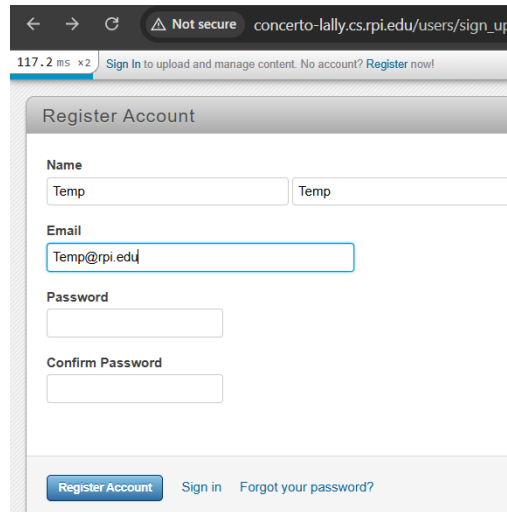
What I've done this semester

2. As a user (Follow these instructions if you're not using campus Wi-Fi:

<https://itssc.rpi.edu/hc/en-us/articles/360008783172-VPN-Installation-and-Connection>)

- a. Connecting to Concerto:

- i. Go to <http://concerto-lally.cs.rpi.edu/> and create an account.



The screenshot shows a web browser window with the address bar displaying "concerto-lally.cs.rpi.edu/users/sign_up". The page title is "Register Account". It contains a form with the following fields: "Name" (split into two input boxes, both containing "Temp"), "Email" (containing "Temp@rpi.edu"), "Password", and "Confirm Password". At the bottom, there are three buttons: "Register Account", "Sign in", and "Forgot your password?".

- ii. The webpage for each feed/display:

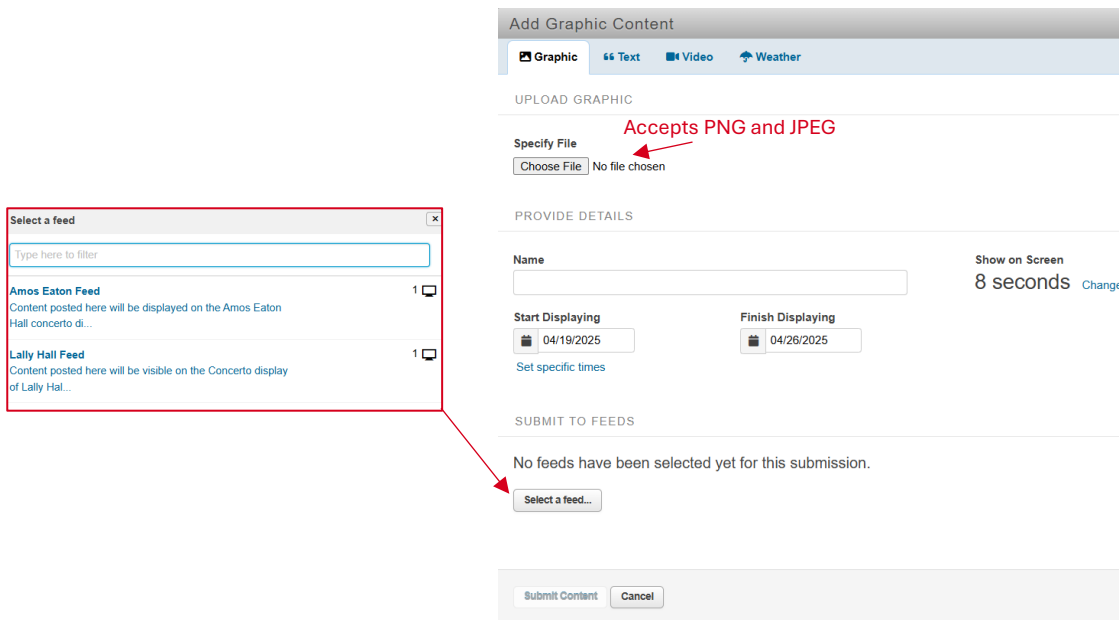
1. Amos Eaton Hall: <http://concerto-lally.cs.rpi.edu/frontend/2>

2. Lally Hall: <http://concerto-lally.cs.rpi.edu/frontend/3>

- b. Uploading an image of your slide/poster:

- i. Click the *add* button in the upper left corner (within the content box.)

Your submission will need to be approved by a moderator.



The screenshot shows the "Add Graphic Content" form. At the top, there are tabs for "Graphic", "Text", "Video", and "Weather". Below this is the "UPLOAD GRAPHIC" section, which includes a "Specify File" label and a "Choose File" button. A red arrow points to the "Choose File" button with the text "Accepts PNG and JPEG". Below this is the "PROVIDE DETAILS" section, which includes a "Name" field, a "Show on Screen" dropdown set to "8 seconds", and "Start Displaying" and "Finish Displaying" date pickers. At the bottom, there is a "SUBMIT TO FEEDS" section with a message "No feeds have been selected yet for this submission." and a "Select a feed..." button. A red arrow points from the "Select a feed..." button to a "Select a feed" dialog box on the left. The dialog box has a search bar and two options: "Amos Eaton Feed" and "Lally Hall Feed".

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What I've done this semester

1. Remote Desktop (RDP):

- In order to set up RDP for the Raspberry Pi in Lally, I configured X11/VNC, set up an Uncomplicated Firewall, and opened the ports needed by SSH/RDP/other things. I then used Real VNC as an intermediary client to access the Pi's GUI.

```
concerto-admin@concerto-lally:~$ sudo ufw status
Status: active

To Action From
--
3389/tcp ALLOW Anywhere
25 ALLOW Anywhere
22 ALLOW Anywhere
80 ALLOW Anywhere
443 ALLOW Anywhere
3000 ALLOW Anywhere
5900 ALLOW Anywhere
587 ALLOW Anywhere
3389/tcp (v6) ALLOW Anywhere (v6)
25 (v6) ALLOW Anywhere (v6)
22 (v6) ALLOW Anywhere (v6)
80 (v6) ALLOW Anywhere (v6)
443 (v6) ALLOW Anywhere (v6)
3000 (v6) ALLOW Anywhere (v6)
5900 (v6) ALLOW Anywhere (v6)
587 (v6) ALLOW Anywhere (v6)
```

2. Auto launch the Concerto script on start/reboot:

- I edited our .bashrc and some the Pi's runtime settings in order to launch a Concerto instance upon start-up/reboot.

3. Edureka:

- Dr. Turner asked us to work alongside the Edureka team to integrate their data into Concerto's database. So, I created a script that collects Edureka's data via an API call. I also used Crontab (Use the command *crontab -e* to open) to designate an execution schedule for the script and log the result of the script's execution. Currently, we're still working on inserting the returned data into Concerto's database.

```
GNU nano 7.2 /tmp/crontab.WogvXd/crontab
# Edit this file to introduce tasks to be run by cron.
#
# Each task to run has to be defined through a single line
# indicating with different fields when the task will be run
# and what command to run for the task
#
# To define the time you can provide concrete values for
# minute (m), hour (h), day of month (dom), month (mon),
# and day of week (dow) or use '*' in these fields (for 'any').
#
# Notice that tasks will be started based on the cron's system
# daemon's notion of time and timezones.
#
# Output of the crontab jobs (including errors) is sent through
# email to the user the crontab file belongs to (unless redirected).
#
# For example, you can run a backup of all your user accounts
# at 5 a.m every week with:
# 0 5 * * 1 tar -zcf /var/backups/home.tgz /home/
#
# For more information see the manual pages of crontab(5) and cron(8)
#
# m h dom mon dow command
* * * * * python /home/concerto-admin/Edureka_Api_Request.py > /home/concerto-admin/cronjob_log.log 2>&1
```

What I've done this semester

4. Assembling, setting up, and installing the second PI in Amos Eaton Hall:
 - a. We assembled the Pi, flashed the OS onto it, and tested that everything was working correctly. We haven't been able to install it in Amos Eaton yet because we're waiting on Dr. Turner to fix the TV's mounting bracket.
5. Showcasing Concerto:
 - a. Jonathan and I set up a meeting with Dr. Turner, in which we helped him set up an account and detailed how the signage system (Concerto) works.
6. Email/Postfix:
 - a. I installed postfix (mail transfer agent) on the Pi in Lally in an attempt to receive/send emails. Postfix is running without any issues, but, for some reason, emails sent to a gmail account get stuck in our mail queue, while emails sent to other providers (i.e. Outlook) leave the queue but are never received. We think that it's an authentication (tls) issue and it seems like we might need to meet with DotCIO to figure out a fix.
7. GitHub Organization:
 - a. I created a GitHub organization for our project, so that we have a streamlined way of managing Git merges, commits, and pulls in the future. As well as providing a basic organizational structure. <https://github.com/RCOSConcerto>
8. Helping Madhav:
 - a. We had a new member join Concerto this semester, so I spent the first couple of weeks demoing the Pi, detailing the work we've done, and helping him get learn Ruby/SQL/Bash.
9. Maintaining the Linux environment:
 - a. I was responsible for culling logs, writing bash scripts, and making sure that new scripts don't conflict with preexisting ones.

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What I've done this semester

10. Resource blocker and why we have no commits:

- a. We didn't receive the second Pi nor the domain until late March, so we spent most of this semester fixing bugs and maintaining Concerto.
- b. We haven't made any changes to the code we pulled from Concerto's main repo, so there hasn't been anything to commit.