

From Raw Data to Live System: A Backend Deployment Pathway

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Overview

- Linux System Administration Experience
- Incoming Tickets
- Backend server maintenance ([www1/www-2017](#))
- Command-line workflows for debugging and deployment
- nEXO wiki rebuild and data migration (trials and tribulations)
- What next?

Core Skills

- Linux & Bash workflows
- Web server management (Nginx / Apache)
- Service orchestration (systemd)
- Debugging production systems
- Data migration & infrastructure setup

Why I was hired in the beginning



How it still feels to use Linux

- Total Control of all actions (almost)
- Level 99 Wizard simulator
- Shell Commands == Spell Casting



Linux Administration



Example "string" command

- `grep -RniE 'ProxyPass|ProxyPassReverse' /etc/httpd 2>/dev/null`
- Other examples are too detailed; this one was the shortest

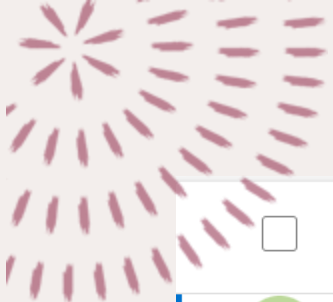
Prepare to READ






```
[qalmar@wool ~]$ grep -RniE 'ProxyPass|ProxyPassReverse' /etc/httpd 2>/dev/null
Binary file etc/httpd/modules/mod_proxy.so matches
/etc/httpd/conf.d/00_cute.twiki.conf.ssl:1:ProxyPass /cute/private/TWiki https://www-2017.sno1ab.ca/cute/private/TWiki
/etc/httpd/conf.d/00_cute.twiki.conf.ssl:3:ProxyPass /cute/private/TWiki https://www-2017.sno1ab.ca/cute/private/TWiki
/etc/httpd/conf.d/00_cute.twiki.conf.ssl:4:ProxyPassReverse /cute/private/TWiki https://www-2017.sno1ab.ca/cute/private/TWiki
/etc/httpd/conf.d/disabled/00_docushare7eval.conf.ssl:1:ProxyPass /docushare7eval.jsp /docushare7eval.internal.sno1ab.ca:8009/docushare7eval
/etc/httpd/conf.d/disabled/directors.conf.ssl:3:ProxyPass /directors https://directors.internal.sno1ab.ca/directors
/etc/httpd/conf.d/disabled/directors.conf.ssl:4:ProxyPassReverse /directors https://directors.internal.sno1ab.ca/directors
/etc/httpd/conf.d/disabled/openproject.conf.ssl:3:ProxyPass /openproject http://www-2017.sno1ab.ca:8009/openproject
/etc/httpd/conf.d/disabled/openproject.conf.ssl:4:ProxyPassReverse /openproject http://www-2017.sno1ab.ca:8009/openproject
/etc/httpd/conf.d/ubara.conf:5:ProxyPass /webmail https://188r2-external.sno1ab.ca
/etc/httpd/conf.d/ubara.conf:6:ProxyPassReverse /webmail https://188r2-external.sno1ab.ca
/etc/httpd/conf.d/00_owncloud.conf.ssl:1:ProxyPass /owncloud http://owncloud.internal.sno1ab.ca/owncloud
/etc/httpd/conf.d/00_owncloud.conf.ssl:2:ProxyPassReverse /owncloud http://owncloud.internal.sno1ab.ca/owncloud
/etc/httpd/conf.d/00_sbc.twiki.conf.ssl:1:ProxyPass /sbc/private/TWiki https://www-2017.sno1ab.ca/sbc/private/TWiki
/etc/httpd/conf.d/00_sbc.twiki.conf.ssl:2:ProxyPassReverse /sbc/private/TWiki https://www-2017.sno1ab.ca/sbc/private/TWiki
/etc/httpd/conf.d/00_sbc.twiki.conf.ssl:3:ProxyPass /sbc/private/TWiki https://www-2017.sno1ab.ca/sbc/private/TWiki
/etc/httpd/conf.d/00_sbc.twiki.conf.ssl:4:ProxyPassReverse /sbc/private/TWiki https://www-2017.sno1ab.ca/sbc/private/TWiki
/etc/httpd/conf.d/00_pico-docb.conf.ssl:1:ProxyPass /owncloud http://owncloud.internal.sno1ab.ca/owncloud
/etc/httpd/conf.d/00_pico-docb.conf.ssl:2:ProxyPassReverse /owncloud http://owncloud.internal.sno1ab.ca/owncloud
/etc/httpd/conf.d/www-disabled/securitycamproxy.conf.disabled:1:ProxyPass /securitycam https://192.51.71.49/securitycam
/etc/httpd/conf.d/www-disabled/securitycamproxy.conf.disabled:2:ProxyPassReverse /securitycam https://192.51.71.49/securitycam
/etc/httpd/conf.d/www-disabled/securitycamproxy.conf.disabled:3:ProxyPass /securitycam-direct http://securitycam.sno1ab.ca
/etc/httpd/conf.d/www-disabled/securitycamproxy.conf.disabled:4:ProxyPassReverse /securitycam-direct http://securitycam.sno1ab.ca
/etc/httpd/conf.d/www/proxy_to_www.conf:3:ProxyPass /pico https://www1.sno1ab.ca/pico
/etc/httpd/conf.d/www/proxy_to_www.conf:4:ProxyPassReverse /pico http://www1.sno1ab.ca/pico
/etc/httpd/conf.d/www/proxy_to_www.conf:6:ProxyPass /grading-committee https://www1.sno1ab.ca/grading-committee
/etc/httpd/conf.d/www/proxy_to_www.conf:7:ProxyPassReverse /grading-committee https://www1.sno1ab.ca/grading-committee
/etc/httpd/conf.d/www/proxy_to_www.conf:8:ProxyPass /icms http://www1.sno1ab.ca/icms
/etc/httpd/conf.d/www/proxy_to_www.conf:9:ProxyPassReverse /icms http://www1.sno1ab.ca/icms
/etc/httpd/conf.d/www/proxy_to_www.conf:10:ProxyPassReverse /icons http://www1.sno1ab.ca/icons
/etc/httpd/conf.d/www/sympa.conf:3:ProxyPass /sympa https://lists.sno1ab.ca/sympa
/etc/httpd/conf.d/www/sympa.conf:4:ProxyPassReverse /sympa https://lists.sno1ab.ca/sympa
/etc/httpd/conf.d/www/sympa.conf:5:ProxyPassReverse /static-sympa https://lists.sno1ab.ca/static-sympa
/etc/httpd/conf.d/www/sympa.conf:6:ProxyPassReverse /static-sympa https://lists.sno1ab.ca/static-sympa
/etc/httpd/conf.d/www/sympa.conf:pre-move:6:ProxyPassReverse /sympa http://mail.sno1ab.ca/sympa
/etc/httpd/conf.d/www/vhost.conf.pre-include:53# ProxyPass /news-projects/private 1
/etc/httpd/conf.d/www/vhost.conf.pre-include:54# ProxyPass /news-projects https://www1.sno1ab.ca/news-projects
/etc/httpd/conf.d/www/vhost.conf.pre-include:55# ProxyPassReverse /news-projects https://www1.sno1ab.ca/news-projects
/etc/httpd/conf.d/www/sympa.conf.new:4:ProxyPassReverse /sympa https://lists.sno1ab.ca/sympa
/etc/httpd/conf.d/www/sympa.conf.new:5:ProxyPassReverse /static-sympa https://lists.sno1ab.ca/static-sympa
/etc/httpd/conf.d/www/sympa.conf.new:6:ProxyPassReverse /static-sympa https://lists.sno1ab.ca/static-sympa
/etc/httpd/conf.d/www/moving_to_www.conf:1: ProxyPassMatch "/~/*" https://www1.sno1ab.ca/1
/etc/httpd/conf.d/www/moving_to_www.conf:2: ProxyPassReverse / https://www1.sno1ab.ca/
/etc/httpd/conf.d/www/vhost.conf.pre-include:53# ProxyPass /news-projects/private 1
/etc/httpd/conf.d/www/vhost.conf.pre-include:54# ProxyPass /news-projects https://www1.sno1ab.ca/news-projects
/etc/httpd/conf.d/www/vhost.conf.pre-include:55# ProxyPassReverse /news-projects http://www1.sno1ab.ca/news-projects
/etc/httpd/conf.d/www/cap-loc.conf:3:ProxyPass /cap-loc https://www1.sno1ab.ca/cap-loc
/etc/httpd/conf.d/www/cap-loc.conf:4:ProxyPassReverse /cap-loc https://www1.sno1ab.ca/cap-loc
/etc/httpd/conf.d/00_orbeon.conf.ssl:1:ProxyPass /orbeon.jsp /localhost:8009/orbeon
/etc/httpd/conf.d/00_orbeon.conf.ssl:2:ProxyPassReverse /orbeon.jsp /localhost:8009/orbeon
/etc/httpd/conf.d/00_orbeon.conf.ssl:4:ProxyPass /orbeon http://localhost:8009/orbeon
/etc/httpd/conf.d/00_orbeon.conf.ssl:5:ProxyPassReverse /orbeon http://localhost:8009/orbeon
/etc/httpd/conf.d/sympa.conf.ssl:5:ProxyPass /sympa https://lists.sno1ab.ca/sympa
/etc/httpd/conf.d/sympa.conf.ssl:6:ProxyPassReverse /sympa https://lists.sno1ab.ca/sympa
/etc/httpd/conf.d/sympa.conf.ssl:7:ProxyPassReverse /static-sympa https://lists.sno1ab.ca/static-sympa
/etc/httpd/conf.d/sympa.conf.ssl:8:ProxyPassReverse /static-sympa https://lists.sno1ab.ca/static-sympa
/etc/httpd/conf.d/00_pl12019.twiki.conf.ssl:1:ProxyPass /pl12019 https://www-2017.sno1ab.ca/pl12019
/etc/httpd/conf.d/00_pl12019.twiki.conf.ssl:2:ProxyPassReverse /pl12019 https://www-2017.sno1ab.ca/pl12019
/etc/httpd/conf.d/pchange.conf.ssl:1:ProxyPass /pchange https://www-2017.sno1ab.ca/pchange
/etc/httpd/conf.d/pchange.conf.ssl:2:ProxyPassReverse /pchange https://www-2017.sno1ab.ca/pchange
/etc/httpd/conf.d/sympa.conf:old:3:ProxyPass /sympa https://lists.sno1ab.ca/sympa
/etc/httpd/conf.d/sympa.conf:old:4:ProxyPassReverse /sympa https://lists.sno1ab.ca/sympa
/etc/httpd/conf.d/sympa.conf:old:6:ProxyPass /static-sympa https://lists.sno1ab.ca/static-sympa
/etc/httpd/conf.d/sympa.conf:old:7:ProxyPassReverse /static-sympa https://lists.sno1ab.ca/static-sympa
/etc/httpd/conf.d/00_docushare.conf.ssl:1:ProxyPass /docushare.jsp /ds2016.sno1ab.ca:8009/docushare
/etc/httpd/conf.d/00_docushare.conf.ssl:2:ProxyPassReverse /docushare.jsp /ds2016.sno1ab.ca:8009/docushare
/etc/httpd/conf.d/00_docushare.conf.ssl:4:ProxyPass /connectkey.jsp /ds2016.sno1ab.ca:8009/connectkey
/etc/httpd/conf.d/00_docushare.conf.ssl:5:ProxyPassReverse /connectkey.jsp /ds2016.sno1ab.ca:8009/connectkey
/etc/httpd/conf.d/proxy_html.conf:7: ProxyPass /mygateway http://www.sno1ab.ca:8009/mygateway
/etc/httpd/conf.d/proxy_html.conf:7: ProxyPassReverse /
/etc/httpd/conf.d/sno1ab-cameras.conf:1:ProxyPass /sno1ab-cameras http://www1.sno1ab.ca/sno1ab-cameras
/etc/httpd/conf.d/sno1ab-cameras.conf:2:ProxyPassReverse /sno1ab-cameras http://www1.sno1ab.ca/sno1ab-cameras
```

```
tc/httpd/conf.d/00_sbc_twiki.conf_ssl:2:ProxyPassReverse /sbc/private/TWiki/ https://www-2017.snolab.ca/sbc/private/TWiki
tc/httpd/conf.d/00_sbc_twiki.conf_ssl:3:ProxyPass /sbc/private/TWiki/ https://www-2017.snolab.ca/sbc/private/TWiki
tc/httpd/conf.d/00_sbc_twiki.conf_ssl:4:ProxyPassReverse /sbc/private/TWiki/ https://www-2017.snolab.ca/sbc/private/TWiki
tc/httpd/conf.d/00_pico-docdb.conf_ssl.no:1:ProxyPass /owncloud http://seagull.internal.snolab.ca/owncloud
tc/httpd/conf.d/00_pico-docdb.conf_ssl.no:2:ProxyPassReverse /owncloud http://seagull.internal.snolab.ca/owncloud
tc/httpd/conf.d/from-www/disabled/securitycamproxy.conf.disabled:17:ProxyPass /securitycam http://142.51.71.49/securitycam
tc/httpd/conf.d/from-www/disabled/securitycamproxy.conf.disabled:18:ProxyPassReverse /securitycam http://142.51.71.49/securitycam
tc/httpd/conf.d/from-www/disabled/securitycamproxy.conf.disabled:20:ProxyPass /securitycam-direct http://securitycam.snolab.ca
tc/httpd/conf.d/from-www/disabled/securitycamproxy.conf.disabled:21:ProxyPassReverse /securitycam-direct http://securitycam.snolab.ca
tc/httpd/conf.d/from-www/proxy_to_www1.conf:3:ProxyPass /pico http://www1.snolab.ca/pico
tc/httpd/conf.d/from-www/proxy_to_www1.conf:4:ProxyPassReverse /pico http://www1.snolab.ca/pico
tc/httpd/conf.d/from-www/proxy_to_www1.conf:6:ProxyPass /grading-committee http://www1.snolab.ca/grading-committee
tc/httpd/conf.d/from-www/proxy_to_www1.conf:7:ProxyPassReverse /grading-committee http://www1.snolab.ca/grading-committee
tc/httpd/conf.d/from-www/proxy_to_www1.conf:9:ProxyPass /icons http://www1.snolab.ca/icons
tc/httpd/conf.d/from-www/proxy_to_www1.conf:10:ProxyPassReverse /icons http://www1.snolab.ca/icons
tc/httpd/conf.d/from-www/sympa.conf:3:ProxyPass /sympa https://lists.snolab.ca/sympa
tc/httpd/conf.d/from-www/sympa.conf:4:ProxyPassReverse /sympa https://lists.snolab.ca/sympa
tc/httpd/conf.d/from-www/sympa.conf:6:ProxyPass /static-sympa https://lists.snolab.ca/static-sympa
tc/httpd/conf.d/from-www/sympa.conf:7:ProxyPassReverse /static-sympa https://lists.snolab.ca/static-sympa
tc/httpd/conf.d/from-www/sympa.conf.pre-move:5:#ProxyPass /sympa http://mail.snolab.ca/sympa
tc/httpd/conf.d/from-www/sympa.conf.pre-move:6:#ProxyPassReverse /sympa http://mail.snolab.ca/sympa
tc/httpd/conf.d/from-www/vhost.conf.preinclude:53:# ProxyPass /news-projects/private !
tc/httpd/conf.d/from-www/vhost.conf.preinclude:54:# ProxyPass /news-projects http://www1.snolab.ca/news-projects
tc/httpd/conf.d/from-www/vhost.conf.preinclude:55:# ProxyPassReverse /news-projects http://www1.snolab.ca/news-projects
tc/httpd/conf.d/from-www/sympa.conf.new:3:ProxyPass /sympa https://lists.snolab.ca/sympa
tc/httpd/conf.d/from-www/sympa.conf.new:4:ProxyPassReverse /sympa https://lists.snolab.ca/sympa
tc/httpd/conf.d/from-www/sympa.conf.new:6:ProxyPass /static-sympa https://lists.snolab.ca/static-sympa
tc/httpd/conf.d/from-www/sympa.conf.new:7:ProxyPassReverse /static-sympa https://lists.snolab.ca/static-sympa
tc/httpd/conf.d/from-www/moving_to_www1.conf:1: ProxyPassMatch ^(/~.*)$ https://www1.snolab.ca/\$1
tc/httpd/conf.d/from-www/moving_to_www1.conf:2: ProxyPassReverse /~ https://www1.snolab.ca/~
tc/httpd/conf.d/from-www/vhost.conf.preinclude.novhosts:53:# ProxyPass /news-projects/private !
tc/httpd/conf.d/from-www/vhost.conf.preinclude.novhosts:54:# ProxyPass /news-projects http://www1.snolab.ca/news-projects
tc/httpd/conf.d/from-www/vhost.conf.preinclude.novhosts:55:# ProxyPassReverse /news-projects http://www1.snolab.ca/news-projects
tc/httpd/conf.d/from-www/cap-loc.conf:3:#ProxyPass /cap-loc https://www1.snolab.ca/cap-loc
tc/httpd/conf.d/from-www/cap-loc.conf:4:#ProxyPassReverse /cap-loc https://www1.snolab.ca/cap-loc
tc/httpd/conf.d/00_orbeon.conf_ssl:1:# ProxyPass /orbeon ajp://localhost:8009/orbeon
tc/httpd/conf.d/00_orbeon.conf_ssl:2:# ProxyPassReverse /orbeon ajp://localhost:8009/orbeon
tc/httpd/conf.d/00_orbeon.conf_ssl:4:ProxyPass /orbeon http://localhost:8080/orbeon
tc/httpd/conf.d/00_orbeon.conf_ssl:5:ProxyPassReverse /orbeon http://localhost:8080/orbeon
tc/httpd/conf.d/sympa.conf_ssl:5:ProxyPass /sympa https://lists.snolab.ca/sympa
tc/httpd/conf.d/sympa.conf_ssl:6:ProxyPassReverse /sympa https://lists.snolab.ca/sympa
tc/httpd/conf.d/sympa.conf_ssl:8:ProxyPass /static-sympa https://lists.snolab.ca/static-sympa
tc/httpd/conf.d/sympa.conf_ssl:9:ProxyPassReverse /static-sympa https://lists.snolab.ca/static-sympa
```

Major Ticket: Remember TWiki?

- Email shift reports
- Underground shift report, what happened?
- The classical "Intern messed up" moment
- The worst setup one can lay eyes on
- The Ballad of the Emails: Return of the UG Shift Reports
- Multiples cannot save when accessing same sessions



- Results
- >  SNOLAB **Shift** Report Administrator
Shift Report for 2026-0... 2/24/2026
Shift Report for 2026-02-2... Inbox
 - >  SNOLAB **Shift** Report Administrator
Shift Report for 2026-02-... 2/24/2026
Shift Report for 2026-02-1... Inbox
 - >  SNOLAB **Shift** Report Administrator
Shift Report for 2026-02-... 2/24/2026
Shift Report for 2026-02-1... Inbox
 - >  SNOLAB **Shift** Report Administrator
Shift Report for 2026-0... 2/24/2026
Shift Report for 2026-02-2... Inbox
 - > SNOLAB **Shift** Report Administrator
Shift Report for 2026-0... 2/24/2026
Shift Report for 2026-02-1... Inbox
 - >  SNOLAB **Shift** Report Administrator

Shift Report for 2026-02-13 Day Shift, Underground 📄 Summarize



SNOLAB **Shift** Report Administrator <webmaster@snolab.ca>



To: +1 other

Tue 2/24/2026 10:48 AM

Shift Report for 2026-02-13 Day Shift, Underground

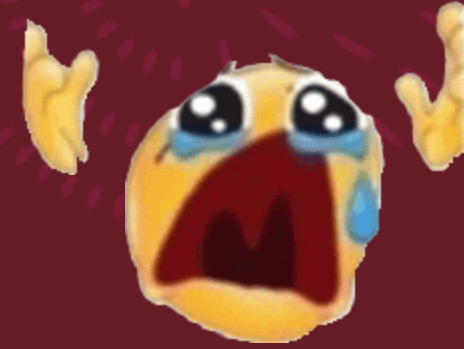
This **Shift** Report, including full Detailed Activities, can be found at [DocuShare](#).
 All Underground **Shift** Reports can be found [here](#).

SNOLAB General **Shift** Information:

General **Shift** Information



Backend Maintenance



- **Proper Routine when handling www1 and www-2017:**

- SSH-based system access (MobaXterm)
- Service monitoring & recovery (Intermediate)
- Log analysis and debugging (Major)
- File system management (Major)
- Resolving port and service conflicts (Minimal)

- **What actually happens:**

- Misery (Not really)
- Lots of lines to read that cannot be given to ChatGPT (Privacy & Confidentiality Clause)
- Debugging/Documenting is where all attention is usually at (Occasional line skipping can happen)

Linux Workflows

Essential Commands for Backend Management with MediaWiki and Twiki

- Each new addition to LocalSettings.php needs restarting `====>` `systemctl status mediawiki`
`systemctl restart mediawiki`
- Network Debugging
 - `ss -ltnp`
- Data Handling
 - `tar -xf archive.tar`
- Permissions Example
 - `chown -R www-data:www-data`

What do some spells mean ?

- **ss -lntp** = "Show me all the listening tcp sockets, displayed in numeric form, and include the process using each port"
- **grep -RniE'ProxyPass|ProxyPassReverse'/etc/httpd 2>/dev/null** => grep is the search tool, after the dash, 'RniE' looks intimidating, no worries that's what got 'stringed' together!
 - It means the following: -R 'recursive search' -n 'show line number where matches are found' -i 'ignore case, ex: ProxypaSs, proxypass, pROXyPaSs, etc' and finally -E 'use extended regular expressions like | (or).
 - Why recursive? To Search through all files and the directories respective 'sub directories'.
 - Hold on, what about 2>/dev/null ?? That is for error redirection, a must have else the string script exits with error code 1 and stops the search, a null dump for better words.

nEXO Project

- Longest Running, 99.99% completed.
- Large dataset (~60GB+) with more to come
- Slightly functional authentication system
- Old hosting environment, ancient PHP and mediawiki installation versions

Migration Process

- Transferred large archive via SSH
- Extracted and reorganized file structure
- Integrated into MediaWiki /images
- Fixed permissions and indexing

System Architecture

- Ubuntu VM deployment
- 5 TB storage allocation
- MediaWiki/PHP web server backend
- Nginx reverse proxy
- Internal + external access via DNS

Web Infrastructure

- Configured Nginx reverse proxy
- Connected domain (nexowiki.sno1ab.ca/wiki)
- Implemented HTTPS (Let's Encrypt)
- Resolved redirect and routing issues



MediaWiki 1.43.6

LocalSettings.php not found.

Please [set up the wiki](#) first.



Main Page Discussion

Read Edit View history More

Main Page

The nEXO Collaboration Wiki

Welcome to the nEXO collaboration wiki. This is a fully editable web page to store information on the nEXO project. There are other resources such as the mailing lists. If there are questions about what information should be placed on what resource please contact Mike Heffner (mheffner@lnl.gov). Please refrain from editing the top level pages without discussing with folks maintaining this site.

nEXO Welcome Page - New members can start here for important on-boarding steps

- [Meetings]
- [Contacts]
- [email lists]
- [Level 2 Workgroup Pages]
- [Design Workshops]
- [Publications, Proceedings, and theses (Paper archive)]
- [Conferences and Talks (Talks list)]
- [Management]
- [Other Work]
- [nEXO Point Design Documents]
- [nEXO Board Documents]

- Main page
- Recent changes
- Random page
- Help about MediaWiki
- Tools
- What links here
- Related changes
- Upload file
- Special pages
- Printable version
- Permanent link
- Page information

Challenges & Diagnoses

- Extension Feasibility

- *"Error: Fatal exception of type
"Wikimedia\Rdbms\DBQueryError"*
- *"Error 1: near "AUTO_INCREMENT":
syntax error"*
- Diagnose:
 - *"acr_id int unsigned NOT NULL PRIMARY
KEY AUTO_INCREMENT "*

- Apache clashing with Nginx

- *"Error (98) Address already in use: AH00072:
make_sock: could not bind to address
0.0.0.0:80"*
- *"no listening sockets available, shutting down"*
- Diagnose line:
 - *"ss -ltnp | grep -E ':80|:81|:8080|:443'"*

Cause & Solution

Extensions

- SQLite does not support "variable extension"
- Fix: Transition to access-based login via admin control (better security)
- `# wfLoadExtension('ConfirmAccount');`
- Demo to show

Apache & Nginx

- Ports 80 and 443 were in use
- Fix: `sudo snap set nextcloud ports.https=444`
- `sudo snap restart nextcloud.apache`
- Config: `location /wiki/ { proxy_pass http://127.0.0.1:8080/; }`

What next? Possibilities are Endle- Limited

- Aiding in Business Automation Development
 - Some experience with automation and app creation
- PHP server-side programming
 - Used for overhauling certain aspects of the current state of some websites
- Can not be too ambitious

IT Appreciation

- Kipp Grose
- James Hawkins
- Peter Luczak
- Parsa Moradian
- Diane Lessard
- Krina Patel
- Leonardo Aquino



Questions?