Session Description

As a member of BCNET, Thompson Rivers University has utilized EduCloud virtual server, storage, and network resources at a cost much lower than similar outsourced Cloud or in House (Private Cloud) solutions.

In this session, you will learn how TRU has deployed Oracle Corporation Data Guard technology to protect our critical Enterprise Primary Databases at TRU with Standby Databases in EduCloud.

In the event of a Disaster, the DBA can failover from Primary Databases located in our Kamloops Data Centre to Standby Databases in Vancouver and resume operations while minimizing downtime and loss of committed transactions.

Agenda

- TRU Facts and Figures

- The need: what we protect

- The benefits of DR on EduCloud

- DR on EduCloud Architecture

- DR on EduCloud setup – high level

- "Break glass in case of …" procedure

- Where we are at now and the future

- Questions and Discussion

Territorial Acknowledgement

TRU's Kamloops campus is situated on the traditional lands of the Tk'emlúps te Secwépemc within Secwépemc'ulucw, the traditional territory of the Secwépemc people.

TRU Facts and Figures

Students headcount:

On Campus	13,443
Open Learning	13,471
Dual Enrolled	1,160
Unique Total	25,754

- Majority age group: 19-24
- Average age on campus: 25.0
- Average age in Open Learning: 30.4

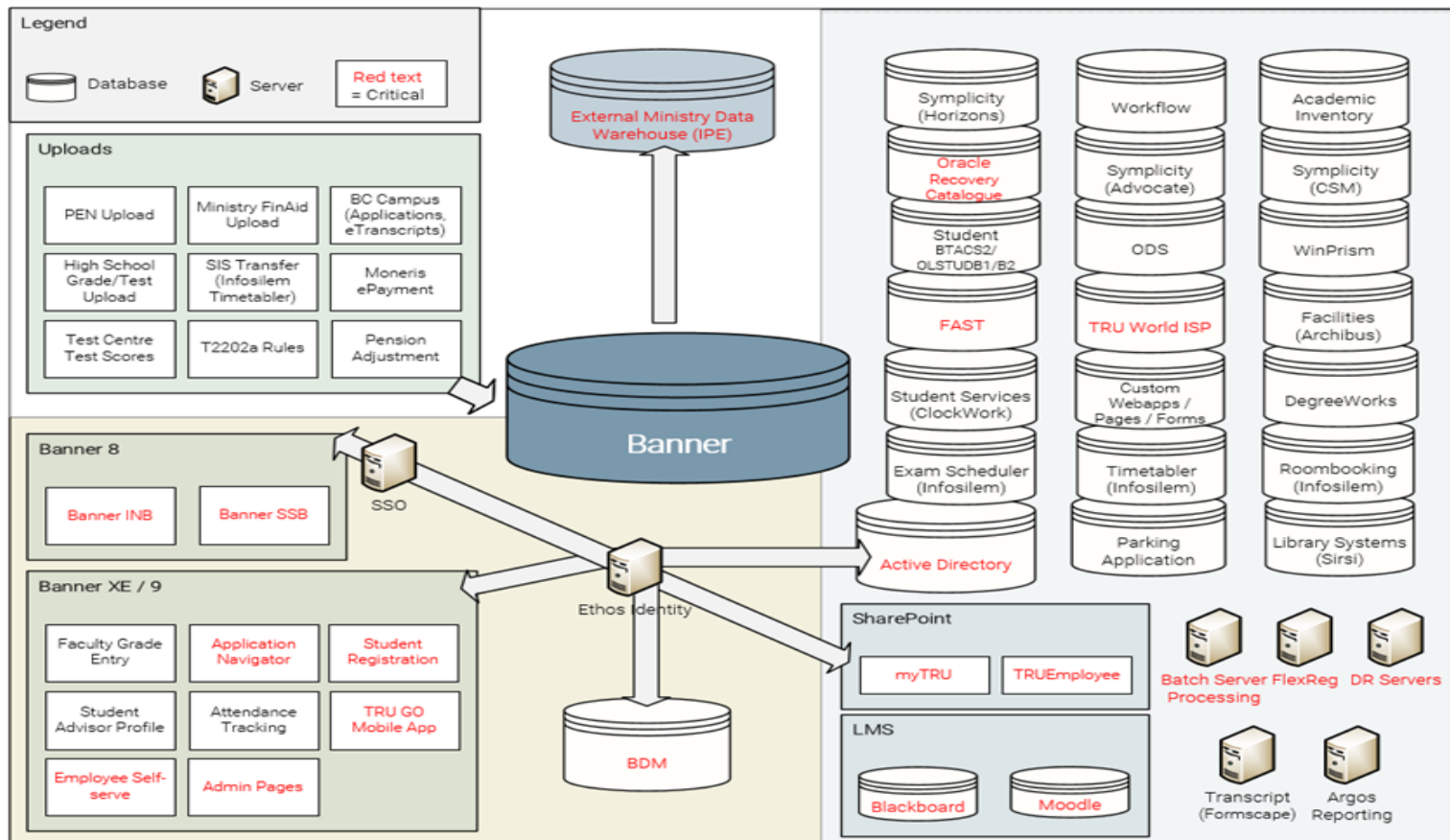

https://www.tru.ca/about/facts.html

Faculty and staff:

- Total employees, including faculty, support staff and administration: 1,543

The need: What we protect

Benefits of using Oracle Data Guard with BCNET's EduCloud for Disaster Recovery

- Secure and robust

- Fraction of the cost versus Private Cloud/physical servers

- Non-Active Data Guard is included with Oracle Enterprise Edition

- Faster provisioning – days instead of weeks

- Max loss of data is fifteen minutes compared with up to a full day

- Disaster Recovery is same day compared with weeks

- Operationalized and tested

- Part of Accreditation by NWCCU

- What it is not: Active Data Guard or Oracle Real Application Cluster (RAC)

Fees - examples

Description	Price	Unit
Basic fee (includes licensing and support)	$85	per VM/year
CPU		
High Performance Tier (Kamloops only)	$50	per GHz/year
Standard Performance Tier	$9	per GHz/year
Memory	$10	per GB/year
Disk		
High Performance (includes local and remote backup)	$0.40	per GB/year
Standard Performance (includes local and remote backup)	$0.15	per GB/year
Virtual Firewall	Included in basic fee	
Virtual Load Balancer	Included in basic fee	

Fees vary: see website
Educloud Backup:
https://www.bc.net/service-catalogue/educloud-backup

Educloud Server:
https://www.bc.net/service-catalogue/educloud-server
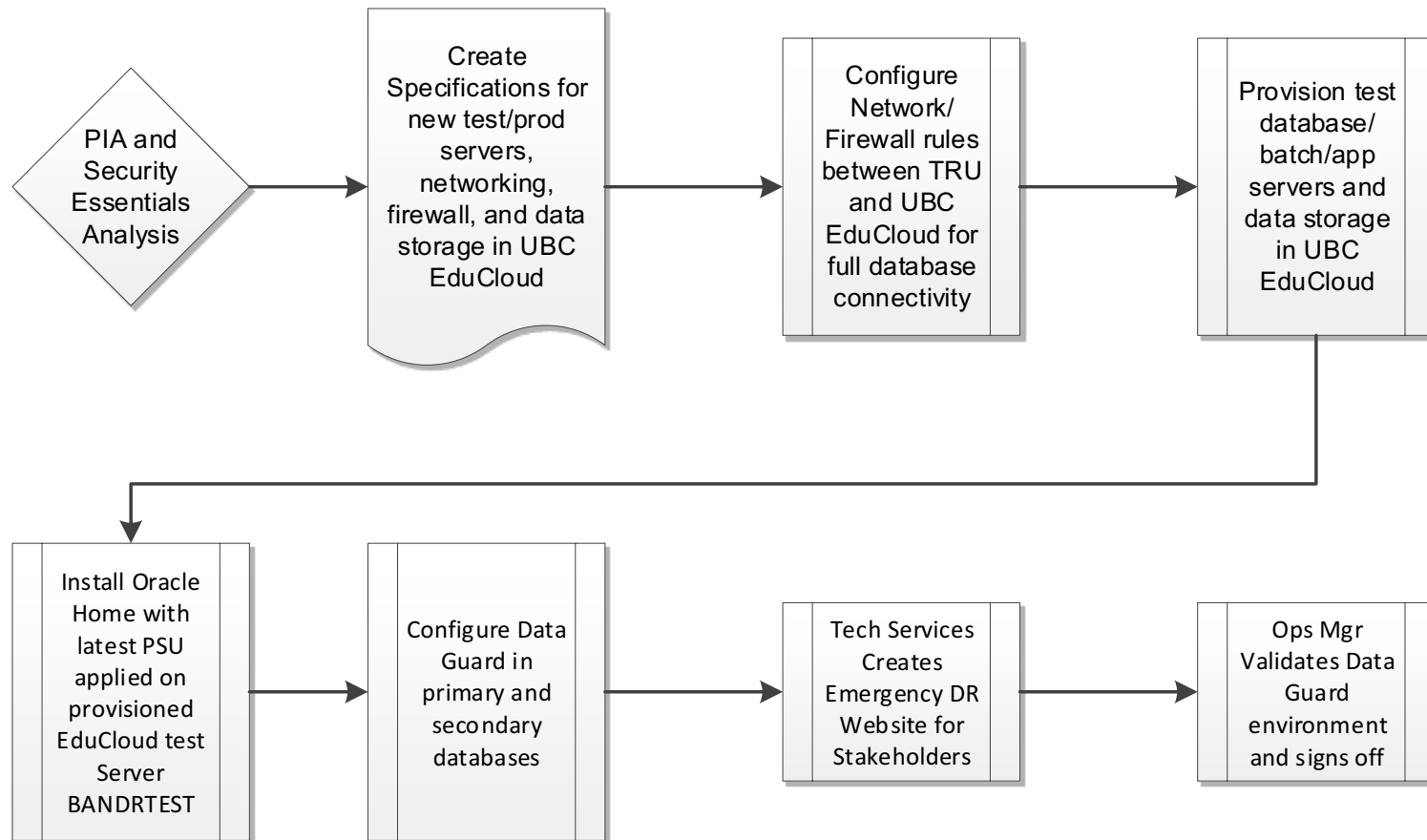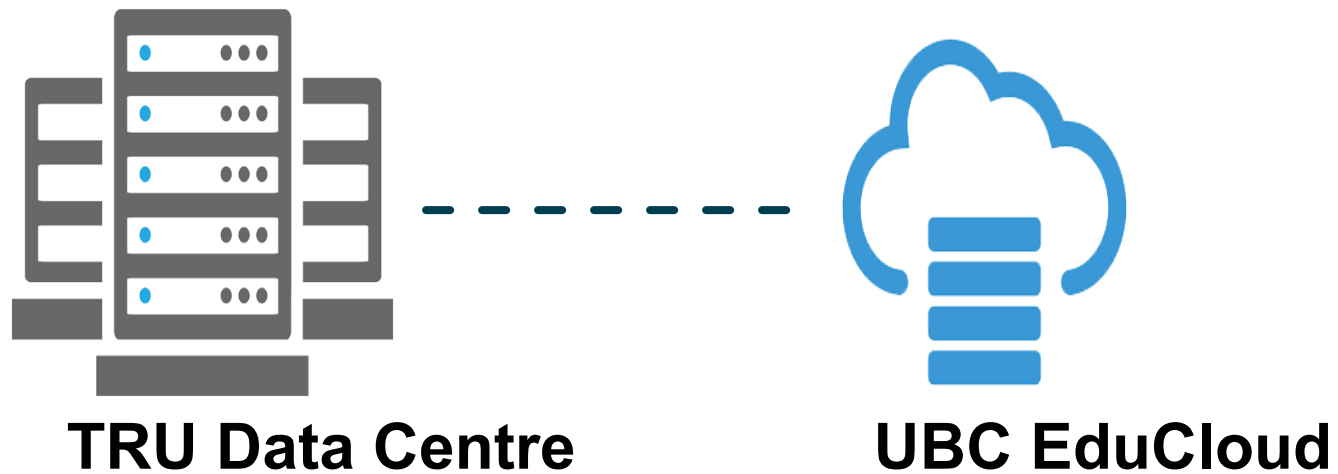
DR on EduCloud setup – high level

DR on EduCloud – architecture

TRU has Primary Databases and
EduCloud has Standby Databases

TRU Data Centre   **UBC EduCloud**

Oracle Net - Asynchronous

Primary Databases:
Recovery Catalog, Banner
Prod/Test, FAST

Redo Logs

Primary Databases:
Recovery Catalog, Banner
Prod/Test, FAST

Batch, Weblogic,
and App Servers

Batch, Weblogic,
and App Servers

Clients

Clients
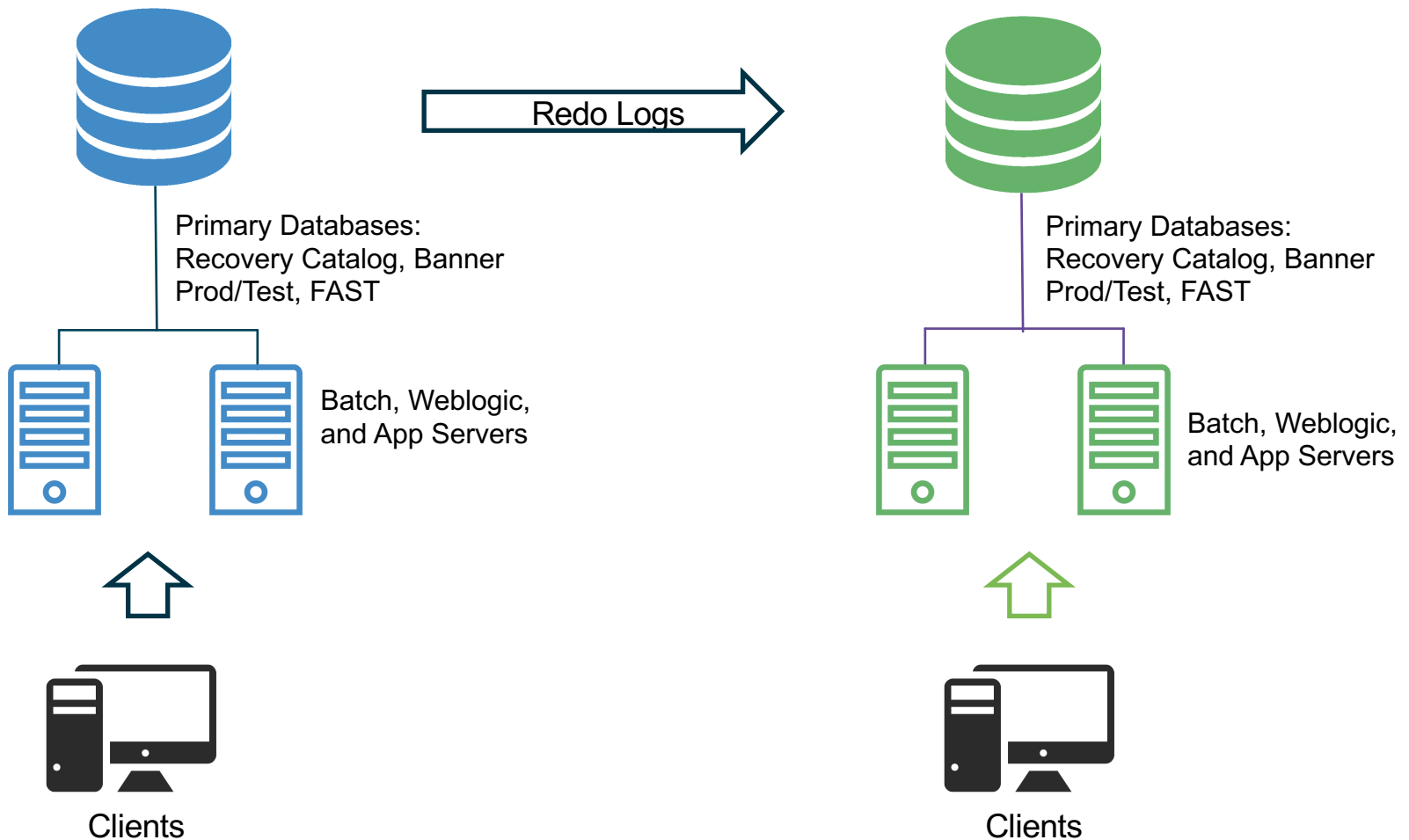
TRU site is online, RFS sends logs to FAL Standby site, which uses MRP

Primary Databases:
Recovery Catalog,
Banner Prod/Test, FAST

Batch, Weblogic,
and App Servers

Standby Databases:
Recovery Catalog,
Banner Prod/Test, FAST

Batch, Weblogic,
and App Servers

Clients

Switchover on DR

Clients
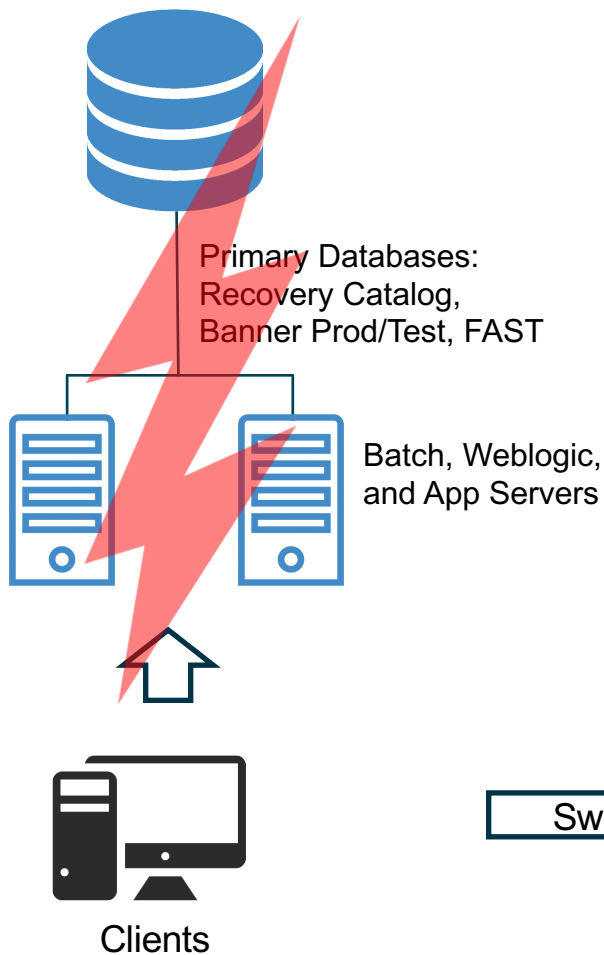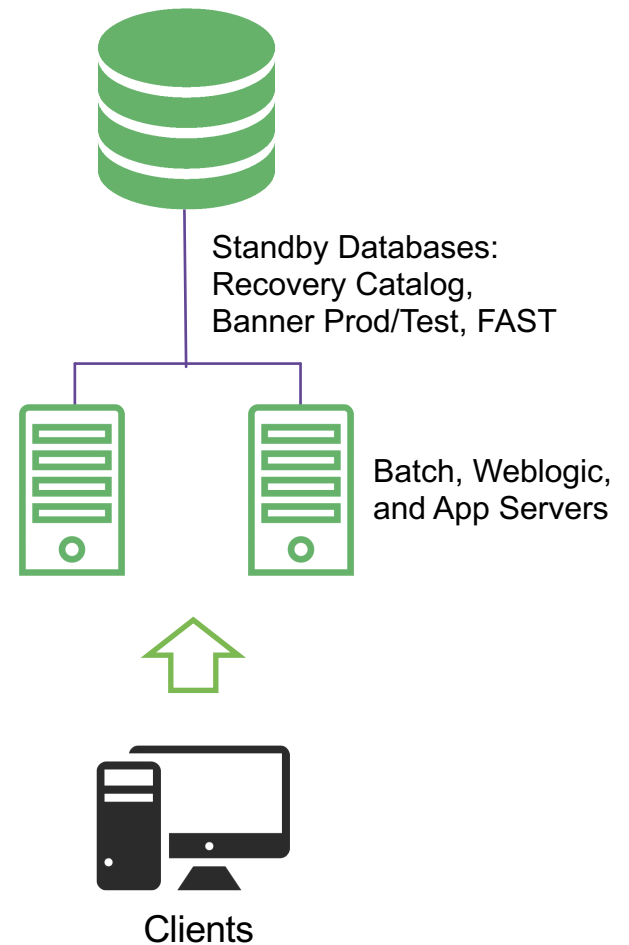
TRU site has suffered catastrophic failure – DR approved and implemented

The phone just rang and it's work calling … !

"Break glass in case of …" procedure

WARNING

- Use only in case of DISASTER RECOVERY upon approval of TRU IT Services CIO (or designate), after Severity One Service Request has been opened (by phone if necessary) with Oracle Support.

Scenario

- The production Banner database BANPROD has suffered a catastrophic failure.

- Available TRU Database Administrators have analyzed the situation and recommended Oracle Data Guard Failover to BANPROD_STBY be activated given the situation.

- The TRU IT Services CIO (or designate) approves this Failover to BANPROD_STBY as the Primary database to maintain critical business continuity for key Banner applications. **Emergency communication procedures are enacted for Disaster Recovery.**

"Break glass in case of …" remaining steps

Failover of the Standby Database to Primary

- Connect to the EduCloud server as oracle, login to the standby database as sysdba and issue the commands

ALTER DATABASE RECOVER MANAGED STANDBY DATABASE FINISH;

ALTER DATABASE ACTIVATE STANDBY DATABASE;

ALTER DATABASE OPEN;

Contact Oracle Support if an error is encountered on any command

The Secondary Database is now Primary - BUT YOU ARE FAR FROM DONE YET!

- Activate connections on batch, weblogic, and applications servers
- Test/troubleshoot all critical Banner applications
- Address any issues found

Make DR website live to the web and Notify Stakeholders

EduCloud for DR – where we are now and the future

1   **DG for RCAT (May 2016)**   Established Oracle Data Guard standby database for TRU's Enterprise Recovery Catalog on UBC's EduCloud

2   **DG for ERP Database (Oct 2016)**   Established Oracle Data Guard standby database with Disaster Recovery for TRU's flagship ERP Banner database BANPROD on UBC's EduCloud

3   **Banner Prod DR (Dec 2016)**   Established Banner production Disaster Recovery site with INB/SSB/Batch Jobs/Flexreg functionality on UBC's EduCloud

4   **FAST Prod DR (Aug 2017)**   Established FAST production Disaster Recovery site using a Data Guard standby database for FAST application functionality on UBC's EduCloud

5   **Degreeworks DR (Summer 2018)**   Establish Degreeworks production Disaster Recovery site with Degreeworks application functionality on UBC's EduCloud

Acknowledgements and thanks

- Brian Mackay, CIO and Project Sponsor

- Ellis Herbert, Director Enterprise Systems Dept.

- Wes Cole, Director Technical Services Dept. (retired)

- Wendy Blake, Director Tech Services Dept.

- Hugh Burley, Manager Information Security

- David Burkholder, Manager Learning and Communications Systems

- Cliff Harms, Senior IT Analyst

- Austin Wang, Operations Manager

- Zeljko Bodruzic, Senior Systems Analyst

- Vera Merkusheva, Senior Software Analyst

- The UBC EduCloud Team

Questions & Discussion

Thank you!

Karl Fultz

Database Administrator

Thompson Rivers University

kfultz@tru.ca