



## VSE to z/OS Conversion

A (relative) Mainframe Newbie's Experience

# My Background



2002

## Helpdesk

- Password Monkey™
- pOwErPoiNt
- Heavy monitors
- Floppy disks
- Introduced to Linux

2005

## Sysadmin

- SCO Unix (shudder)
- AIX (RS6000)
- Informix
- Physical Tape
- Driving a lot
- Kernel panics
- Impact printers
- Lots of Bash

2007

## Forensics

- Encase
- File systems
- Lots of Hex
- Progress bars
- Regular Expression
- Court Appearances
- Evidence Bags
- Misanthropy

2013

## The Mainframe



# Distributed Systems

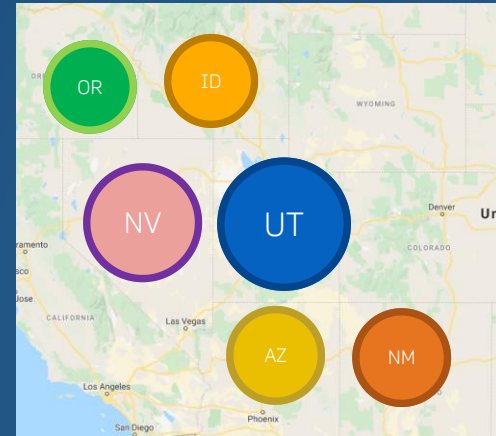
# America First Credit Union



1939 – Fort Douglas Civilian Employees Credit Union



- Not for profit, member-owned organization
- More than 1 million members
- ~\$12 billion in assets
- 131 branches (UT, NV, ID, AZ, OR, NM)







# Pre-conversion Architecture

zEC12



- Model 703 4 IFLs
- 96G of RAIM
- 4 z/VM LPARs

z/VM 6.2 (2 active member SSI cluster)

LPAR1

z/VSE 5.2

Linux (Websphere Message Broker)

Linux (Websphere Message Broker)

Linux (Websphere Message Broker)

Linux (WMB DB2 LUW)

Linux (Apache)

Linux (VSE Virtual Tape)

Linux (DB2 Federation Server)

LPAR2

Linux (ATM Application)

Linux (ATM DB2 Database)

Linux (ATM Web Services)

Linux (SMT)

Linux (DNS)

Linux (DB2 Federation Server)

Linux (Websphere Message Broker)

Linux (Websphere Message Broker)

Linux (Websphere Message Broker)

FICON

DS8870

OSA

(1Gb)

CISCO  
NEXUS

CISCO  
NEXUS

FICON

PRIZM

PRIZM

ESCON

3590 A60

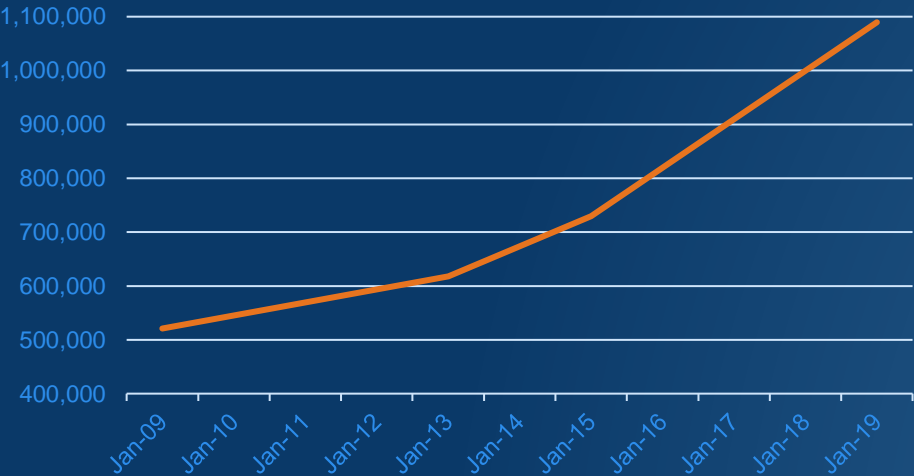
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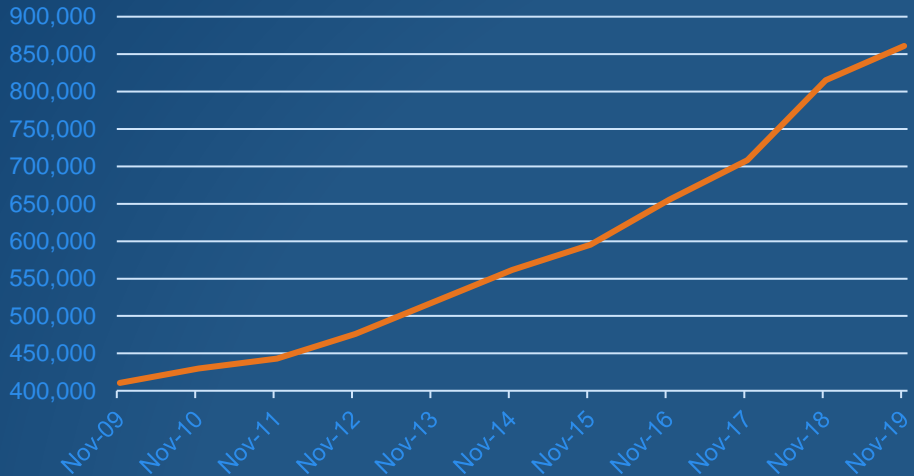
# Reasons for Reconsidering

## Organizational Growth

### Membership



### Black Friday ATM/POS Transactions





# Reasons for Reconsidering

MQ for VSE End of Life



Skills shortage



Constraints of VSE (real or perceived)



# Evaluation of Alternatives



Distributed alternative?





# Conversion



September 2015

- Kickoff meeting
  - IBM
  - Developers
  - Infrastructure Folks
  - Computer Operations Staff
  - Management/Business Representatives
  - ★ - Infrastructure Conversion Partners
  - ★ - Application Conversion Partners

The classic IBM logo, consisting of the letters 'IBM' in a bold, sans-serif font with horizontal stripes, rendered in white.

The Sirius logo, featuring a stylized blue starburst icon to the left of the word 'SIRIUS' in a bold, blue, sans-serif font.

The CONVTEK logo, featuring the word 'CONVTEK' in a bold, purple, sans-serif font with a slight 3D effect and a horizontal line above the 'V'.

Ahhhhhhhhhhhhhhhhhhhhhh!!



# The Conversion



## Application Conversion Disclaimer: IANAAD (I Am Not An Application Developer)

- Institutional understanding of application
- Mass conversion of JCL/Assembler/COBOL
- Problems along the way
- My area of responsibility: code re-supply (don't talk about SharePoint)
  - REXX EXECs
  - VMFPLCD

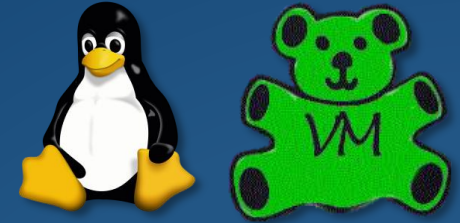
```
Last commit:  
Delivery 1 10/21/2015 by Gerard Howells  
Ready; T=0.01/0.01 09:42:39
```

# The Conversion



## z/VM and Linux

- Building a new golden image – SLES 11 or SLES 12?
- z/VM 6.3
- VM and Linux systems built from new installations (with very few exceptions)
- RACF for z/VM



```
ENTER PASSWORD (IT WILL NOT APPEAR WHEN TYPED):
```

```
Enter your password,  
or  
To change your password, enter: ccc/nnn/nnn  
where ccc = current password, and nnn = new password
```



# Conversion - Hardware

z13



- Model 603 4 IFLs/2 ICFs/1 zIIP
- 320G of RAIM
- 4 z/VM LPARs
- 4 z/OS LPARs
- 4 CF LPARs

z/OS 2.2 (2 member Parallel Sysplex)

ZOSP1/2

CICS TS 5.2

MQ V8

CommServer

RACF/Vanguard

z/VM 6.3 (2 active member SSI cluster)

ZVMP1/2

Linux (ATM Application)

Linux (ATM DB2 Database)

Linux (ATM Web Services)

Linux (SMT)

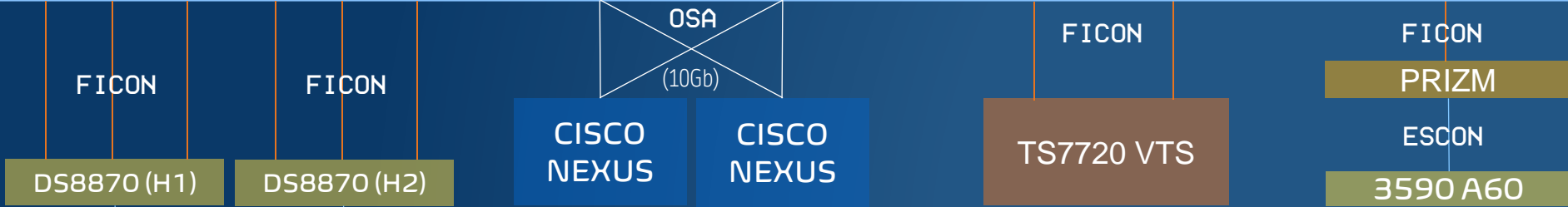
Linux (DNS)

Linux (DB2 Federation Server)

Linux (Websphere Message Broker)

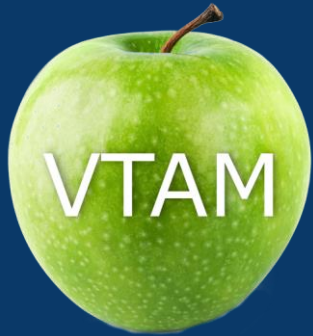
Linux (Websphere Message Broker)

Linux (Websphere Message Broker)



Metro/Global Mirror

# The Conversion - CommServer



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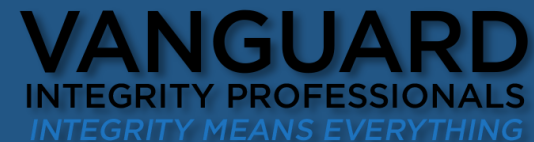




# The Conversion - RACF



- Official definition: Resource Access and Control Facility
- Alternative definition: ReAlly Confusing and hard to Figure out
- Benefits: -
  - Password complexity enforcement
  - Multifactor Authentication
  - Separation of duties
  - Vastly increased data security
- Drawbacks: -
  - Limited in-house understanding
  - Increased complexity





# The Conversion – ATMs/POS System



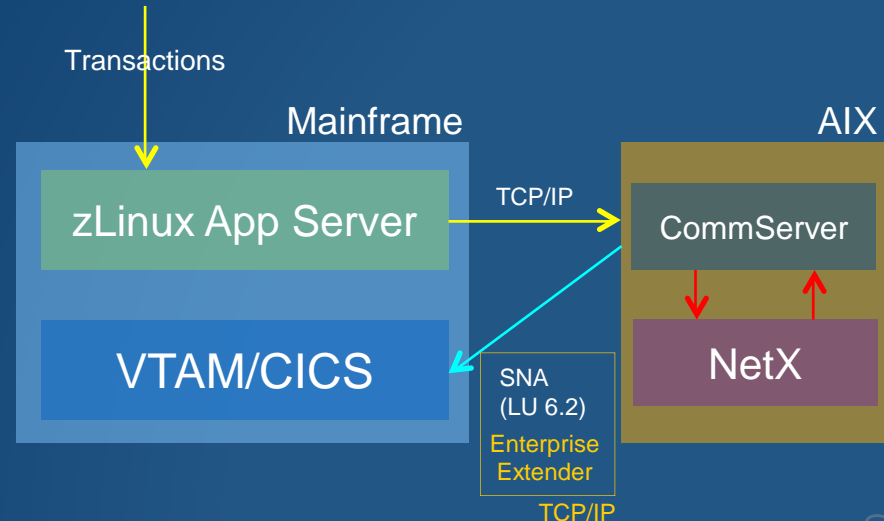
- Pre-conversion:
  - Application “sunsetted” but still actively supported
  - Used/Uses SNA to send transactions to TALON over dedicated copper OSAs
  - Protocol conversion server off-platform

- Challenges:

- Lost knowledge
- CICS definitions
- VTAM definitions

- Post-conversion:

- Enterprise extender
- Shared (fibre) OSAs



# The Conversion – Firewall Rules



- Mandated strict separation of z13 environment from rest of network
- Default DENY ALL rule in place
- ~500 conversion rules built/9,429 objects (hosts)
- Fully understood by nobody
- Arbitrary labels in the firewall for objects and services
- I examined them all
- I repeat I examined them ALL
- Test/Production cross contamination
- Very few missed rules on conversion night



# Conversion Night



09/09/2018

- Many departments involved in night-of changes
- Detailed, step-by-step action plan
- Around 12-14 hours of effort
- A few hiccups
- Credit Union woke up to what appeared to be a non-event
- And that's exactly what we wanted!



M O T H E R S H I P

SUCCESS!



CONV

# Post Conversion Findings

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- Application runs waaaaaaay more quickly and efficiently under z/OS
- (Vastly) Increased ISV choices
- Potential for security enhancement including encryption
- Linux workload increasing over time
- Application has room to grow due to available features and subsystems
- Skills shortage is still a thing
- Increased personnel need
- With complexity, come new challenges

I'll shut up now

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Questions?

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SUMMARY



**AMERICA FIRST**

CREDIT UNION

