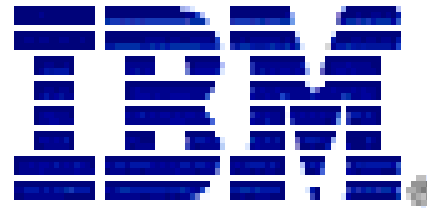


Open Source and the Mainframe in the Data Center:

Deciding to join this potential revolution of the 2000s



LINUXX**CARE**SM

Art Olbert
Linuxcare, Inc.

Agenda

- Open source
- Linux and open source servers in the data center
- Usage and issues
- Making a successful decision

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Summary: Open Source and Linux in the data center

- **Deployment of independent servers in the data center has compelling business justification**
- **Open Source portability supports choice**
- **The mainframe is a viable platform for selected open source applications / servers**
- **Success is driven more by business needs than technology**

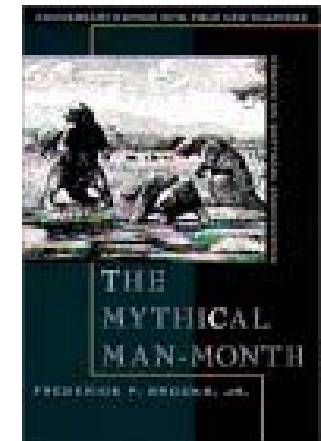
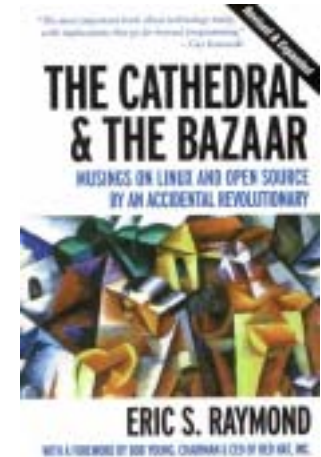


Open Source

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Suggested Reading

- The Cathedral and the Bazaar
 - Eric S. Raymond ISBN 0-596-00108-8
- “In The Beginning was the Command Line”
 - Neal Stephenson
www.cryptonomicon.com/beginning.html
- The Mythical Man-Month
 - Fred Brooks ISBN 0-201-83595-9
- OpenSource.org
 - <http://www.opensource.org/>



Open Source

The Open Source Definition – OpenSource.org

- Free Redistribution
- Source Code
- Derived Works
- Integrity of The Author's Source Code
- No Discrimination Against Persons or Groups
- No Discrimination Against Fields of Endeavor
- Distribution of License
- License Must Not be Specific to a Product
- The License Must Not Restrict Other Software

Examples

- Linux
- Samba
- Apache
- Sendmail (a version)



Open Source characteristics and values

Characteristics

- **Platform independent**
- UNIX application compatible
- Source code provided
- Open inspection of all functions
- Standards based
- Highly skilled, dedicated developers
- Multi-vendor support
- Extensible

Customer Values

- Increased customer choice and customer power
 - **True portability: hardware, operating system; applications**
 - **Increased competition**
 - **Increased heterogeneity**
 - **Platform substitution and commoditization**
- Available skills
 - **Highly skilled developers**
 - **Large skill pool of employees**
- Low- or no-cost for the function
- Trendy and hyped



Good function / Vendor Independence / Lower cost



Open Source has drawbacks

Customer definition

- Historically, the customer is the developer
- Unique understanding of requirements
- E.g. Linux servers historically have had departmental functionality

Responsiveness to end customers

- Requirements prioritization
- Fix responsiveness
- Documentation sometimes poor or nonexistent
- Service and support availability

Some standards are arcane (e.g. RFCs)

Unfamiliarity (e.g. Client GUI)

Trendy and hyped



Open Source is evolving

Service and support available

- RedHat
- SuSE (United Linux)
- IBM
- etc.

Support, participation, and investment by major vendors

- IBM
- Sun
- HP
- Dell
- etc.

New, specific customer sets targeted by OSDL

- Carrier Grade Linux
- Data Center Linux



The case for Open Source servers

The Open Source process has proven to work effectively when the intended use is well defined and understood

- E.g. distributed / infra-structure servers
- Linux, Samba, Apache, Sendmail, etc.

For distributed / infra-structure servers, open source offerings can be as good as, or better than, proprietary offerings

- Comparable or superior function
- Comparable or superior performance, reliability, serviceability
- No- or Low- cost
- **Portability**



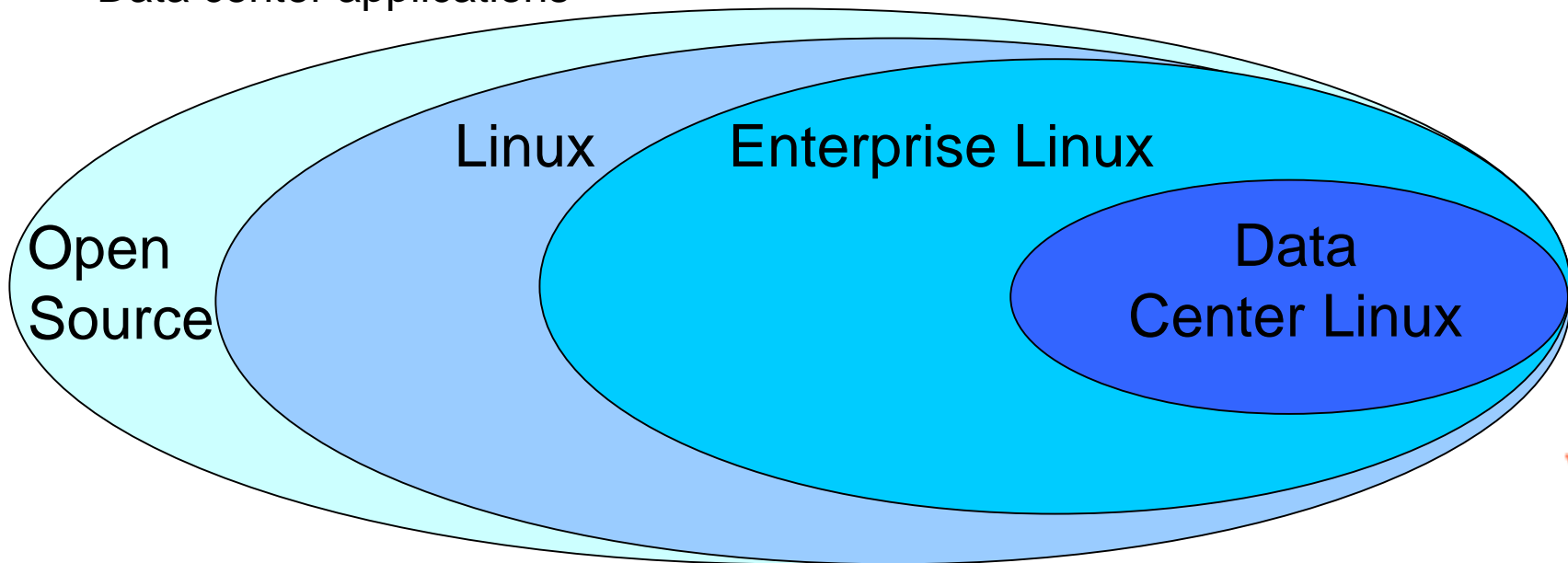
Linux and Open Source Servers in the Data Center

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Data center Linux is part of Open Source / Linux in the enterprise

Broad Range of Usage for Open Source / Linux in the Enterprise

- Devices (“gizmos”)
- OEM'd in printers, etc.
- Network appliances
- “Thin” and “Fat” clients
- Distributed / infra-structure Servers (e.g. mail, file & print, directory, web serving)
- Data center applications



Linuxcare listened to data center Linux customers and vendors

>50 enterprise accounts; various points in the organization

- Global financial institutions
- Global manufacturers
- Telecoms
- National retailers
- Major health care providers



Opportunity for Linux in the data center is real

- Customers nearly universally positive on concept
- TCO (capex & opex) and control benefits are compelling
- Benefits of web-facing systems & mission critical applications / data
- Linux infrastructure applications available; proprietary applications becoming available
- Customers can access & improve source code
- Several hundred pilot programs; fewer deployments



Customers need help moving from potential to real benefits



Data center Linux is driven by customer needs; not technology

CUSTOMER ENVIRONMENT

- Internet applications are “mission critical”
 - Business critical
 - Opex and capex increasing
 - Separate from, but connected to, mainframe back-end systems
- CIOs taking control of Internet systems
 - Reduce opex and capex
 - Increase reliability, availability, serviceability, and utilization

EXISTING TECHNOLOGY

- Linux and applications
 - Experience increasing
 - UNIX application portability
- Service and support available
- Mainframe price declining
- IBM's zVM virtualization software

IMPACT

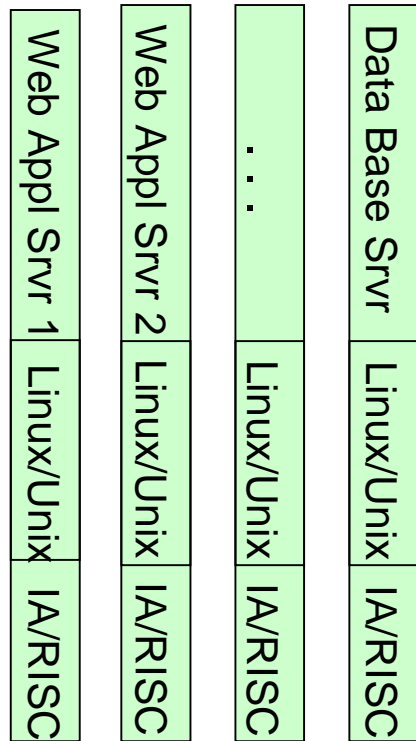
- IBM “papal blessing’ of Linux
- Fortune 1,000 executive interest
- IBM sales emphasis on Linux on zSeries



Distributed servers proliferate & interconnect

Internet applications

- *On line mortgage* -

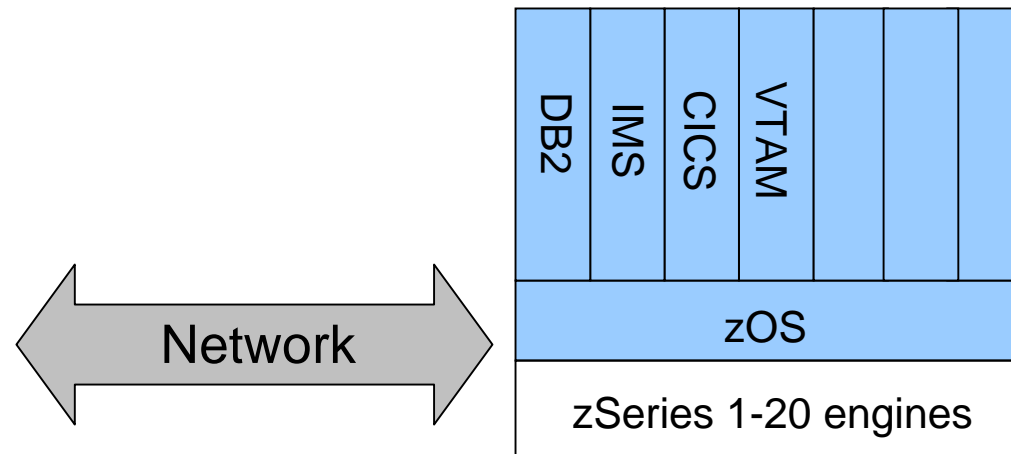


Distributed architectures (Unix, Linux, NT)

- Each application in a unique system
- One “business process” spans multiple systems

Mission critical applications and data

- *Mortgage rate generation* -



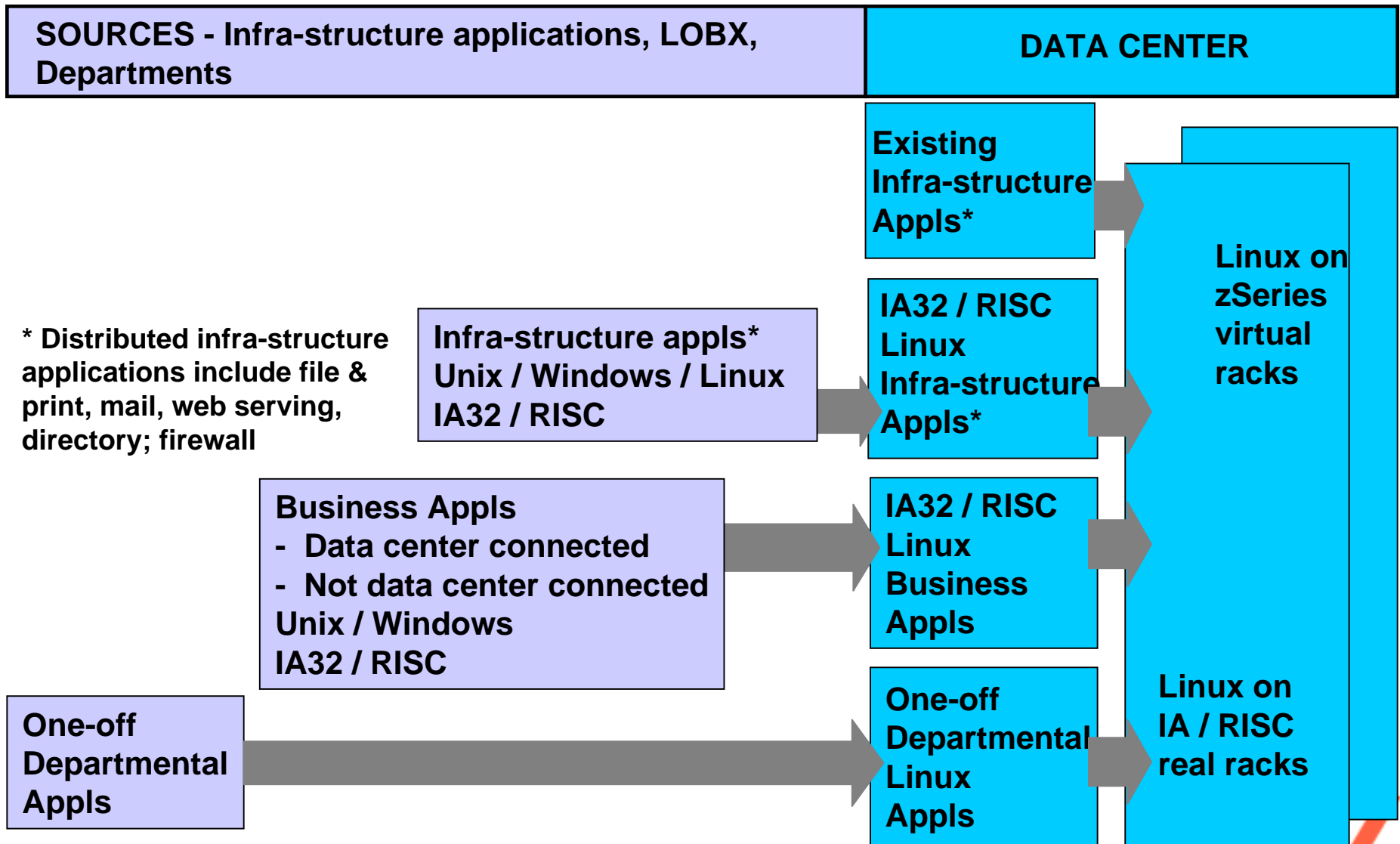
Mainframe architecture

- Multiple applications / system

“We have how many systems ?!”



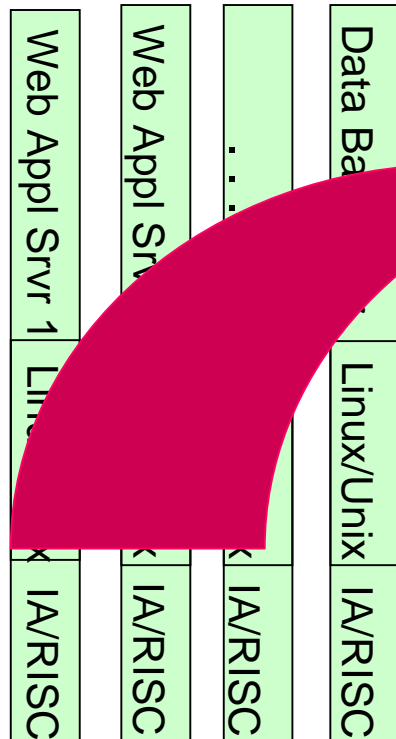
Linux server paths to the data center



Consolidated servers are moved to the data center

Internet applications

- **On line mortgage** -

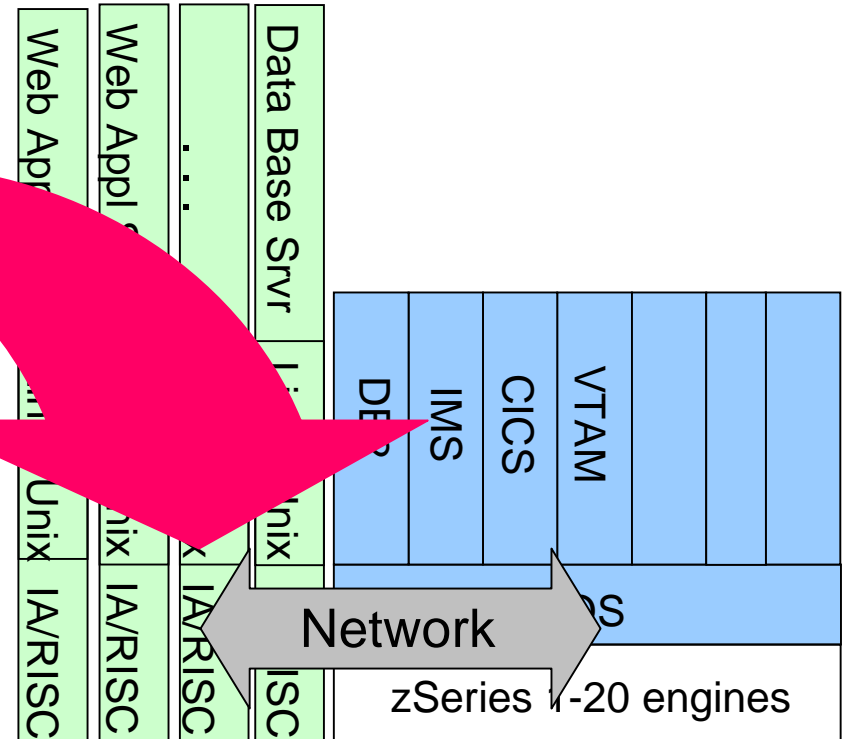


Distributed architectures (Unix, Linux, NT)

- Each application in a unique system
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Mission critical applications and data

- **Mortgage rate generation** -



Mainframe architecture

- Multiple applications / system

To achieve cost reduction and control



Usage and Issues of Data Center Deployments

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Data center deployment of multiple, independent Linux servers has unique values

Web Appl Svr 1	Web Appl Svr 2	...	Web Data Svr
Linux	Linux	Linux	Linux
Real racks or Virtual racks			

Data center “best practices” can be applied to these now mission critical web applications

TCO reduction meets reduced IT budgets

- Choose the “best” hardware platform
- **“Server consolidation”**

Disaster recovery for the end-to-end solution

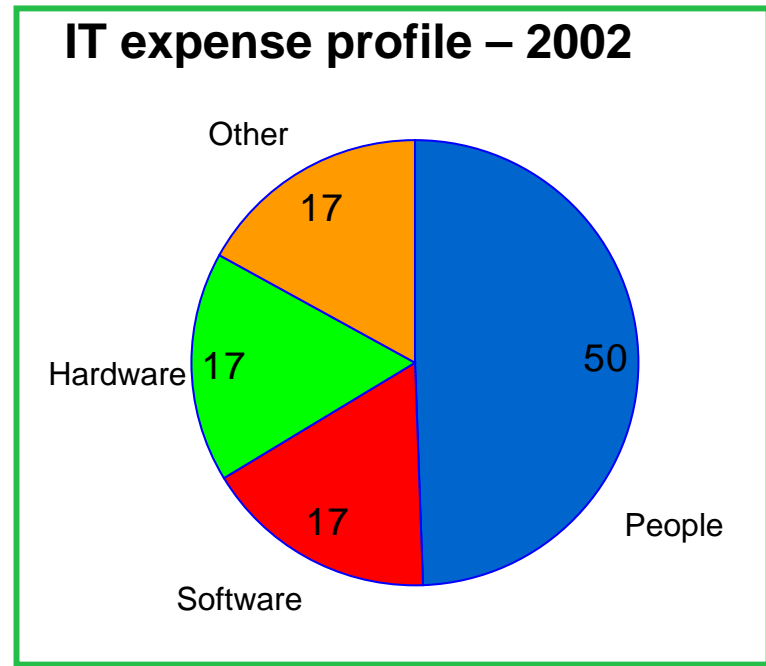
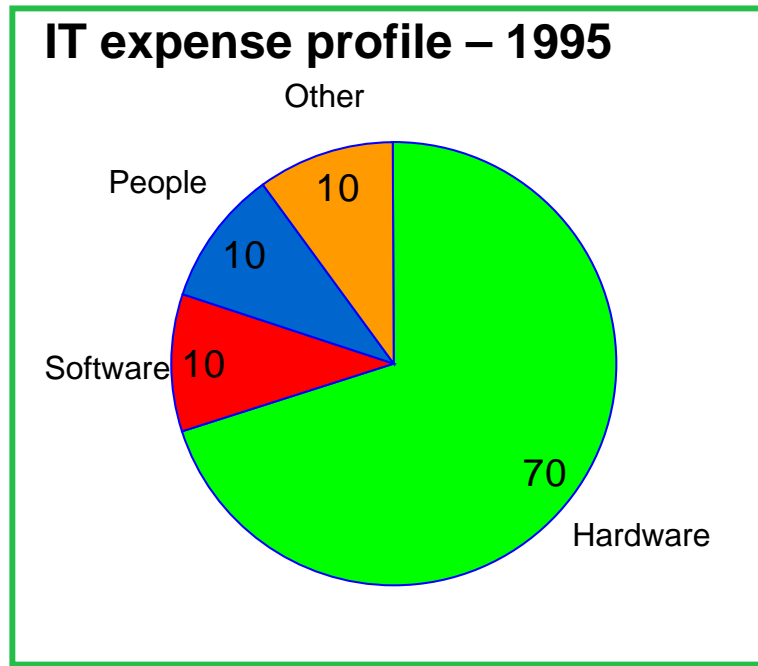
- Chain of independent systems to connect the back end systems and data to the Internet
- Reduce the number of system “links in the chain”
- System links and back-up links can be deployed on a mainframe

Auditability



Issue - People costs must be addressed

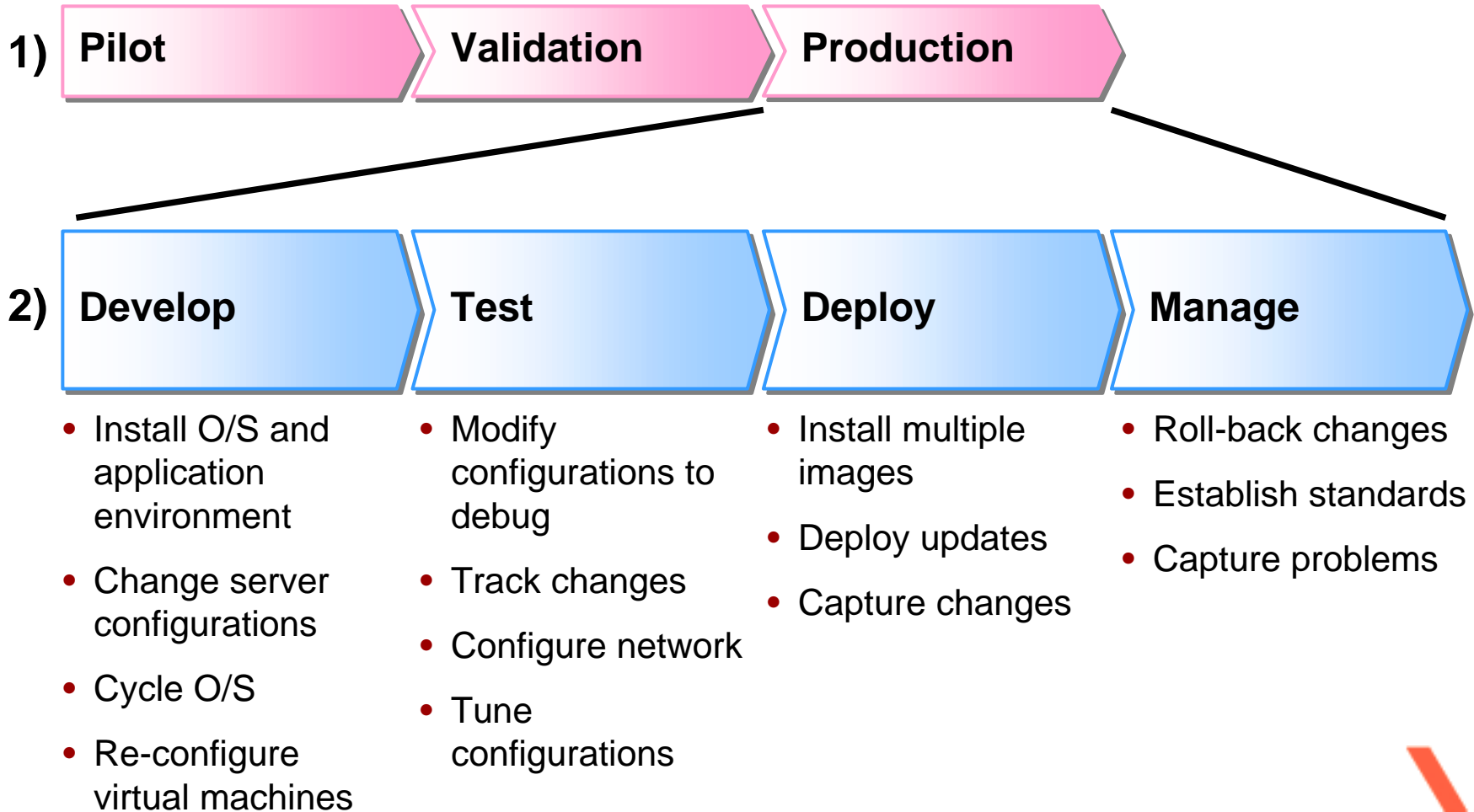
- IBM - Marlin Maddy



Major data center IT initiatives must address people cost

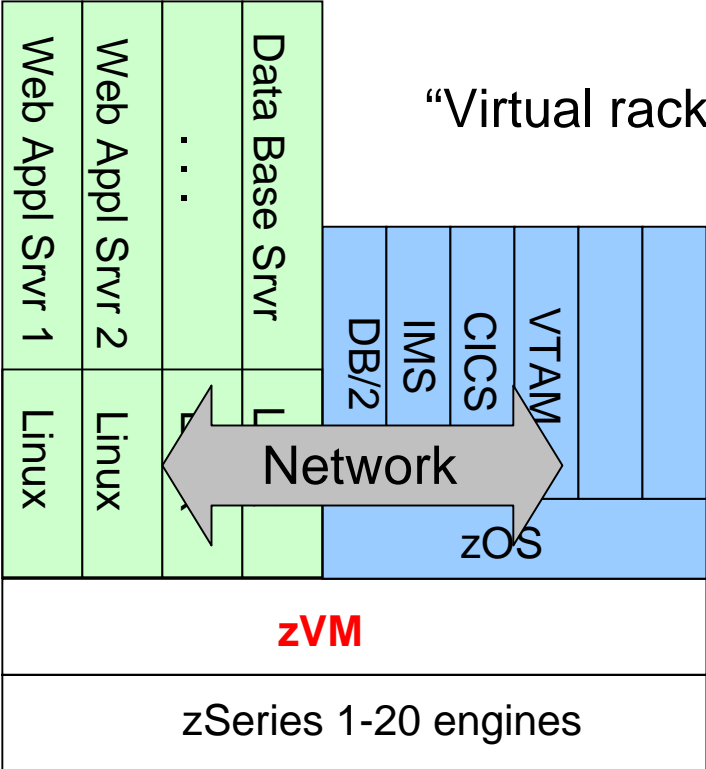


Issue - All phases of the solution lifecycle must be addressed



Issue - z/VM's “virtual racks” have unique values

Real racks of independent Unix / Linux machines
 - become -
 “Virtual racks” of independent Linux virtual machines



Comparative value

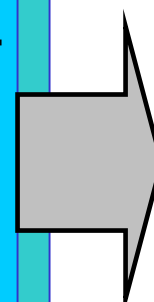
- ~100% utilization
- 99.999% availability
- Hundreds of virtual machines
- Hipersockets networking
- Rapid creation of new virtual machines
- Software priced per engine or capacity
- Less floor space, power, cooling
- Staff efficiency

Linux on zSeries can minimize CAPEX and OPEX



Issue - OPEX savings of z/VM “virtual racks” are real . . . but incomplete

OPEX savings opportunities from server consolidation	Actual savings using Linux on z/VM
HARDWARE LAYER	
Increased capacity utilization	yes
Reduced environmental expenses (power, r. estate, etc.)	yes
Reduced downtime	yes
SOFTWARE LAYER	
Simplified data Backup	yes
Simplified config management	No
Simplified rollback	No
Simplified upgrades	No
Simplified change control	No
	+ VM skills required
	+ Linux skills required
	+ Coordination overhead between Linux and mainframe teams



Many cumbersome tasks do not disappear with server consolidation — they shift to the data center staff



Issues – Open Source portability enables platform selection

Price / performance is a complex criterion:

- Mainframe data processing advantages
- RISC / IA32 compute processing advantages

Application Price / Performance Spectrum

Data intensive

- zSeries

- File and print
- Static web serving
- Mail
- I/O bound data base

Mixed data / compute

- Depends

- Complex data base
- Dynamic web serving

Compute intensive

- RISC / IA32

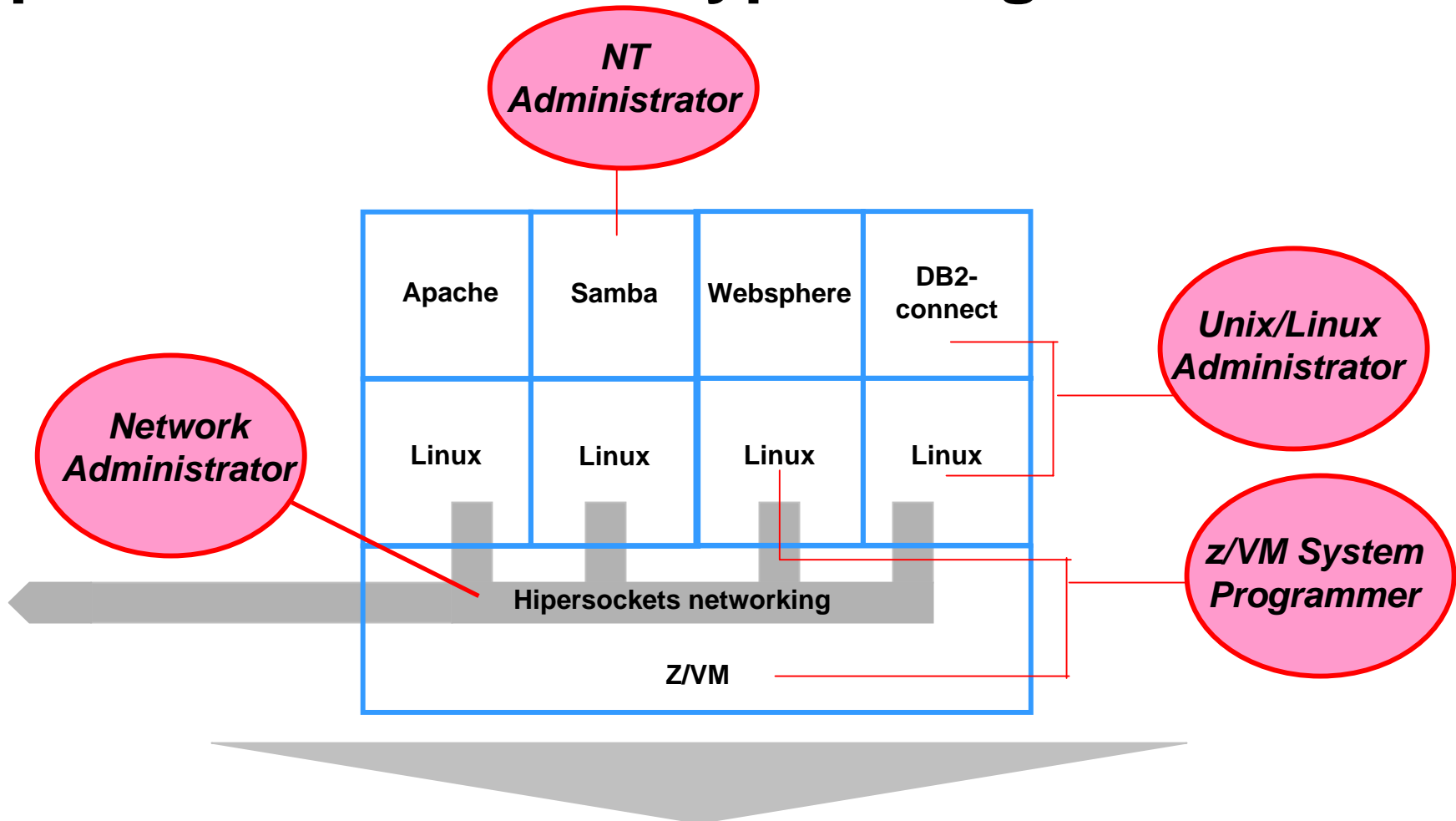
- Image rendering
- Financial analytics
- High Java execution

Business drivers are also key criteria:

- Best practices RAS
- TCO analysis
- Software price
- Auditability
- Disaster recovery
- Tools
- Skills



Issue - Linux on z/VM touches the major platform teams in a typical organization



Cross team collaboration is required



Making the Decision



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Open Source and Linux in the data center

- **Deployment of independent servers in the data center has compelling business justification (e.g. “departmental,” infra-structure, general purpose)**
- **Open Source portability supports choice:**
 - Real racks of IA32 / RISC servers
 - Virtual racks of z/VM servers on zSeries
 - UNIX and Windows application portability / substitution
- **The mainframe is a viable platform for selected open source applications / servers**
- **Success is driven more by business needs than technology**
 - Few, key decisions required - Application selection
 - Critical success criteria are also social and political
 - Application ownership
 - Cross team collaboration
 - “Managed self-service”
 - Customer experiences exist
 - Vendor support available



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