



# Linux and Open Source – The View From IBM

## SHARE 102 - Session 9200



Jim Elliott, Advocate  
IBM Corporate Linux  
IBM Canada Ltd.



SHARE 102 - Session 9200

2004-02-23

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## 9200 Linux and Open Source: The View From IBM

- **Where is IBM going with their Linux strategy? IBM believes Linux to be game changing technology. Jim Elliott, IBM's Linux Advocate, provides an overview of IBM's Linux strategy. Jim will cover:**
  - Linux Overview, Value and Marketplace: A brief overview of Linux and Open Source and the value to customers
  - Linux Usage: How Linux is being used by today and our view of the future
  - Linux: Fact or Fiction: Setting right the facts about Linux and what it is capable of today
  - IBM and Linux: How IBM is using Linux and IBM hardware, software and services for Linux
  - Linux on zSeries: Overview, status update, and zSeries Virtualization



# Linux Overview



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## What is Linux?

- **UNIX-like operating system**
  - Supported by a global community
  - Unprecedented flexibility
- **Why Linux?**
  - Single operating system; desktop to mainframe
  - Attracting the best technical talent
  - Basis for innovation
- **Packaged and shipped by distributors**
  - World-wide distributors such as Red Hat, SUSE
  - Regional distributors such as Connectiva, ESware, Mandrake, Red Flag, Turbolinux, ...

**“Hello everybody... I’m doing a (free) operating system (just a hobby, won’t be big and professional...)”**


Linus Torvalds, creator of Linux, from the first Internet announcement on August 25, 1991



Linux @ IBM



## Open Source Software (OSS)

[www.opensource.org](http://www.opensource.org)



- **The basic idea behind open source is very simple:**
  - When programmers can read, redistribute, and modify the source code for a piece of software, the software evolves
  - People improve it, people adapt it, people fix bugs
  - And this can happen at a speed that, if one is used to the slow pace of conventional software development, seems astonishing
  
- **What is Open Source?**
  - Community develops, debugs, maintains
  - “Survival of the fittest” – peer review
  - Generally high quality, high performance software
  - Superior security – on par with other UNIX, superior to Windows

5SHARE 102 - Session 92002004-02-23



## Why does IBM consider OSS important?

- **Customers are asking for it**
  - OSS is a good approach to developing open standards
  - Popular OSS projects can become open standards
- **Wide distribution and use can create a de-facto industry standards**
  - OSS can be a source of innovation
  - Innovation can happen anywhere, at any time
- **Developing through an “open community” can lead to broad ideas and creativity**
- **Decision to use OSS is just another business decision**



Linux @ IBM

# Linux is an industry-wide initiative

[www.osdl.org](http://www.osdl.org)

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7 | SHARE 102 - Session 9200 2004-02-23 Linux 

## OSS/Linux strengths support key customer needs

### ▪ Business needs

- Address current budget challenges
- Enhance security and privacy
- Improve collaboration of people and organizations
- Shorten cycle time of business and IT projects
- Prepare to address uncertain future needs
- Manage costs and reduce risks over time

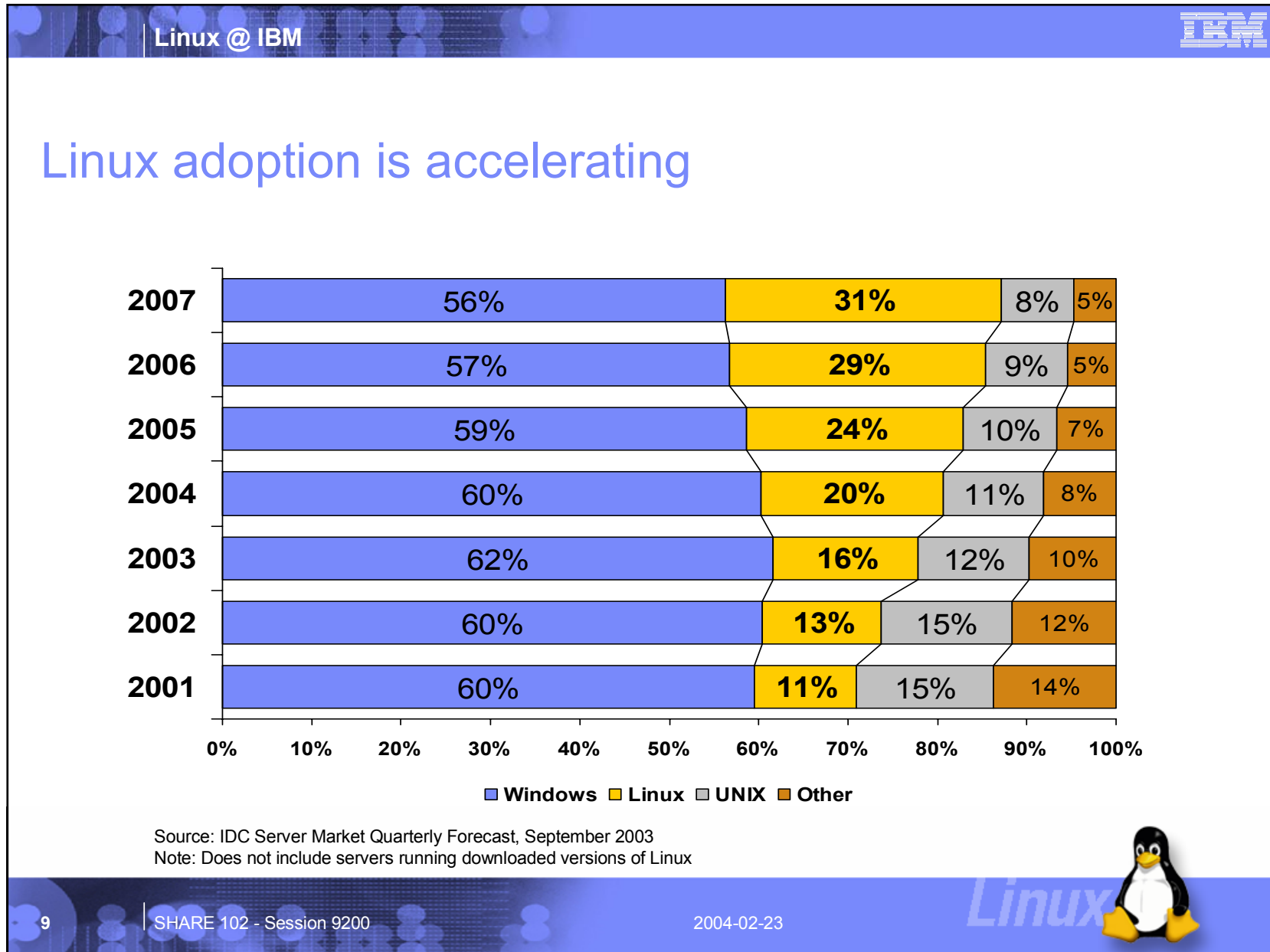
### ▪ OSS/Linux strengths

- Low acquisition and lifecycle costs
- Open source permits independent validation
- Open standards enable interoperation
- Application availability and scalability
- OSS model relies on user energy to direct evolution
- Platform stability and lack of “software monoculture”

Vendor and platform independence








## Indemnification?

- **SUSE and Red Hat provide indemnification**
  - SUSE: <http://www.novell.com/licensing/indemnity/>
  - Red Hat: <http://www.redhat.com/software/rhel/assurance/>
- **IBM, Intel, and others have contributed to the OSDL Linux Legal Defense Fund to protect end-users**
  - [http://www.osdl.org/about\\_osdl/legal/lldf/](http://www.osdl.org/about_osdl/legal/lldf/)
- **Discussion and analysis of the “legal” issues around Linux**
  - <http://www.groklaw.net>


“Since day one, the IBM strategy in the SCO lawsuit has been to defend against SCO's unfounded claims vigorously in court. Our belief is that the best way to deal with the SCO campaign is where it can truly be resolved – in court.”

Bob Samson – Vice President System Sales IBM





# Linux Usage



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The slide features a blue header and footer with a pattern of glowing blue circles. The main content area is white. The IBM logo is in the top right. The title 'Linux Usage' is centered. A large, faint, light-blue Tux penguin is in the background. A smaller, 3D-rendered Tux penguin is in the bottom right. The footer contains session information, date, and copyright.

## Linux client



- **Office solutions**

- OpenOffice/StarOffice; Ximian; Xandros; KOffice; ...



- **Kiosk/Point of Sale**

- **Graphics workstations**

- Special effects




- **Embedded systems**

- It's about build up vs. slim down

- Only what you need
- Less to go wrong!



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# Linux servers

### Workload Consolidation

### Linux Clusters/Blades

### Industry Applications

### Infrastructure Solutions

13 | SHARE 102 - Session 9200 2004-02-23  



# Linux: Fact or Fiction?



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## Fact or fiction: Some myths about Linux

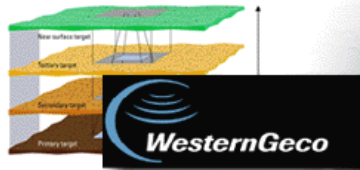
- **Linux does not scale**
- **Linux is not ready for the enterprise**
- **Linux skills are scarce**
- **Linux porting is difficult**
- **Linux lacks business applications**
- **Linux is not secure**



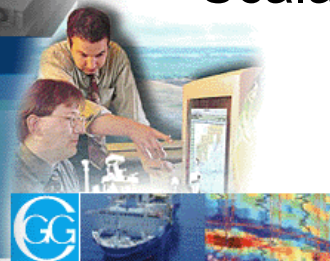
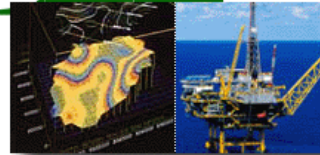
# Fact: Linux sets records in horizontal scalability, rapidly improving SMP ratios



## Supercomputing MHPCC<sup>®</sup> MALI HIGH PERFORMANCE COMPUTING CENTER



## Improving SMP Scalability



## Seismic Processing





# Fact: Linux is rock solid in many mission-critical applications

## Retail / POS



## Electronic Commerce



## Internet Service Applications



## Research



## Fact: Linux skills are readily available

- **If your programmers know UNIX, they know Linux**
- **Linux is very popular in higher education**
- **Linux certification programs are available**
  - Novell
    - Linux Professional Institute
  - Red Hat
- **Linux education is widely available**
  - IBM Technical Training Services
- **IBM Linux Centres**
- **Many users groups provide Linux support**



## Fact: Porting to Linux is easy

- **"Several large projects of moving UNIX-based applications from 100 kloc to 600 kloc have been completed. Most were completed in about 2 months and only required a small percentage (1% or so) of the code to be modified in any way."**
  - SoundView Technology Group, "Linux Momentum in Europe Appears to be Strong", June 2002
- **"Migrating UNIX web servers to Linux is one of the easiest migration scenarios in the industry."**
  - D.H. Brown, "Migrating Mail and Web Servers to Linux", August 2002
- **Porting tools available at [ibm.com/developerWorks](http://ibm.com/developerWorks)**



# Fact: ISVs adopting Linux



## Fact: Linux is architected for security, Open Source development enhances it

- **The Open Source development process**

- Darwinian – structured/disciplined
- Exposed vs. hidden

- **The US National Security Agency**

- [www.nsa.gov/selinux](http://www.nsa.gov/selinux)



- **Linux security web site**

- [www.linuxsecurity.com](http://www.linuxsecurity.com)



- **Common criteria certification**

- SUSE Linux Enterprise Server 8 certified at EAL3
- Red Hat Enterprise Linux 3 undergoing evaluation at EAL2

"Security through obscurity is the motto of yesterday, the slogan of today is security through transparency."

Margareta Wold



# Why IBM for Linux?



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# Linux and IBM

Worldwide Competence Centers

Worldwide Porting Centers

Linux Technology Center

Linux Sales Specialists

Linux Whitepapers and Redbooks

Linux Integration Center

Open Source Development Lab

Products

Linux Enabled Business Partners

Linux Services

[ibm.com/linux](http://ibm.com/linux)

23 | SHARE 102 - Session 9200 | 2004-02-23

Linux

## Linux Technology Center

[ibm.com/linux/ltc](http://ibm.com/linux/ltc)

- **IBM well accepted by the Linux community**
  - 600+ developers world-wide
  - 90+ active Open Source projects
  - 80% of IBM's contributions are accepted
- **IBM engineers leading enterprise Linux focus**
  - Deeply involved in Linux kernel development
    - Linux on POWER, S/390 and z/Architecture
  - Motivated community to focus on addressing scalability and threading issues
  - Defect support for a set of core Linux packages
  - Key participant and contributor to the OSDL





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# IBM Linux portal

[ibm.com/linux](http://ibm.com/linux)

IBM

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→ Select a country

## Linux at IBM

Business and Linux in an On Demand World

### Linux on POWER

Look out Batman and Robin!  
Here comes the dynamic duo of Linux and IBM's POWER chip

Learn more

Ask the experts  
→ Get expert advice on Linux solutions

IBM wins big at LinuxWorld  
IBM won four awards at LinuxWorld today, including Best of Show. Photos inside  
→ Take an IBM look at the floor

Linux magazine review  
Linux Magazine has reviewed the IBM pSeries 615. "The pSeries 615 is not the first IBM POWER architecture series"


A conversation with  
Matthew Szulik and Red Hat Look Forward  
Red Hat CEO Matthew Szulik on IBM, Red Hat and the global Linux marketplace.

Industry watch  
ThinLinux clients and smartcards at LVM (PDF)  
LVM provides its employees and its partner agencies with access to sensitive customer

Developer's log  
The art of writing Linux utilities  
Peter Seebach discusses how new tools are developed and how to make a one-off program

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25 | SHARE 102 - Session 9200 | 2004-02-23

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## Linux

**Top story**

Updated 20 Jan 2004

### Advanced UI design for GNOME

Learn how easy it can be to build an advanced GTK-based user interface for Linux or UNIX -- or even Windows -- using a modified version of the SLIK source code. [More >](#)

**Linux on Mac: a POWER programmer's primer:** Why Linux on a Macintosh? Performance, a broad selection of file systems, UI consistency across heterogeneous environments, and low cost top the list. (Articles)

**The art of writing Linux utilities:** For tasks you do over and over, you might want to write your own utility. Developer Peter Seebach illustrates the five commandments for successful utilities. (Articles)

**Secure programmer: Keep an eye on inputs:** Do you know where all your inputs come from, or what they can do to you? What you don't know about even seemingly benign input can hurt you. (Articles)

**Putting Linux reliability to the test:** How enterprise-ready is Linux? Very, says the IBM Linux Technology Center. The kernel and other core components provide a robust, enterprise-level environment for long periods. (Articles)

**My developerWorks**

Welcome guest

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**Spotlight**

- EclipseCon 2004
- Tunneling Database Traffic with openSSH and Linux

**Editor's picks**

- Developing a Web service on Linux
- Installing DB2 for Linux on POWER


**News**


- Kernel 2.7: Back to the future of Linux (eWeek)
- Red Hat to accelerate desktop Linux (Techworld.com)

26

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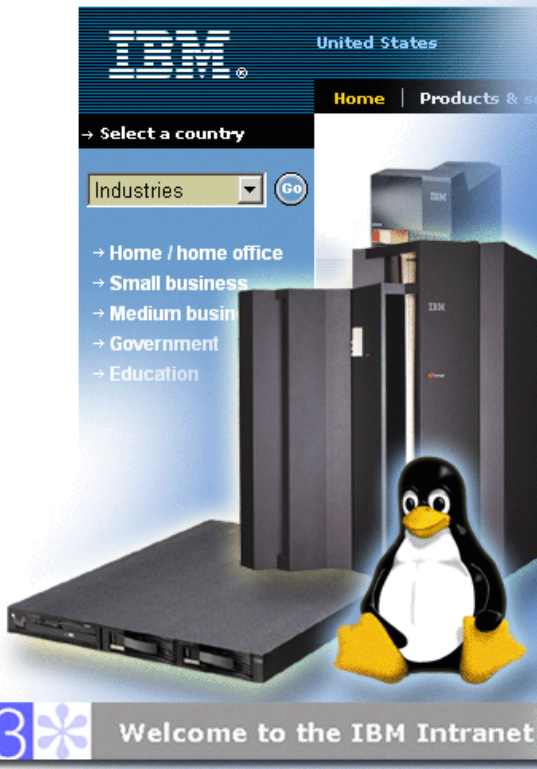
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## IBM uses Linux extensively

- **2100+ production servers world-wide**
  - excludes Research and Development!
- **A partial list of our internal Linux projects:**
  - Microelectronics EDGE Application
  - Intranet forums
  - IBM's On Demand Workplace development
  - Security assessments
  - e-mail anti-virus scanners
  - Operations: e-hosting and network management
  - IBM Standard Software Installer (ISSI)
  - Manufacturing line Kiosks
  - Microelectronics 300mm wafer manufacturing



The screenshot shows the IBM website interface. At the top, it says 'United States' and 'Home | Products & s'. Below that is a 'Select a country' dropdown menu. A 'Go' button is next to the 'Industries' dropdown. The navigation menu includes: Home / home office, Small business, Medium busin, Government, and Education. Below the menu is a large image of IBM server hardware with a Tux penguin mascot in front of it. At the bottom of the screenshot, it says 'w3 Welcome to the IBM Intranet'.

27SHARE 102 - Session 92002004-02-23 Linux

## IBM Hardware, Software, and Services

### ■ Hardware

- All IBM eServer platforms
- POS/Kiosk solutions
- IBM TotalStorage solutions

### ■ Software

- Over 200 software products available

### ■ Services

- Total solution approach
- Single point of contact
- Defect and usage support for Linux



## IBM alliances with Linux distribution partners

- **Red Hat**

- Red Hat Enterprise Linux 3  
*[www.redhat.com/software/rhel](http://www.redhat.com/software/rhel)*



- **SUSE**

- SUSE Linux Enterprise Server 8  
*[www.suse.com/us/business/products/server/sles](http://www.suse.com/us/business/products/server/sles)*



- **Cross-platform support of the IBM eServer family for either Red Hat or SUSE**
- **Customers can obtain remote technical support from IBM for Red Hat or SUSE**



# Linux on zSeries



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## What is Linux on zSeries?

- **A native zSeries operating environment**
  - Pure Linux, an ASCII environment
    - Exploits IBM zSeries hardware
    - Linux for S/390 - 32-bit
    - Linux for zSeries - 64-bit
  - Not a unique version of Linux
- **zSeries application sourcing strategy**
  - The IBM commitment to z/OS is not affected by this Linux strategy
  - zSeries customers are offered additional opportunities to leverage their investments through Linux
  - New doors are opening for zSeries customers to bring Linux-centric workloads to the platform



Dr. Karl-Heinz Strassemeyer

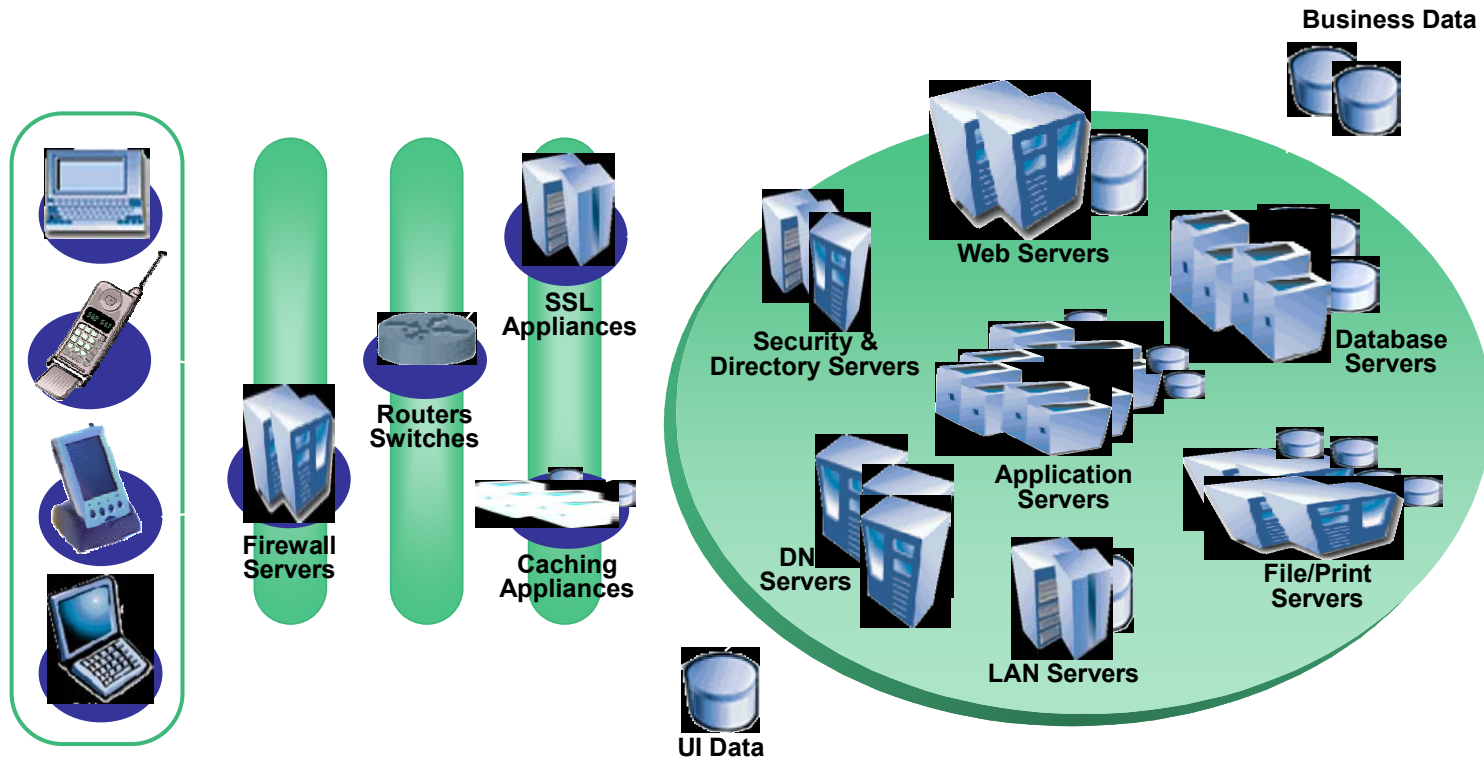
## Why Linux on zSeries?

- 1. Increased solutions through Linux application portfolio**
- 2. Large number of highly skilled programmers familiar with Linux**
- 3. Integrated business solutions**
  - Data richness from zSeries
  - Wide range of Linux applications
- 4. Industrial strength environment**
  - Flexibility and openness of Linux
  - Qualities of service of zSeries
- 5. Unique ability to easily consolidate large number of servers**





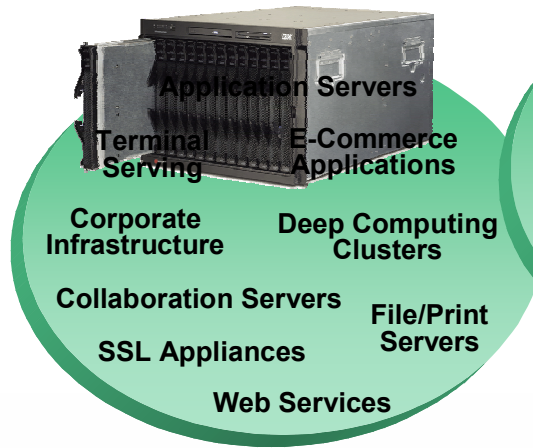
# Today's Environment



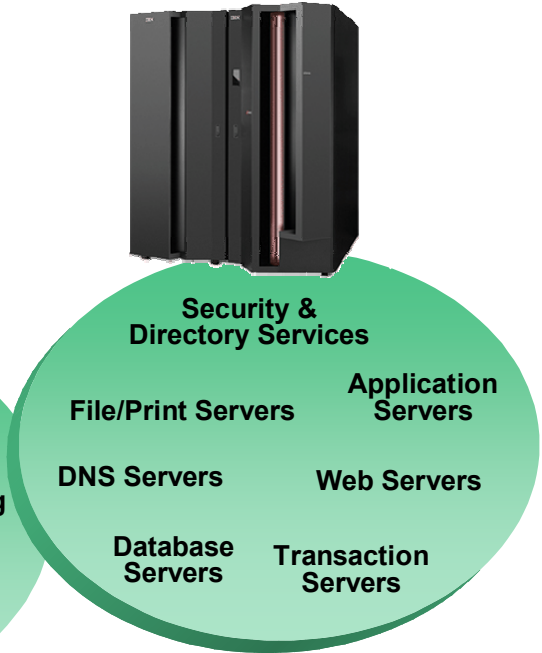
# Infrastructure Simplification



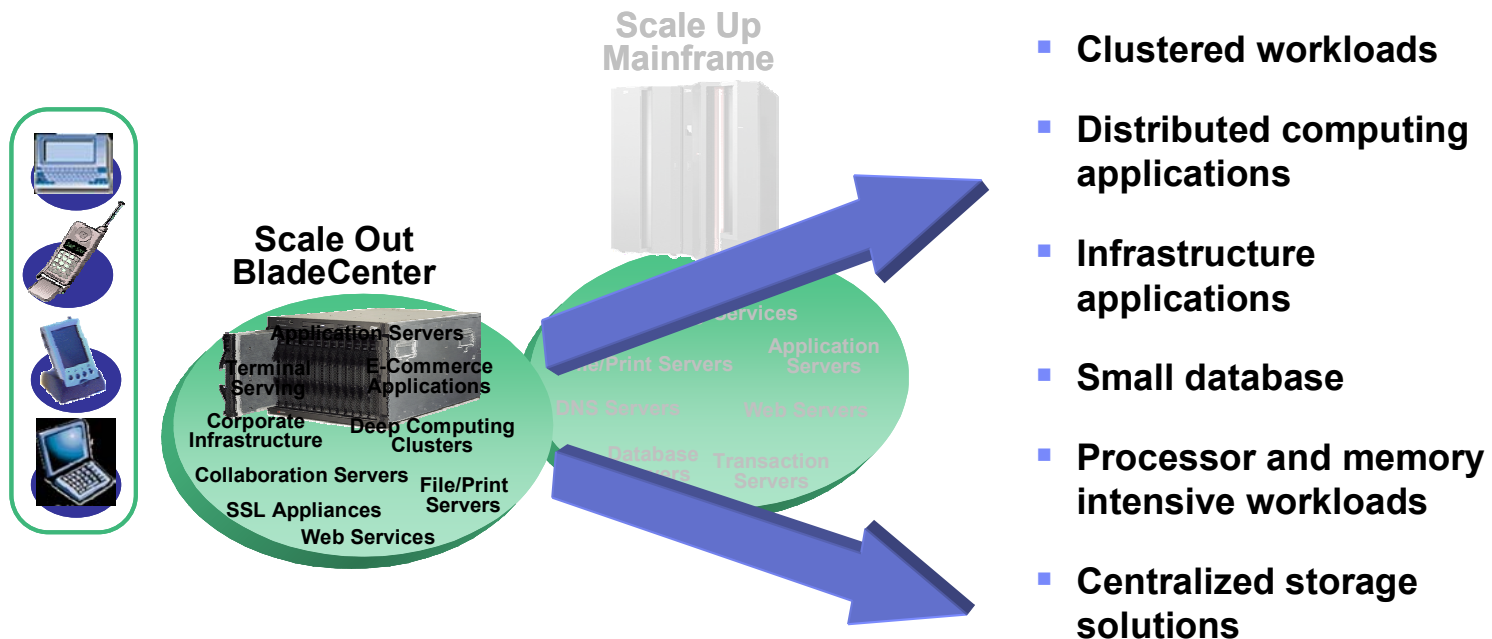
## Scale Out BladeCenter



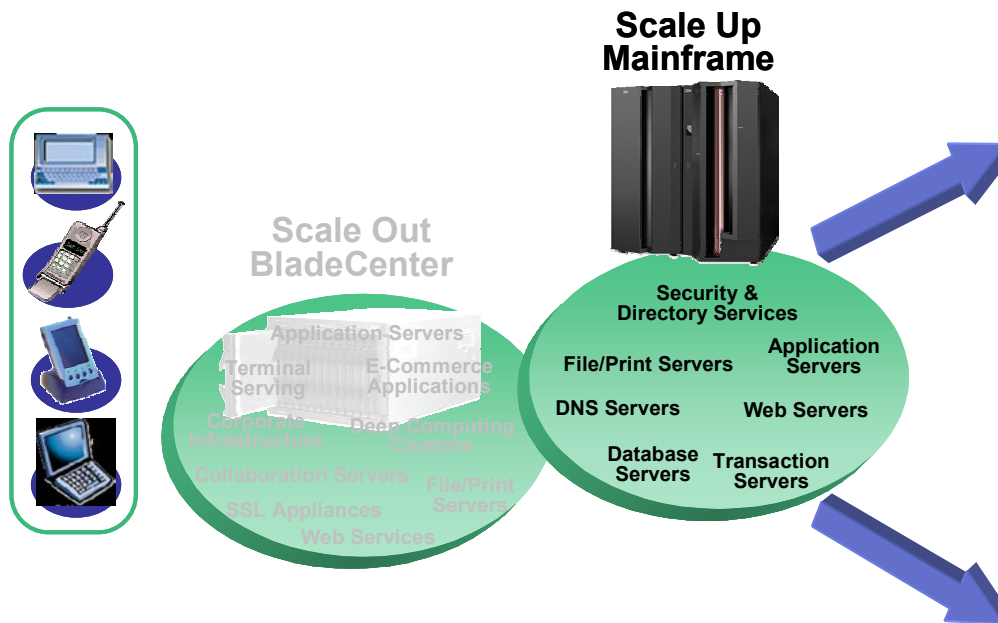
## Scale Up Mainframe



## Ideal BladeCenter Implementations



## Ideal Mainframe Implementations



- High performance transaction processing
- I/O Intensive workloads
- Large database serving
- High resiliency and security
- Unpredictable and highly variable workload spikes
- Low utilization infrastructure applications
- Rapid provisioning and re-provisioning

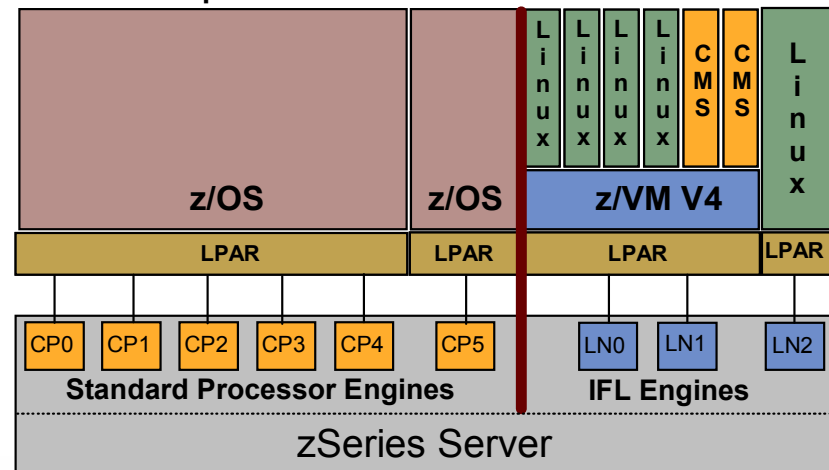


## Operating environments for Linux on zSeries

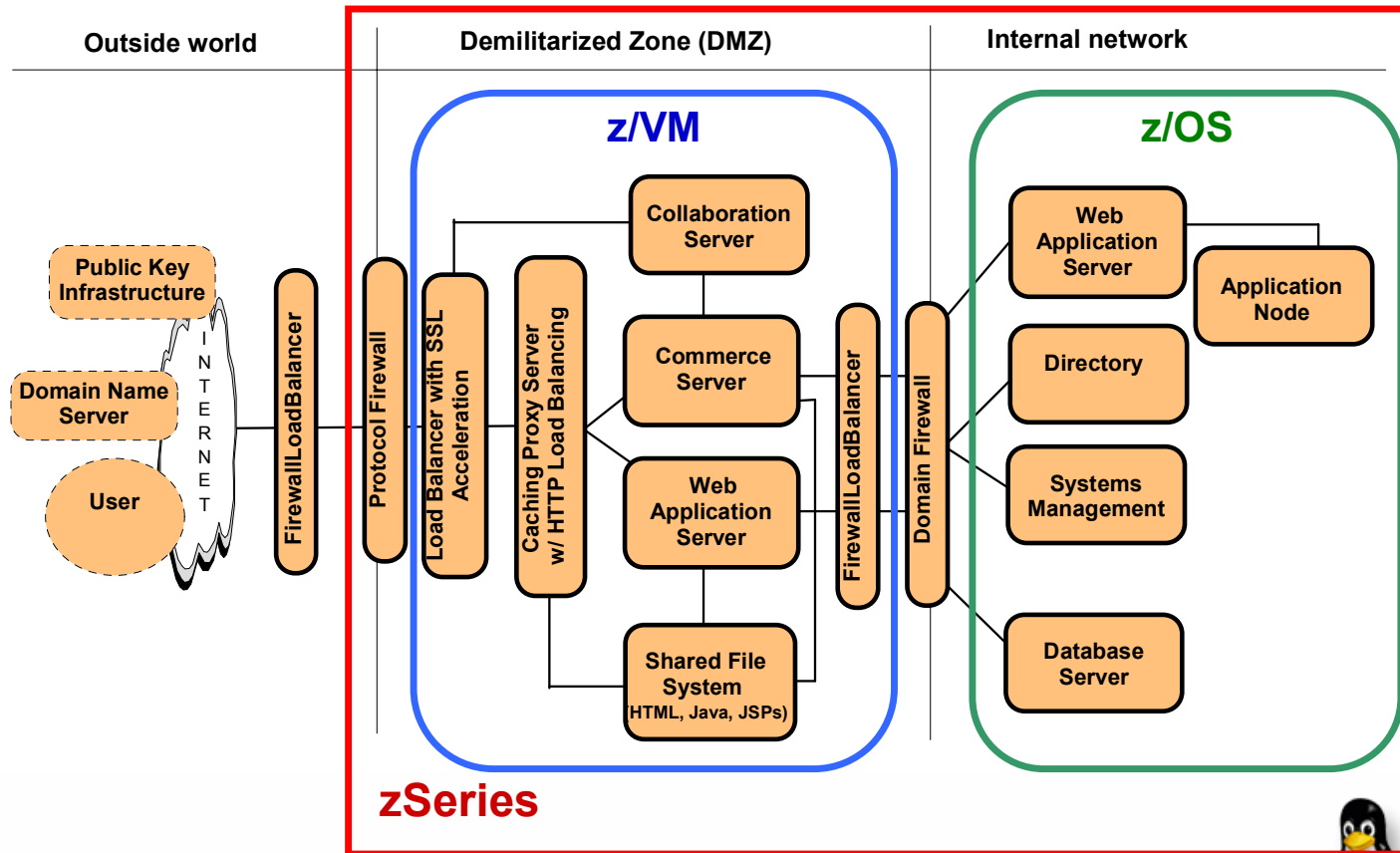
- **Basic mode**
  - An entire processor complex devoted to Linux
    - Not practical in most cases, not available on z990
- **Logical Partitions (LPAR)**
  - Hardware partitioning enabling up to 30 “logical partitions” each of which runs a separate operating system – traditional operating systems and Linux
- **Virtual Partitions (z/VM)**
  - zSeries virtualization technology
  - Support for large numbers of Linux images with rich system management capabilities
  - Very flexible, great for server consolidation
  - Best RAS characteristics

## zSeries Integrated Facility for Linux

- **Additional engines dedicated to Linux workloads**
  - Supports z/VM V4, Linux for S/390 and Linux for zSeries
  - Available on 9672 G5/G6, Multiprise 3000 and zSeries
  - IFLs on "sub-uni" systems run at full speed!
- **Traditional zSeries software charges unaffected**
  - IBM zSeries and S/390 software
  - Independent Software Vendor products
- **Linux and z/VM charged only against the IFLs**



# Application serving with Linux on zSeries





# Summary



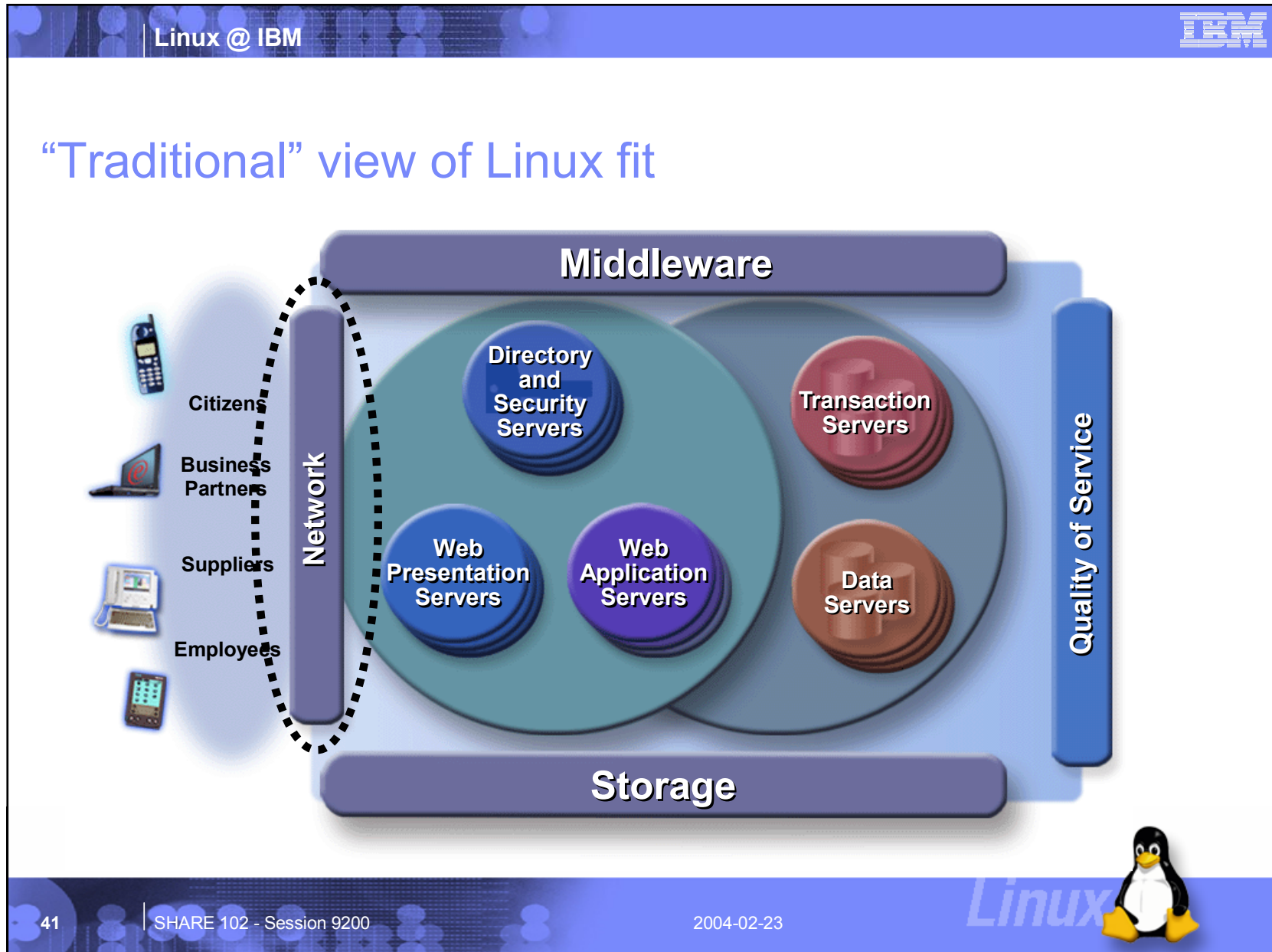
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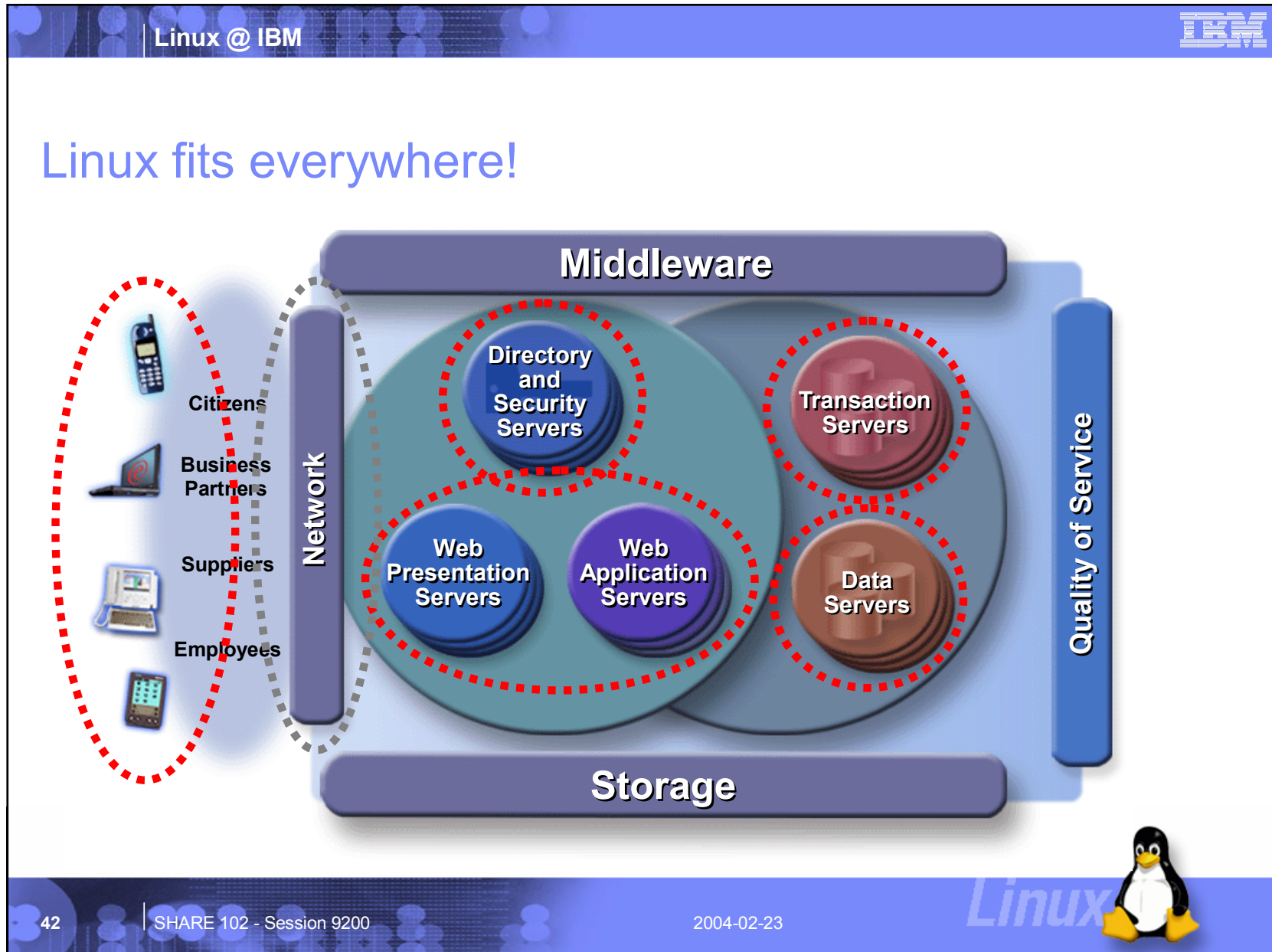
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Linux







## Recommendations

**Jim Elliott, Advocate**  
**IBM Corporate Linux**  
**IBM Canada Ltd.**  
[jim\\_elliott@ca.ibm.com](mailto:jim_elliott@ca.ibm.com)

- **Familiarize yourself with Linux**
- **View Linux as a valid alternative for IT systems**
- **Incorporate open source software development into IT strategies**
- **Look at Linux to see how it can:**
  - Lower costs
  - Increase reliability and security
  - Improve service



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