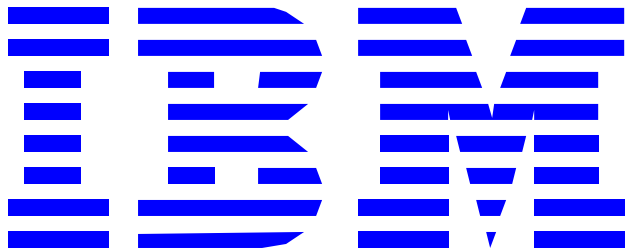




# Linux

(och IBM och Stordatorer)



Jan Strage  
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e-business

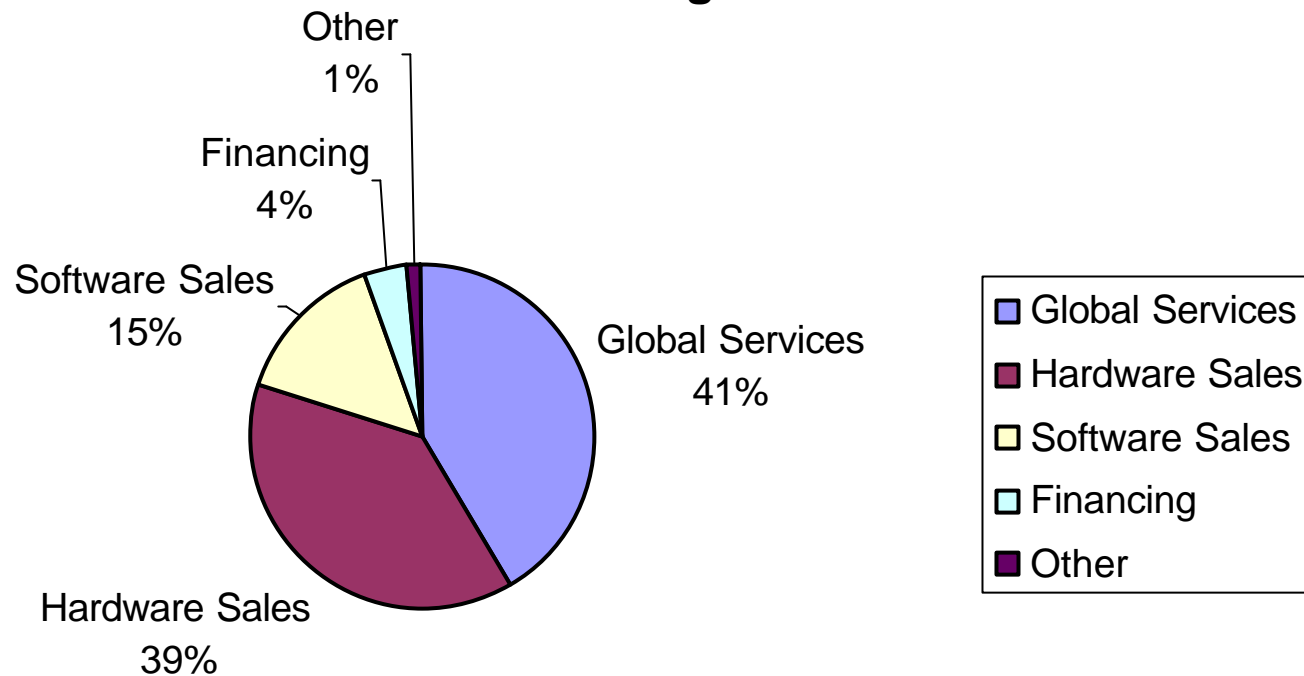


WWW.



IBM

## IBM 2001 - Omsättning ca 86 \$B WW



Verksamhet inom de flesta områden inom IT-industrin

- **Teknologi- och konsult-företag**
- **Omfattande forsknings- och utvecklingsverksamhet**
  - ✓ 3411 US-patent under 2001 (närmaste företag 1961), bäst 9:e året i rad
  - ✓ 5 Nobelpristagare
- **ca 300 000 anställda**
- **Sverige ca 1% av totalen ( ~2600 anställda, ~10 Miljarder i oms.)**



e-business

# Varför är Linux annorlunda...?

## Open Source

Utvecklad på Internet av  
hundratals personer

Många leverantörer

Litet & Modulärt

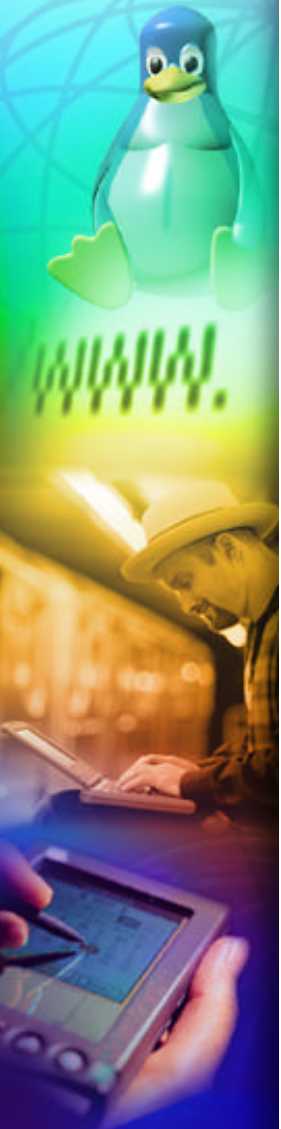
**Linux**  
egenskaper

Standards-  
Baserad

Ägs av alla (och  
ingen)

Lågt pris

Många-plattformar



IBM

# Användning av 'Open Source'-programvara



- Särskilt stark trend inom offentliga sektorn:
- Frankrike, Tyskland, Brasilien, Kina, Argentina etc
- Lag i t.ex. Brasilien: "Använd Open Source om det går...."
  - eEurope – An Information Society for all strategy, which center on plan that "during 2001 the European Commission and Member States will promote the use of open source software in the public sector and e-government"
- Linux, Apache, Openoffice, Samba, databaser.....

**Franska myndigheter satsar på öppen källkod**

(2001-11-26 15:00)

**Franska myndigheter har beslutat att offentliga verksamheter måste utnyttja öppen källkod när så är möjligt.**

För att övervaka det hela har nyinrättade Agence pour les Technologies de l'Information et de la Communication dans l'Administration, ATICA, fått i uppdrag att övervaka och se till att franska statens IT-projekt använder öppen källkod.

Genom att använda öppen källkod räknar myndigheterna med att sänka kostnaderna och främja interoperabilitet mellan olika myndigheters system.

Franska staten vill också uppmuntra decentraliserad systemutveckling genom att tillåta att också mindre företag får delta i utvecklingen av offentliga system.

För den franskspråkige finns mer information på [ATICA:s webbplats](#).

▼ På dansk:  
På dansk:



# Varför satsa på Open Source:

## ■ Tradition:

- ▶ **Forsknings-rapporter**
  - idag ofta i form av kod (software)
- ▶ **Öppna standards (RFC's) - referensimplementationer**
- ▶ **Lång tradition - i första hand på Unix**
- ▶ **Inte bara Linux, Open Source finns för de flesta plattformar; Unix, OS/390, Windows etc.**
- ▶ **Apache som Web-server från IBM (-98)**

## ■ Framtiden:

- ▶ **Mer och mer komplicerade protokoll - öppen kod nödvändigt**
- ▶ **Open Source nödvändigt på vissa nivåer t.ex. för [Grid Computing](#)**

xml  
java  
soap  
uddi  
wsdl  
html  
tcp/ip  
ldap  
.....







# IBM och Open Source

## Project:

Networking  
Filsystem (JFS från AIX,  
GPFS)  
Logical Volume Manager  
Klusters  
glibc/mathlib  
Kernel prestanda  
IA-64 port  
PPC port  
S/390 Linux  
Linux Standards Base  
Skalbarhet  
smail  
Globus

[Linux Technology center](#)

.....

## Utvecklingslab:

Austin, Raleigh, Bangalore,  
Poughkeepsie, Haifa, Seattle,  
Boeblingen, Somers,  
San Mateo...

## Open Source Dev. Lab:

Labb för utveckling av OS -  
Sponsrat av: IBM, HP,  
Intel, Fujitsu, Hitachi, Dell,  
CA, NEC, SGI .....

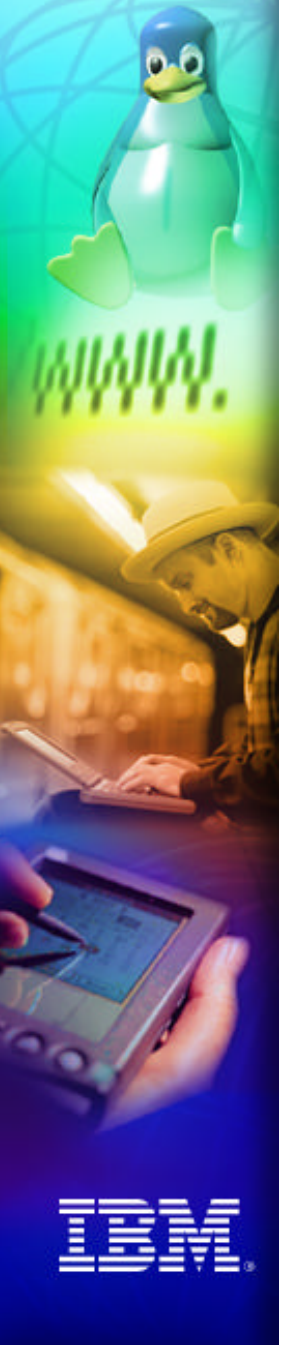




# Varför intresserar sig IBM för Linux?



- **IBM fokuserar bl.a dessa områden:**
  - ▶ **E-business**
    - Alla former av Internet-relaterad affärsverksamhet men med fokus på B2B (Business-to-Business)
  - ▶ **Deep Computing**
    - Att med datorer lösa komplicerade problem
      - Allt från Data Mining till storskaliga beräkningar inom fysik, medicin, etc.
  - ▶ **Pervasive Computing**
    - Datorer 'överallt', .....
    - Palm tops. Wrist tops och ännu mindre

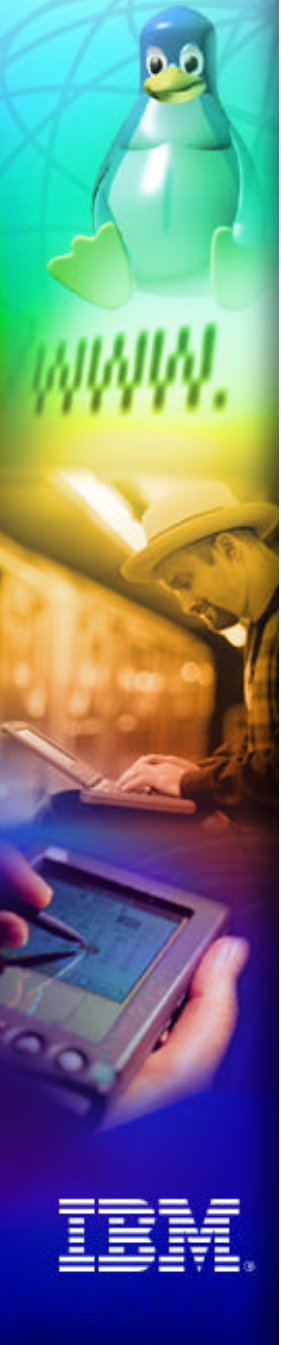




# Varför intresserar sig IBM för Linux?



- **Linux är starkt inom**
  - ▶ **E-business**
    - Linux körs på 40% av alla Internet servrar
    - Linux används i ökad utsträckning som utvecklingsplattform
  
  - ▶ **Deep Computing**
    - Stort intresse för beräknings-kuster
      - top500.org - flera Linux kluster
  
  - ▶ **Pervasive Computing**
    - Linux för "embedded systems"
      - Hushållsmaskiner, Bilar, etc.
      - Mobila lösningar
      - .....

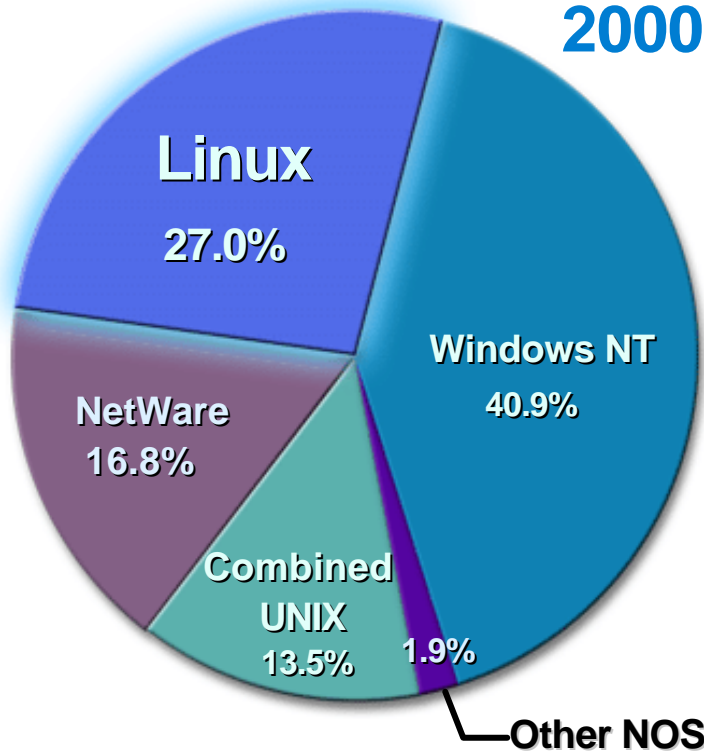






e-business

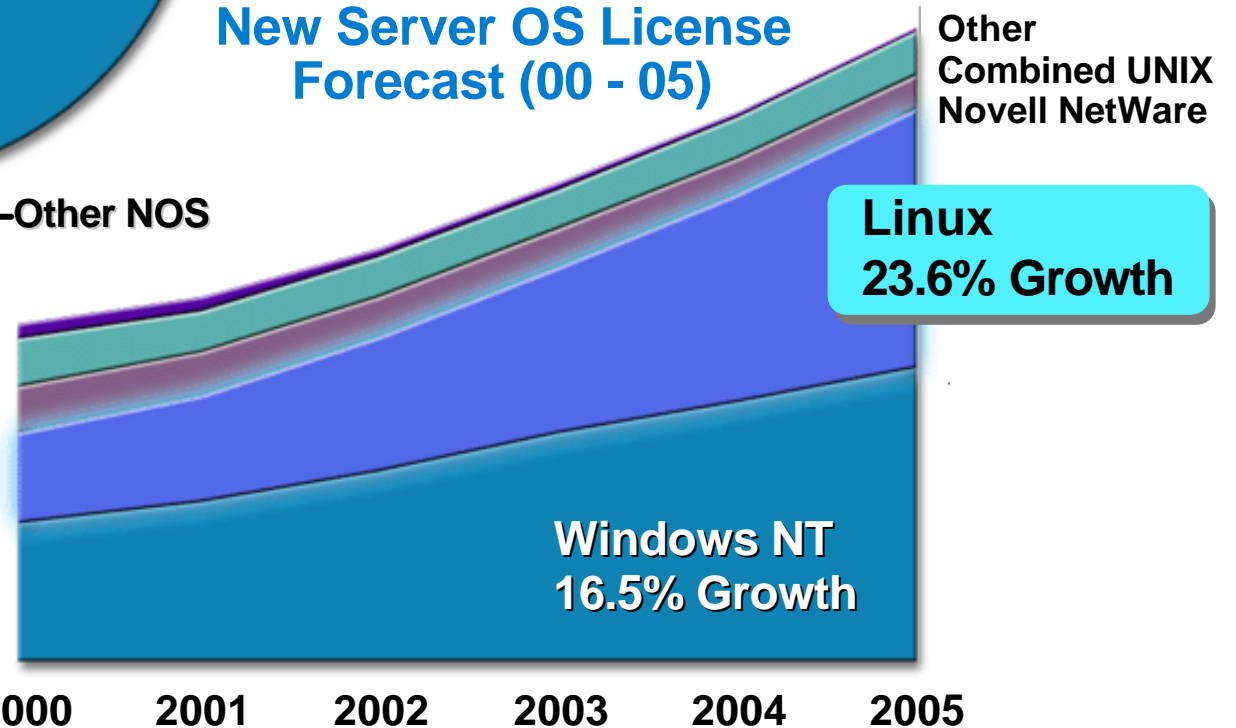
# Linux Momentum



## 2000 New Server OS Shipments

- 1999 - 2000 Linux shipments grew 24% YTY
- 2000: #2 volume OS
- Linux shipments projected to have highest growth (99 - 04)

## New Server OS License Forecast (00 - 05)



from IDC "WW Client Operating Environments Market Forecast and Analysis" July 2001





# Linux Deployment

## Yesterday

- Firewall
- Print/File
- Web Server
- e-mail

## Today

- Firewall
- Print/File
- Web Server
- e-mail

## Tomorrow

- Firewall
- Print/File
- Web Server
- e-mail

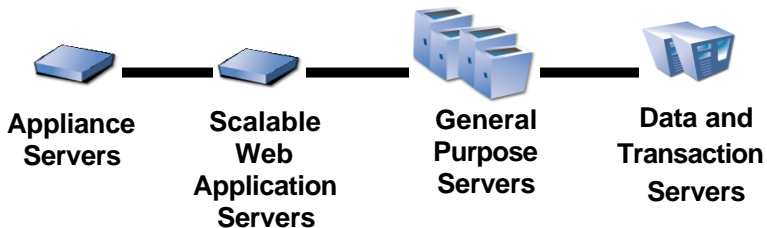
- 
- Super Computing Clusters
  - SW Development
  - e-commerce
  - Embedded devices
  - Web Hosting
  - Branch Automation

- Super Computing Clusters
- SW Development
- e-commerce
- Embedded devices
- Web Hosting
- Branch Automation

- 
- Database server
  - ERP, CRM, SCM
  - Vertical Industry Applications

# Broad Linux Server Line

## Linux for IBM xSeries *The Point of Entry - Where Industry Standards Meet Enterprise Capabilities*



### xSeries 100

- Web servers
- NAS servers

### xSeries 200s

- Price/performance
- High Availability

### xSeries 330

### xSeries 340

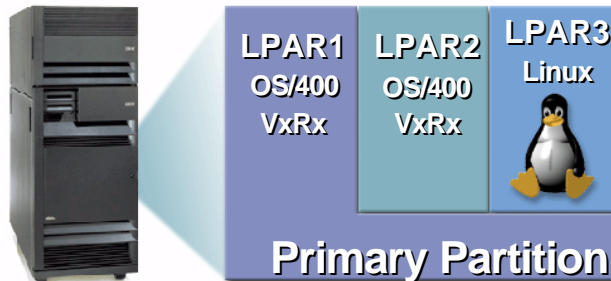
- Rack-optimized
- Clusters
- Linux-ready

## Linux for IBM pSeries & RS/6000 *The Point of Integration - Where Linux Meets UNIX*

- Native Linux for RS/6000 (32-bit)
- Native Linux for pSeries (64-bit)
- Exploit Power3 / Power4 Floating Point, 64-Bit Performance, I/O Bandwidth and RAS
- AIX Toolbox for Linux Applications in AIX 5L



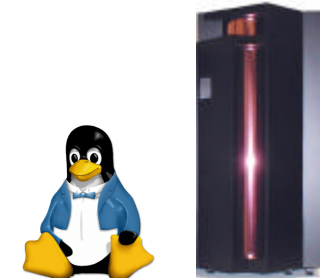
## Linux for IBM iSeries *The Point of Coexistence - Where Linux Complements Integrated e-business Solutions*



- Linux in a partition
- Integrates new e-business applications

## Linux for IBM zSeries and S/390 *The point of consolidation - Linux Ascends to the Mainframe*

- Pure Linux OS
- Exploits zSeries hardware
- Scalable, protected partitions
- Shared infrastructure
- Reduced total cost of ownership





# Middleware Software for Linux



*Development  
Tools and  
Components*

*Application  
Server  
Software*

*Secure  
Network &  
Management  
Software*

- ★ *Java Development kit*
- ★ *VisualAge for Java*
- ★ *WebSphere Host On-Demand*
- ★ *WebSphere Homepage Builder*
- ★ *WebSphere Site Analyzer*
- ★ *Performance Pack Cache Manager for Multi-platform*
- ★ *ViaVoice Dictation*

- ★ *Connectors*
  - *IMS*
  - *CICS*
  - *MQ Series*
- ★ *Lotus Domino Application Server*
- ★ *WebSphere Application Server*
- ★ *WebSphere Commerce Suite*
- ★ *DB2 Universal DataBase (UDB)*

- ★ *Tivoli Storage Manager Client (Server)*
- ★ *SecureWay Wireless Software*
- ★ *Network Dispatcher*







e-business



WWW.



# IBM's Billion Dollar Commitment to Linux



Under år 2001 investerade IBM \$1 000 000 000 i Linux-relaterade aktiviteter



# Stordator, Mainframe, S/390, zSeries...

Obruten produktlinje sedan 1964  
kompatibel sedan begynnelsen  
ständig utveckling av hårdvaran,  
programvaran och hanteringen (drift,  
backuphantering, service etc)  
idag t.ex. marknadens tätast packade  
chips

Främsta egenskaper:

Tillgängligheten - MTBF över 60 år

Klustrad - i princip ständig tillgänglighet

Skalbarhet/Flexibilitet

Säkerhet

Prestanda - kan hantera tusentals samtidiga användare





# Hur används stordatorer traditionellt...

Banker, Försäkringsbolag, Industrieföretag  
ofta större företag

Administrativ databehandling

Bokföring, fakturering, löner.....

Databaser

Transaktionshantering -

IMS, CICS, t.ex. bankomater - upp till 5 000 trans/sek

TPF, biljettbokning - upp till 40 000 trans/sek

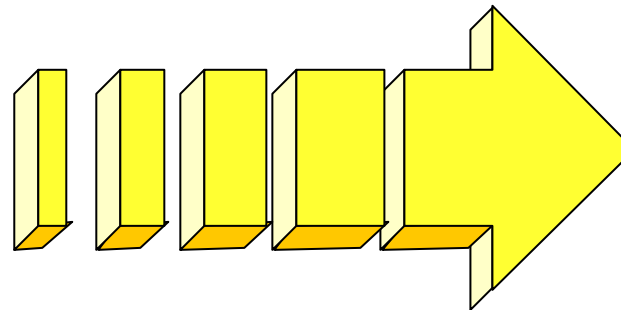
e-Business - kraftigt växande

zOS, zVM, VSE, TPF, Linux

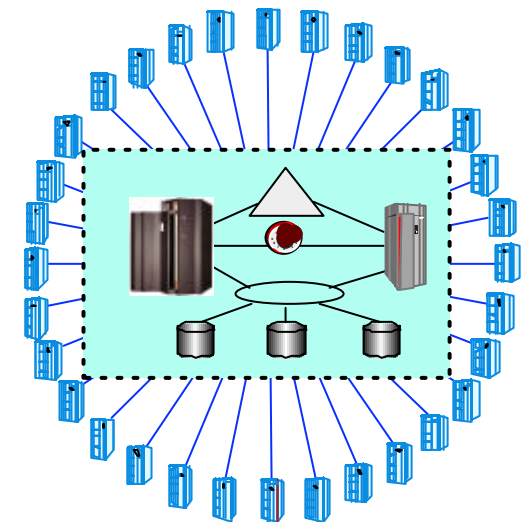


# Tillgängligheten

- Ständig tillgänglighet krävs för denna typ av användning
- Mycket omfattande felhanteringslogik,
- Extra processorer, minnesmoduler, I/O-logik etc.
- Automatiserad drift
- 'call home', alla fel rapporteras (av maskinen själv) - och analyseras (från hårdvarufel till användarfel)
- I ett Sysplex körs processerna parallelt på olika maskiner, Coupling Facility (hårdvara) håller reda på låsningar etc.



## Parallel Sysplex



2 to 32 Systems





e-business

# Prestanda



Fokus på I/O prestanda

speciella processorer för I/O hantering

instruktioner för snabb flyttning av data

Inte speciellt snabb på beräkningar (relativt sett)

20 Processorer (16 PU's, resten för I/O och spares)

upp till 64 GB minne

512KB L1 Cache

32 GB L2 Cache

1.3 ns cycle time - ca 800 MHz

Max I/O thruput 24GBytes/sec



IBM

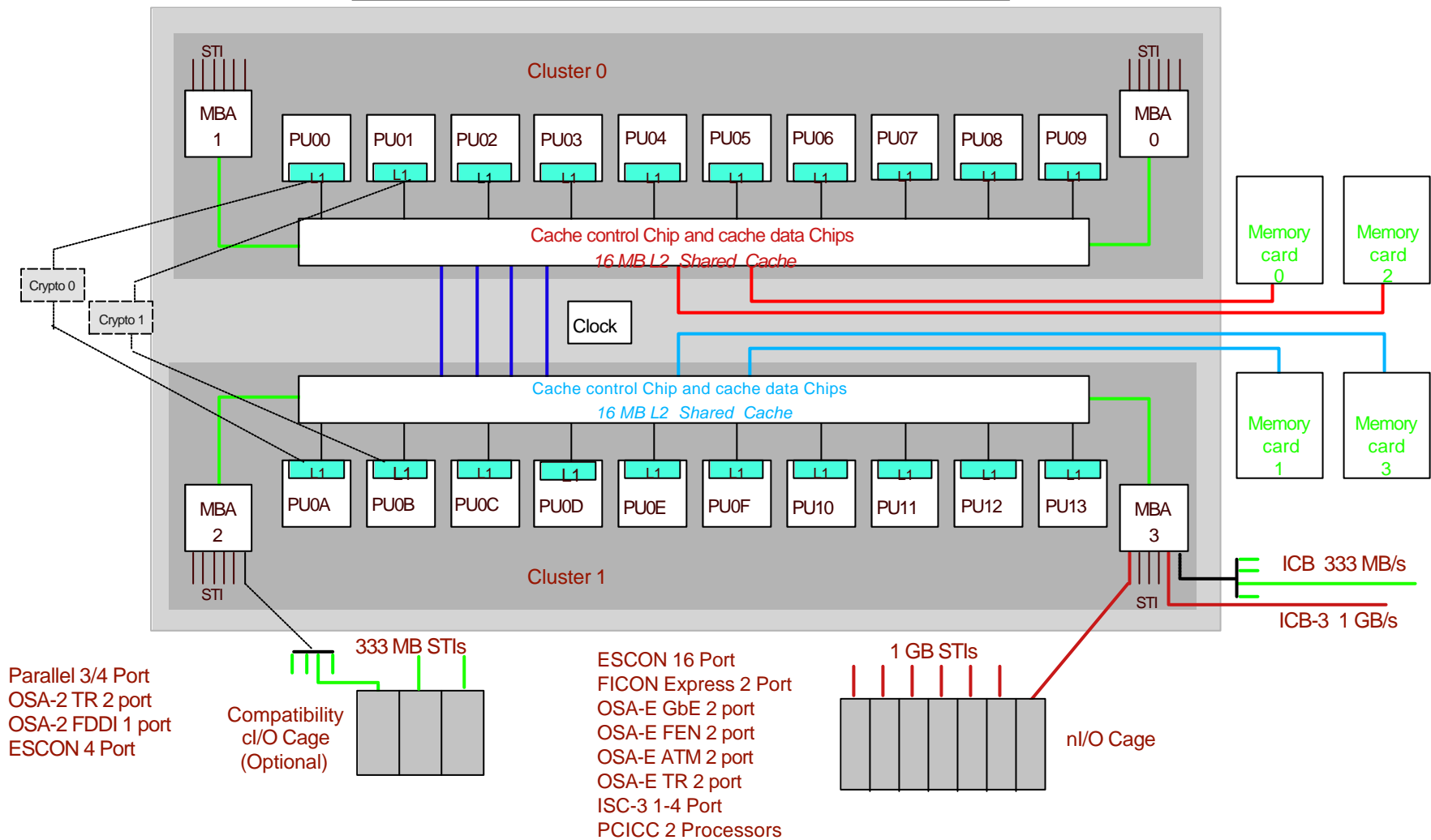


# Arkitektur

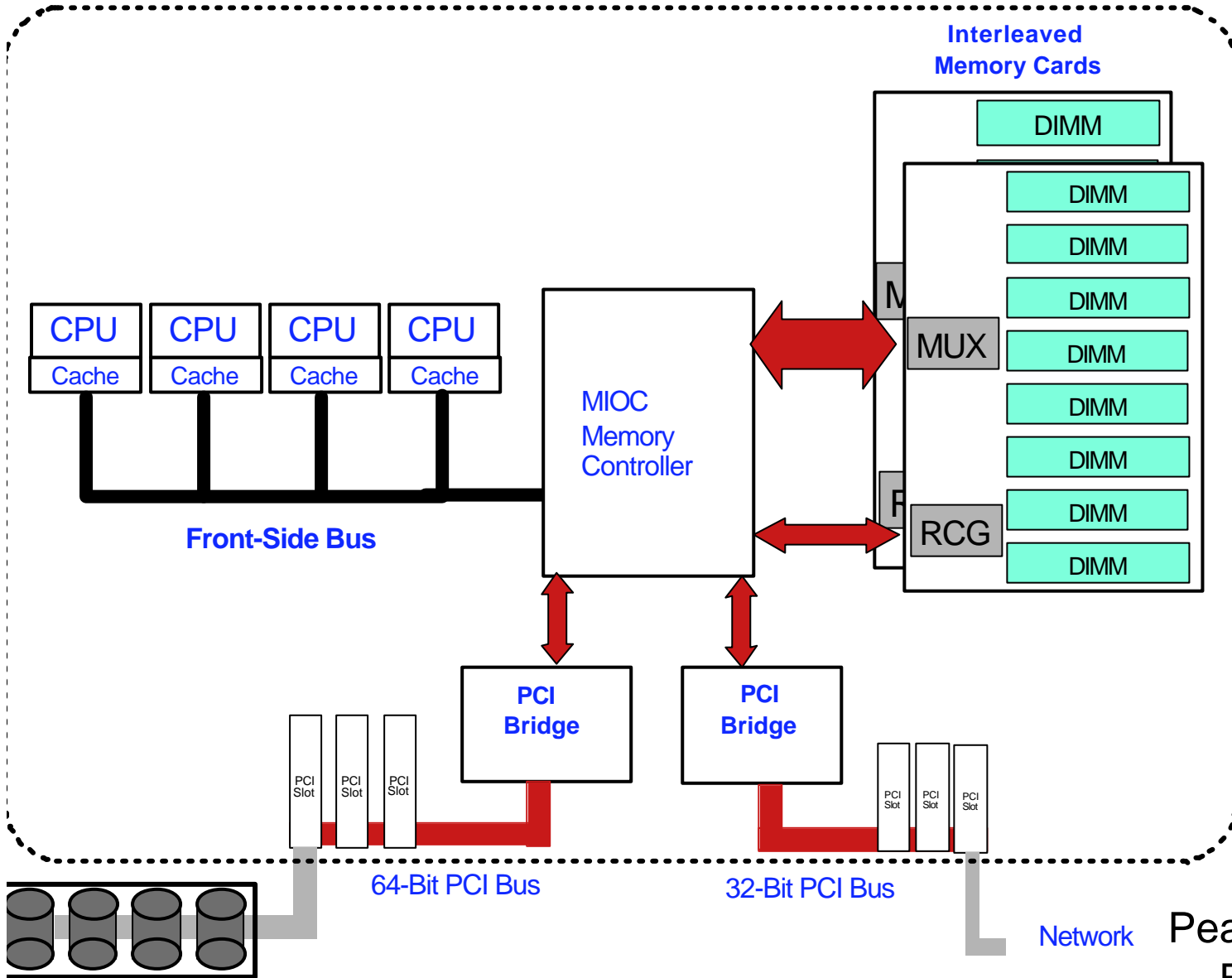
- 32-bitars processor (31-bitar)
  - 64-bitars sedan slutet av år 2000
- 16 General Purpose Register
- BigEndian
- CISC - Complex Instruction Set Computer
  - (drygt 800 instruktioner idag)
  - Maskininstruktioner för flyttning av stora datamängder
  
- Största olikheten - I/O
  - enheterna sitter på kanaler (I/O-processorer)
    - max 256 kanaler
    - upp till 256 enheter per kanal
    - ingen IRQ hantering, varje enhet ger sitt eget interrupt

# z900 20-PU Multi Chip Module

35 logic chips in total on a 20-PU MCM



# Intel Server Internals



32KB L1 Cache  
2MB L2 Cache  
32GB Minne  
1.6 GHz

## Peak Bandwidth Metrics:

Front Side Bus: 800MB/Sec  
Memory Bus: 1066MB/Sec  
PCI Bus: 533MB/Sec  
(PCI-X: 1066MB/Sec)

# Flexibiliteten

Olika sätt att köra en stordator:

## 1) **Native - ett OS**

vanligt vid 'traditionell' användning

## 2) **LPAR - hårdvaran delar upp maskinen i upp till 15 'logiska' maskiner/partitioner**

t.ex. för produktion och test i samma maskin

partitionerna kan tilldelas resurser efter behov

## 3) **VM - VM är ett operativsystem som delar upp maskinen/partitionen i 'virtuella' maskiner**

I varje virtuell maskin kan ett Operativsystem (t.ex. Linux) installeras

Antalet virtuella maskiner begränsas bara av maskinens kapacitet

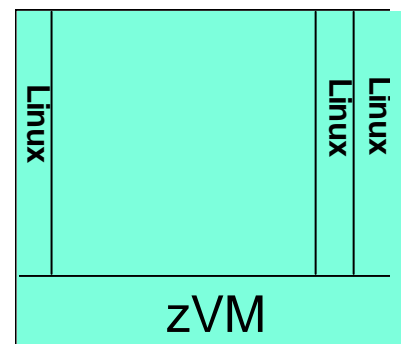
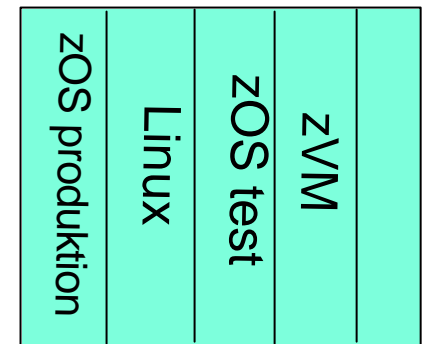
VM ger möjlighet att prioritera och debitera de virtuella maskinerna

VM ger också device-support och möjlighet att testa olika konfigurationer

2) och 3) kan kombineras



zOS



## VM - VM/390, VM/ESA, zVM

- ▶ Första produkten i början av 70-talet (-1967)
  - ▶ i början mest för test och utveckling
- ▶ består av 2 delar
  - ▶ CP - virtualiserings funktionen (Hypervisor)
  - ▶ CMS - speciellt OS enbart för VM (under CP)
    - ▶ CMS användes ofta som användar-OS, t.ex. office-tillämpningar, databas etc.
    - ▶ REXX som scriptspråk (~shell)
- ▶ PROP - PRogrammerad OPeratör
- ▶ Hårdvarustöd för många CP-funktioner
- ▶ De Virtuella maskinerna tilldelas:
  - ▶ Minne, spool-enheter, CPU (om fler än 1), nätverk, Diskutrymme (minidiskar - hanteras av CP) ev. 'reella' enheter - diskar, nätadapters...







# Linux för zSeries och S/390

- 'Standard' Linux OS
  - Utnyttjar zSeries hårdvara
  - Skalbara, avgränsade, skyddade partitioner
  - Dela IT-resurser som redan finns
  - Lägre totalkostnad
- 
- Viktigaste användningen:  
Konsolidering av servers  
(köra många Linux-System i  
samma maskin)
- 
- Finns från SuSE, RedHat,  
Turbolinux (Marist College)





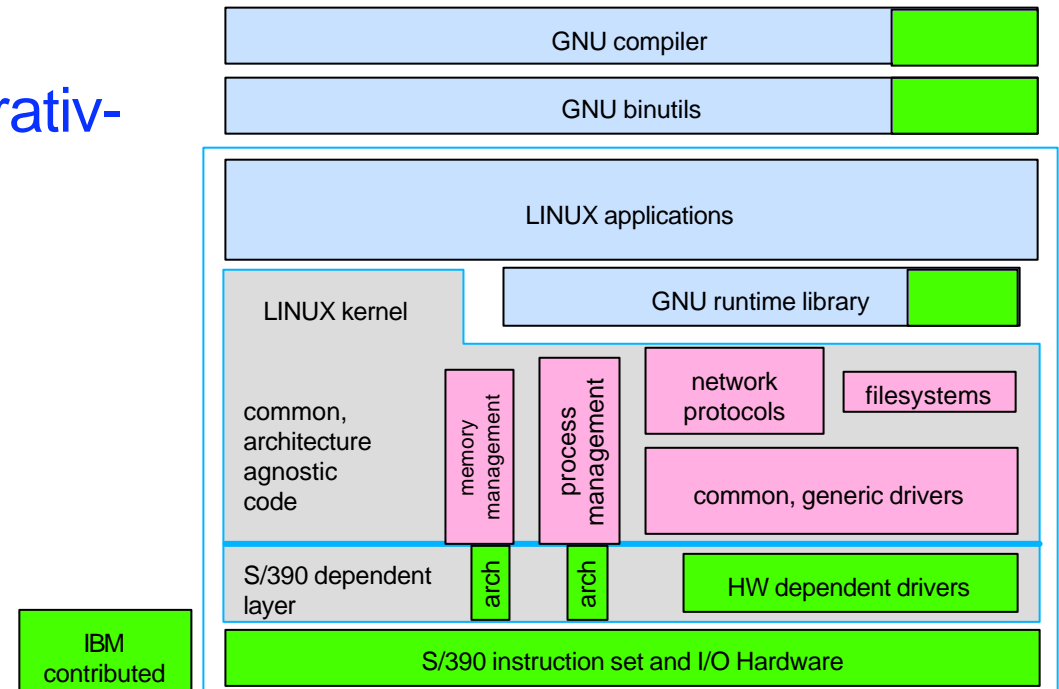
# Linux för z-Serien (S/390)

Körs native, i en LPAR eller under VM

- 'Riktig' Linux, körs i ASCII miljö
- Utnyttjar IBM S/390 hårdvara, inklusive IEEE floating point

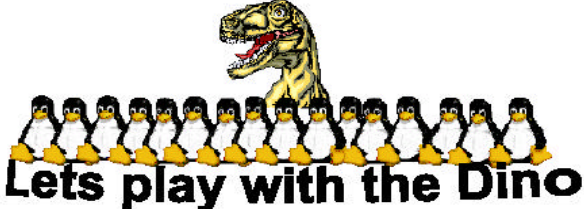
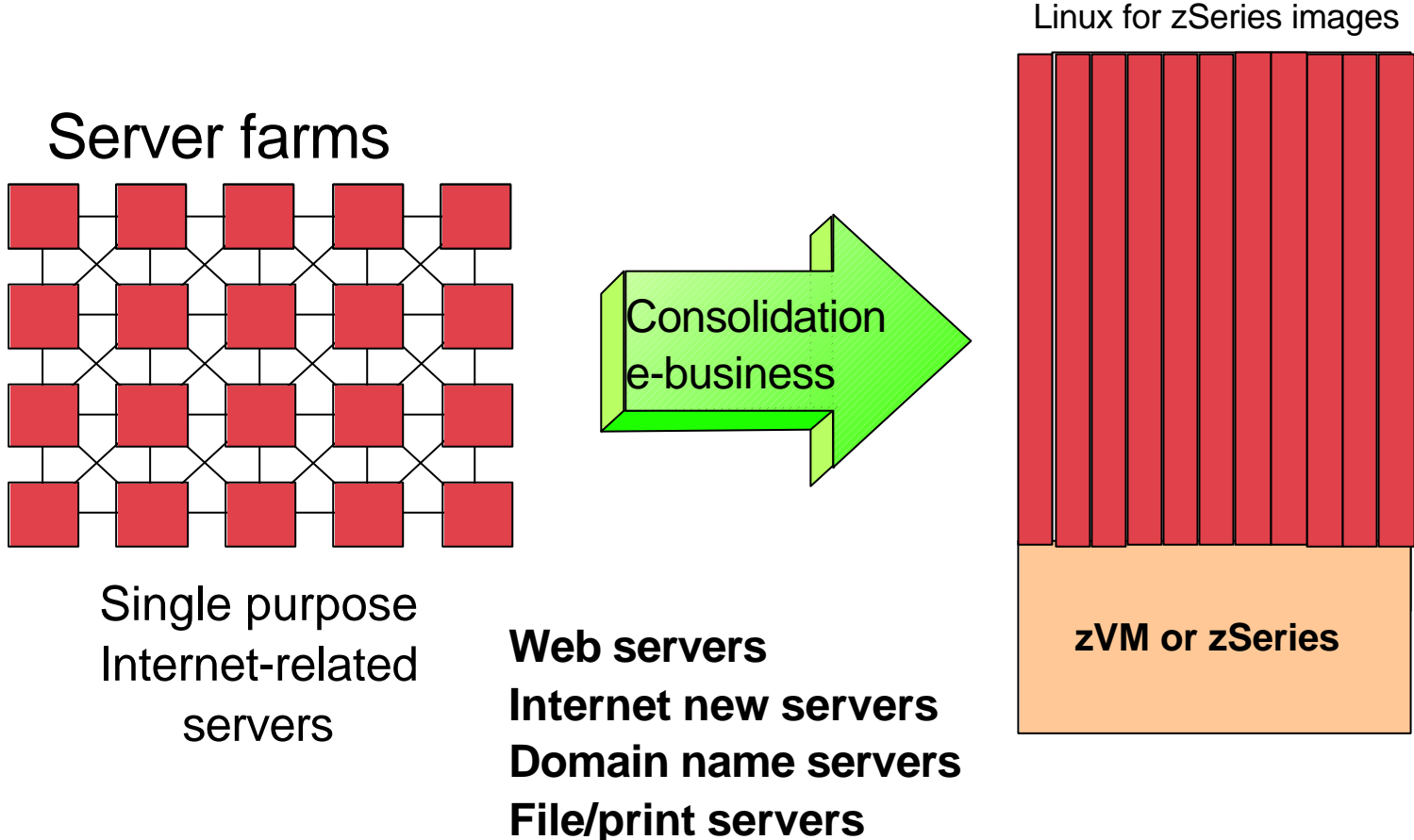
Är inte en unik version av Linux eller något annat operativsystem

Ersätter inte något annat IBM zSeries operativsystem



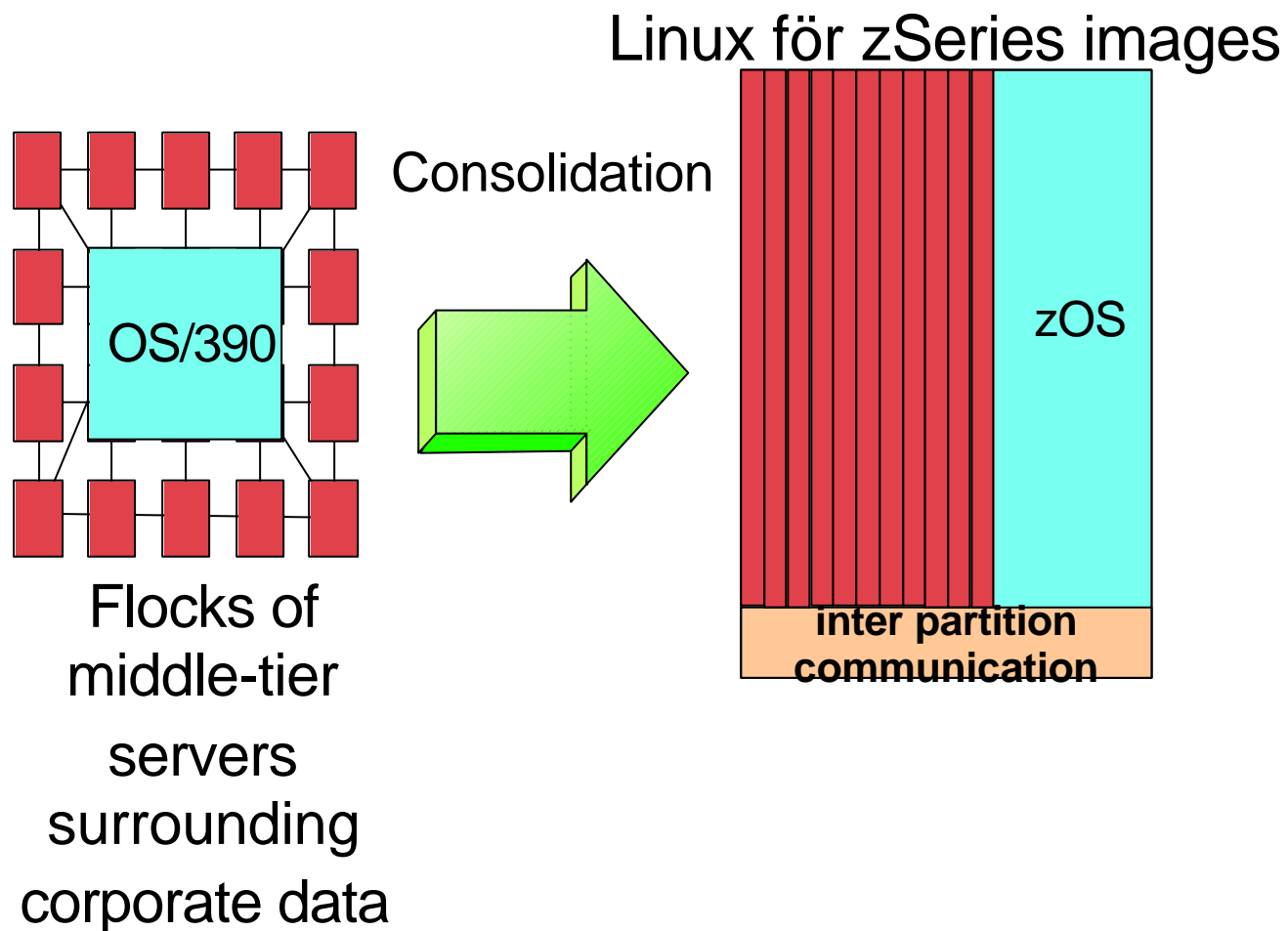
# Hur anvands Linux for zSeries ...?

## Konsolidering av servers



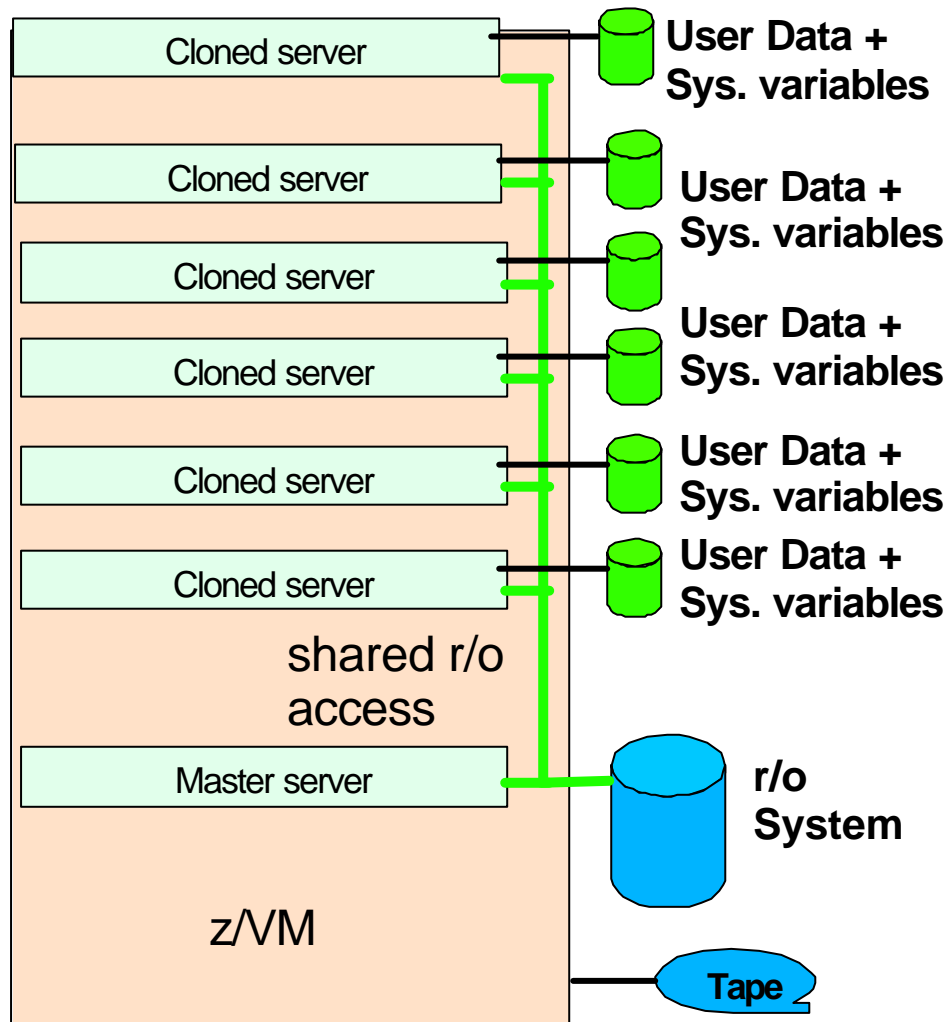
# Hur används Linux för zSeries ...?

Utbyggnad av existerande S/390 installation



Flocks of "logical" middle-tier servers in the same physical system as corporate data accessing via high speed, low latency inter-partition communication

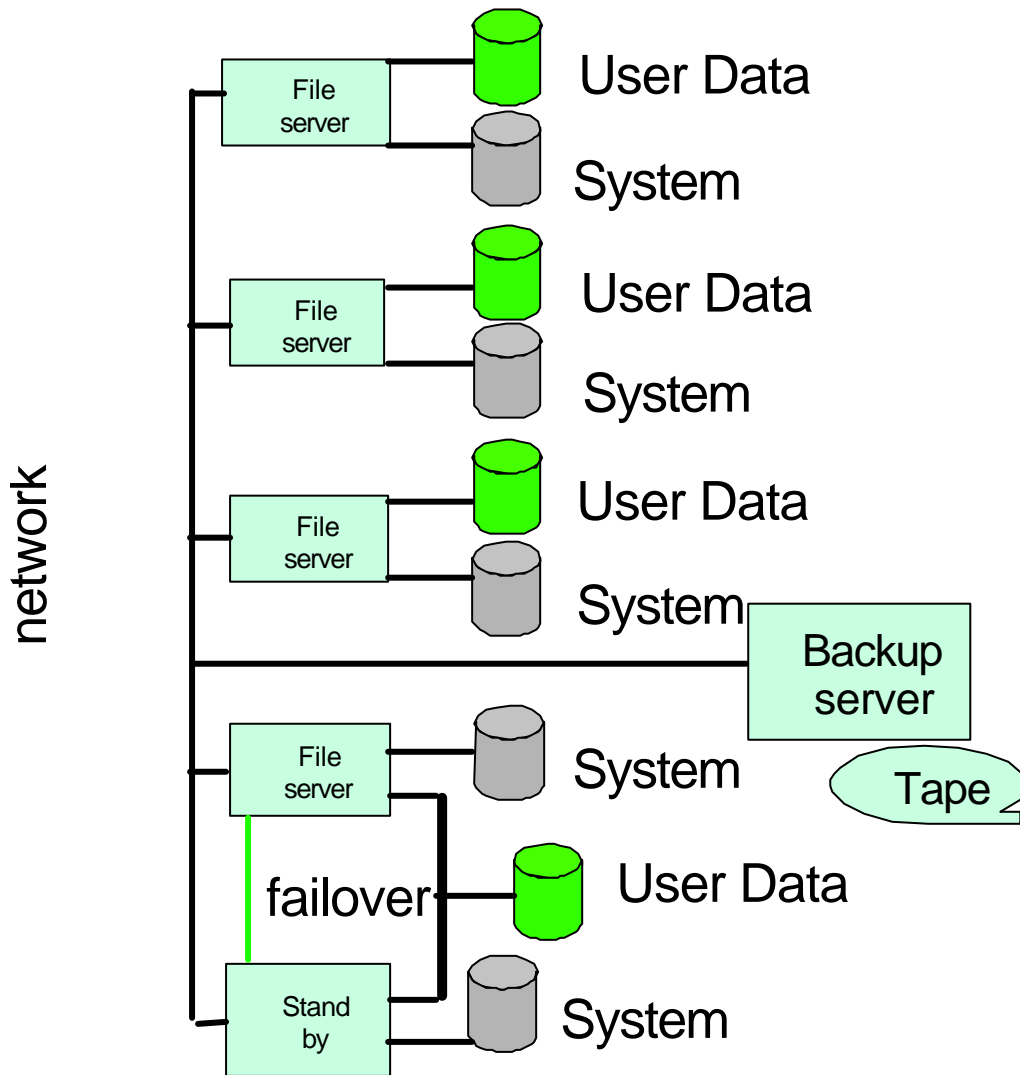
# Cloned enviroment with Linux and zSeries



- ▶ System is split into r/w and r/o parts
- ▶ most parts are shared r/o
  - ▶ saves disk space
  - ▶ VM minidisk as one disk for all systems
  - ▶ maintenance for shared disk is done from master server
  - ▶ easy to have several copies of the system disk, just a configuration change in VM
- ▶ Cloning can be automated
  - ▶ adding of VM guest
  - ▶ copying of r/w disk template
  - ▶ in less than two minutes



# File Serving - Classical Scenario



The size of many file servers is small to medium

File servers are distributed because

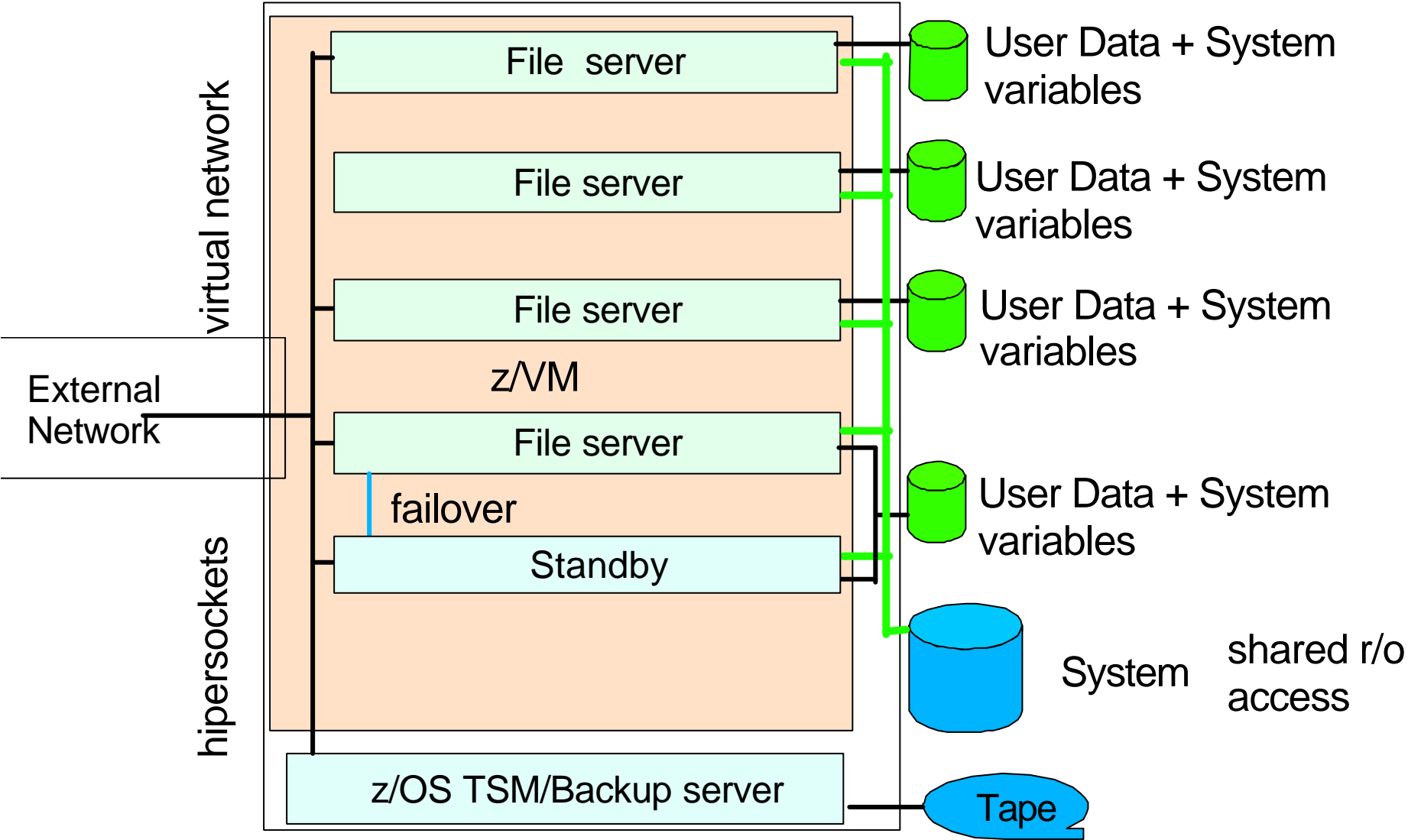
- Departments want to control their own servers
- Division of data and users into small manageable packages
  - instead of one big server for many departments many small for each department

Maintenance and system updates have to be done for each server

File serving is I/O intensive, CPU utilization low

Backup and recovery over network causes bandwidth problems

# File Serving with Linux on zSeries





# What Linux brings to the zSeries

- ◆ The Linux application portfolio has greatly increased the number of applications available to the IBM zSeries and S/390
- ◆ All of the great flexibility and openness of Linux combined with the qualities of service of zSeries and S/390 result in an industrial strength Linux environment
- ◆ zSeries and S/390 can uniquely provide customers with the ability to consolidate a large number of Linux servers onto a single platform easily
- ◆ Customers can blend the data richness of zSeries and S/390 environments with the Web capability of Linux applications to deliver a highly integrated e-business solution



---

Finns det några problem.....?

Ja, flera stycken....

- 1) **Paging - Linux swappar, VM pagar  
- prestanda sjunker**

**Lösning: mera (virtuellt) minne till Linux  
förhindra att Linux swappar, VM sköter detta bättre**

- 2) **Timer hantering,**

**Linux avbruts 100 ggr/sek för timerhantering  
OK för 5 (och 50) instanser men inte för 5000.  
Fix finns.**

# Boscov's Department Stores

*Linux for zSeries - Infrastructure servers consolidation*

Thirty-seven department store chain - eastern U.S.A.

Runs file/print servers on Linux for zSeries

Currently working toward WebSphere Commerce Suite on Linux for zSeries to improve Web site capabilities

Boscov's can consolidate up to 44 servers in their server farm without increasing z900 capacity or increasing z/OS and ISV software costs

Uses SuSE distribution

"Boscov's Department Stores chose to move ahead with the z900 processor because it provided the business with a robust platform that could meet our expected growth in S/390 transactions, as well as an unparalleled platform for consolidation of our server farm on Linux virtual servers."

- Harry Roberts, Chief Information Officer, Boscov's Department Stores LLC



*Boscov's*

*The Country's Largest Family Owned*

**DEPARTMENT STORE!**

*Serving Customers for over 75 Years!*

# Sonera Entrum

*Linux for zSeries, Server hosting*

Sonera Entrum is the leading broadband Internet provider in Finland  
Provides high-speed Internet access for 500,000 private and 70,000 corporate subscribers

Uses zSeries and Linux to run 500 virtual servers on a single zSeries server

Uses IBM Enterprise Storage Server (Shark)

Uses Red Hat and SuSE Linux

"By consolidating all of our services onto one high availability zSeries server running Linux we are saving resources, space and energy. It also makes systems management and maintenance significantly easier."

- Jukka Kämäri, Managing Director, Sonera Entrum







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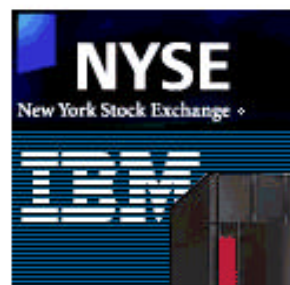
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**NEWS & ANALYSIS | INDUSTRIES****IBM says NYSE to have mainframes running Linux**

By Paul Abrahams in San Francisco

Published: August 28 2001 17:41GMT | Last Updated: August 28 2001 18:43GMT



IBM, the computer group, on Tuesday announced that critical elements supporting the New York Stock Exchange's computer operations were being transferred from Sun servers to IBM mainframes running the Linux operating system.

The move is a significant coup for IBM's mainframe business and Linux, a free operating system that IBM has been championing in the corporate market but has so far been limited to niche applications.

"This is a major endorsement of our Linux strategy. This is the start of an important shift and underlines the fact that Linux has become an industrial scale operating system" said Michael Nelson, IBM's director of internet technology and

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# Telia.Net



- ▶ **Telia, Denmark - Server hosting**
  - ▶ customers can rent a virtual server
    - ▶ webserver, static and dynamic content
    - ▶ database
    - ▶ DNS and mail server
    - ▶ normally on pizza box server
  - ▶ utilization of average ISP hosting farm is extremely low
- ▶ **Advantages**
  - ▶ supercloned enviroment
  - ▶ extremely fast setup time
  - ▶ sharing of hardware
- ▶ **Has upgraded the initial system and bought another one**



# zSeries (Public Sector)

## Enterprise Systems for workload consolidation



- **Reduced Total Cost of Ownership (TCO)**

- ▶ Environmental savings
- ▶ Consolidation savings



welcome to the  
**UNITED STATES SECRET SERVICE**



- **Improved service level**

- ▶ Systems management
- ▶ Reliability, availability, security



- **Speed to market**

- ▶ Capacity-on-demand
- ▶ Dynamic allocation

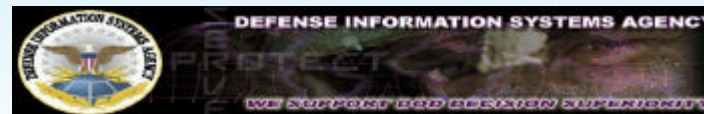
**MARIST COLLEGE**



**Tamkang University Taiwan**



**University of Geneva**





# ISVs Supporting Linux on zSeries

## ERP, Production Planning, Logistics

- ADABAS Software AG
- SAP

## Database

- Oracle 9i
- Software AG Tamino (XML Database)

## Application & e-business Integration

- Tibco
- Iona
- BEA WebLogics
- Aeonware (B2B/B2C)

## Systems Management

- BMC Patrol
- BMC Mail Server Knowledge Agent
- BMC Web Server Knowledge Agent
- Computer Associates

## Windows migration, ASP

- Halcyon Software

## Stock tracking

- RTS Realtime Systems

## Core Banking Applications

- Sanchez

## Mail & Calendaring server

- Sendmail
- Bynari (Mail & Calendaring)

## Print server

- Macro4

## Development & Testing Tools

- Logics Software
- Rational Software
- Rogue Wave Software
- Dignus
- ACTS (testing)

## Backup Software

- Computer Associates

## Firewall

- zGuard

*ISVs are constantly releasing new applications for Linux on zSeries. Get the most current information from the Developer Products for Linux for zSeries and S/390 Web page at:*

[ibm.com/zseries/solutions/s390da/linuxproduct.html](http://ibm.com/zseries/solutions/s390da/linuxproduct.html)

# Linux for S/390 or Linux on other architectures?

## ■ Business considerations

### ▶ Existing infrastructure

- Evaluate current existing capacity

### ▶ Expertise

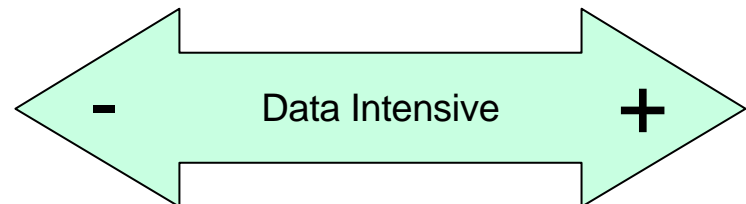
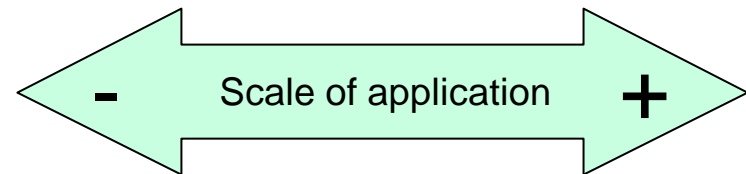
- Evaluate impact of changing the infrastructure on help desk, systems management etc.

### ▶ Long term cost of ownership

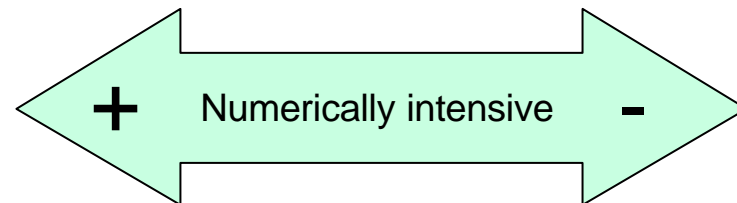
- Systems management costs
- Replacement of hardware vs. upgrade

## ■ Technical considerations

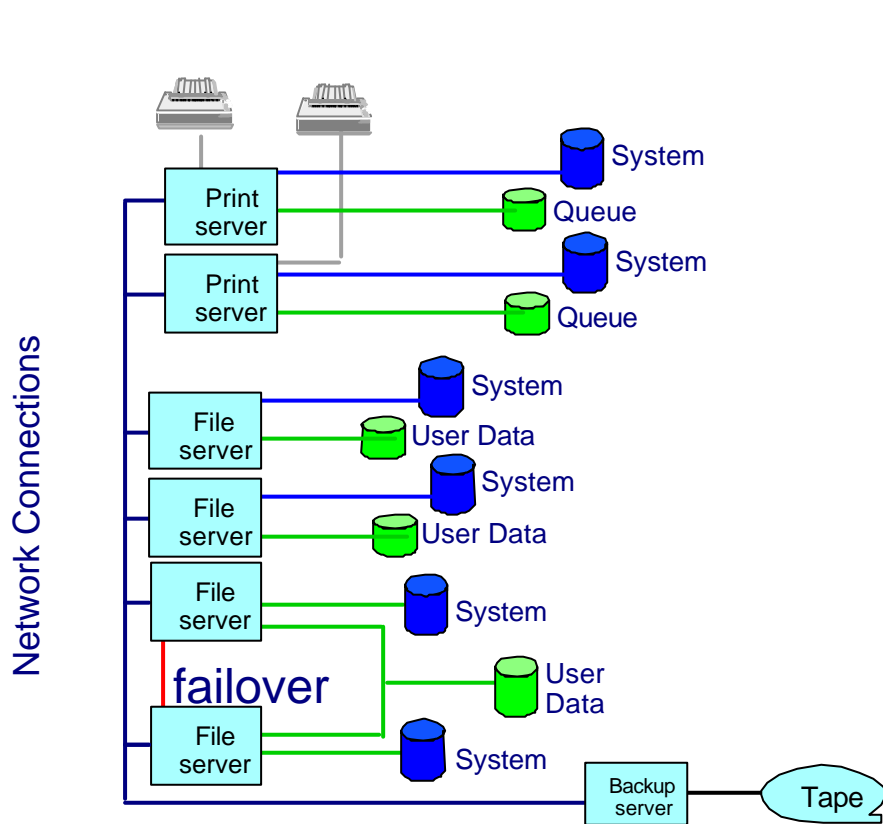
Intel                  RISC                  S/390



RISC                  Intel                  S/390

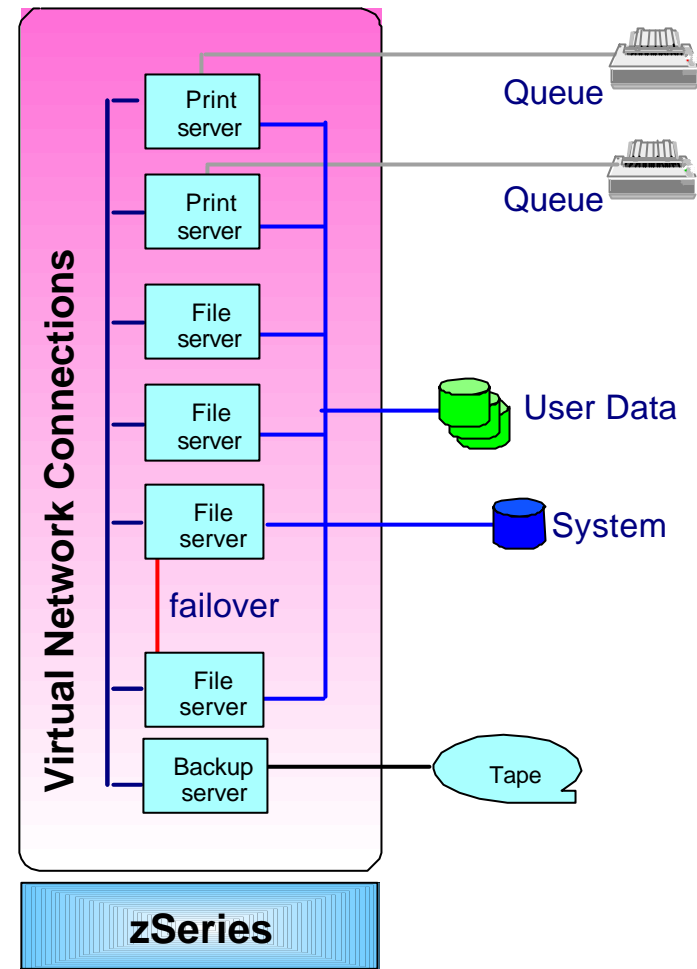


# Scenario – File/Print serving: Alternatives



## Intel Servers

- 150 2-way 1000 Megahertz Intel servers



## IBM

- z900 with 6 IFLs

## zSeries



## Exempel på Investeringskalkyl:



	NT/Win2k		Linux för zSeries	
	Årligen	Setup	Årligen	Setup
LokalHyra	72000		14400	
Ström, kyla	78840		10510	
Personal	1 200 000		800 000	
VM				300 000 *
VM Service			60 000	*
NT/Linux Service	90 000		120 000	*
Användarprogram		120 000		4 800
Server Hårdvara		1 875 000		2 040 000
Restvärde efter 3år		0		-699 720
Hårdvara Service	0		240 000	*
Nätverksutr.		225 000		40 000
Kostnad ned-tid	1 051 200		131 400	
<b>Summa</b>	<b>2 492 040</b>	<b>2 220 000</b>	<b>1 376 310</b>	<b>1 685 080</b>

Kostnad första året: 4 712 040

3 061 390

Årliga kostnader: 2 492 040

1 376 310

Totalkostnad för 3 år 9 696 120

5 814 010



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## Linux Breathes New Life Into The Mainframe

By [Dan Orzech](#)

Go to page: [1](#) [2](#)

Software products targeting vertical niches are beginning to appear as well. Sanchez Computer Associates Inc., of Malvern, Pa., whose customer service and electronic banking software is used by financial industry heavyweights like American Express and BANK ONE, made its software available for the platform a few months ago.

"Not every application is available for mainframe Linux right now," says Mastrobattista, "but a good percentage of them are in the works. A lot of the independent software vendors are excited about Linux, and beginning to put resources toward porting things from Unix over to Linux."

Porting: "It can't be this easy"



see the difference when infrastructure starts with you >>





# Linux Web Portal - [www.ibm.com/Linux](http://www.ibm.com/Linux)



The screenshot shows the IBM Linux Web Portal homepage. At the top left is the IBM logo and a search bar. Below it are navigation links for Home, Products & services, Support & downloads, and My account. A 'Select a country' dropdown is visible. The main heading is 'Linux at IBM' with a large graphic that says 'LINUX IGNITES' over a photo of a person. Below this is a paragraph: 'In recognition of its growing, worldwide user-base, we're proud to introduce the home of Linux at IBM. We're here to share information and bring you news on all the latest developments in the ever-evolving world of Linux.' To the right of this text is a small graphic with icons for peace, a heart, a penguin, and a question mark, with the text 'New world, new rules'. Below the main text is a table with four columns: Hardware, Software, Services, and Key alliances. The Hardware column lists Linux servers at IBM, Intel-based servers (xSeries), Integrated application servers (iSeries), Enterprise servers (zSeries), and Personal systems. The Software column lists e-business software for Linux, Developer Toolbox for Linux, DB2 for Linux, Websphere for Linux, Linux Technology Center Projects, and Other Open Source Projects. The Services column lists Service offerings, Support Line e-Services, and Linux Learning Services. The Key alliances column lists Caldera Systems, RedHat, SuSE, and Turbolinux. Below the table are sections for 'Features' (Moving Linux into the Enterprise: An Interview with Rich Michos) and 'IBM news' (dated April 12, 2001). On the right side of the page, there is a section for 'The Linux Line' e-newsletter with a 'Subscribe today!' link. At the bottom right, there is a 'Power your solutions' section with an image of a person and a penguin.

- Single entrypoint into all Linux Hardware, Software and Services offerings

- News updated daily:
  - Features
  - IBM News
  - Industry News

- The Linux Line**  
Linux e-newsletter for Customers, Business Partners, Open Source Developers and Linux Community



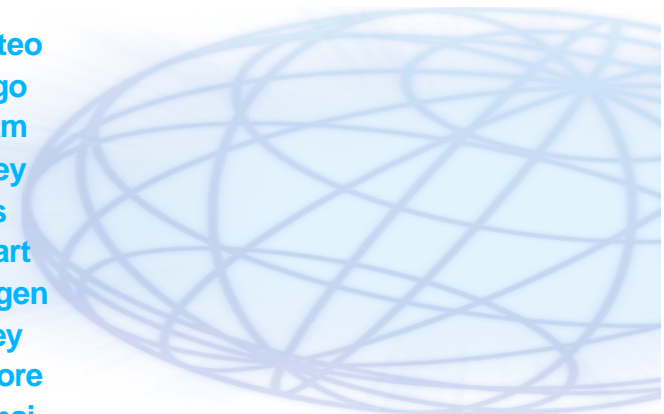


# Linux Support for Developers

## 11 WW Porting Centers

- Linux Workshops, Tech Support
- Linux testing on IBM Hardware
- Linux Performance Tools and MORE

San Mateo  
Chicago  
Waltham  
Hursley  
Paris  
Stuttgart  
Boeblingen  
Sydney  
Bangalore  
Shanghai  
Tokyo



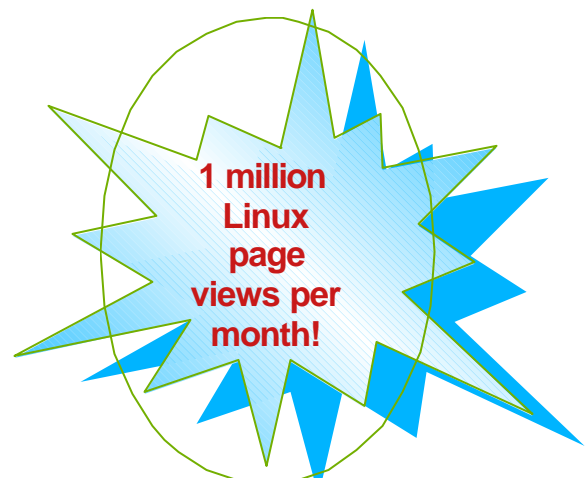
## DeveloperWorks

Dedicated "Linux Zone"

Open Source Center

focus on open-industry standards  
and cross-platform development

alphaWorks, available through  
developerWorks



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







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## IBM: Linux investment nearly recouped

By [Stephen Shankland](#)

Staff Writer, CNET News.com

January 29, 2002, 9:00 PM PT

**NEW YORK--IBM nearly recouped the \$1 billion it said it invested in the Linux operating system in 2001, the head of IBM's four server groups is expected to announce Wednesday.**

Big Blue said more than a year ago that it would invest [\\$1 billion](#) in Linux--spending money on tasks such as bringing the Unix clone to its full line of servers, bringing its broad software portfolio to Linux, training its services and consulting personnel, and placing advertisements such as full-page ads in major daily newspapers.

"We've recouped most of it in the first year in sales of software and systems," Bill Zeitler, head of the server group, said in an interview before his keynote speech Wednesday at the [LinuxWorld Conference and Expo](#). "We think it was money well spent. Almost all of it, we got back."

Zeitler declined to detail how much IBM spent on what initiatives, how much revenue each segment produced, or how much the company plans to spend in 2002. However, he did say the company increased its target revenue from Linux operations by 50 percent over the 2001 level.

### Latest Headlines

[display on desktop](#)

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[Stocks down despite economic news](#)

[Plotting the revival of Ricochet](#)

[Adobe buy continues move to server side](#)

[Grocers make another go at home delivery](#)

[AOL home page glitches irk users](#)

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[Priceline to place travel services on eBay](#)

[Doctors warn of gaming's health risks](#)

[Cisco may gain from old inventory](#)





e-business



# Linux Currently in Production (31/10 -01)

Linux Production Server Images	Quantity	Comments
<b>North America West</b>		
IGS e-hosting Operations	6	Monitoring 400 commercial URLs Hosted by IGS: Remote Ops
Security Assessment	54	Server Security scanning
End to end Probe Platform	6	EPP Probes monitoring notes infrastructure
Logical Networking	2	Using MRTG to monitor 500+ network interfaces
SMTP Anti Virus Gateway	1	SMTP gateway to scan mail for viruses
Development, Test, Support infr.	8	Application and tools testing, Image Development, traffic monitor, web
Site Education	19	Linux Server administration classes
Almaden	207	Web Fountain business data mining
Beaverton	9	Open AFS bridge between Solaris / HPUX and AIX
<b>North America South</b>	4	DTS - File, Print, DB, Domino
	8	Boca monitoring tool
	1	DNS server for network infrastructure backbone
<b>North America Northeast</b>	2	GWA Web Server: www.ibm.com/linux
	4	SWG Web server, FTP, NFS, Sendmail, CVS, MySQL
	4	w3 advanced search engine using Inktomi sw
	4	zSeries eServer Hosting w3.ibm.com/forums
<b>Watson Research</b>	81	Blue Gene Project; compute, NFS, GPFS
	2	DNS Server
	11	Global Storage Architecture: LDAP and Performance servers
<b>Linux Technology Center</b>	12	LTC Infrastructure: SQL, FTP, Apache, applications
<b>Canada</b>	20	File Servers ISCI Client Deployment (CBP)
<b>Bromont</b>	7	4-DNS/DHCP;2-Network monitors / scanners; 1- Image server
	81	Mfg. Kiosks: Slim workstations on manufacturing line (P166&P133)
<b>EMEA</b>	42	File Servers ISCI Client Deployment (CBP) 10 countries
	17	EPP Probes in 12 countries
<b>UK</b>	4	Security test servers
	5	AFS File Server, DSIS WebServer, IRC Server
	8	Notes Print Driver,Server build image,SW Distribution Servers
Israel / Germany/Switzerland	16	Installation and compute servers
<b>LA - Brazil, Chile</b>	5	1 Web server, 1 Notes server, 1 "Production" test server, 2 ISCI
<b>AP - Hong Kong</b>	1	File Servers ISCI Client Deployment (CBP)
	13	Anti Virus Scanners ; one in every country
<b>TOTAL</b>	<b>664</b>	



## IBM's Linux Strategi:

- Delta i *utvecklingen av Linux* genom att göra open source av IBM-utvecklade teknologier och genom att tillsammans med OS-rörelsen förbättra Linux
- Skapa en *fullständig miljö för utveckling och införande av applikationer* för Linux
- Skapa en *ledande produktlinje* för att köra Linux och tillämpningar för Linux
- Se till så att alla *IBM's miljöer kan köra och samverka med Linux* t.ex. genom Linux-kompatibla gränssnitt
- Ta fram *färdiga produkter* i form av maskinvara, programvara och tjänster byggda på Linux





# The Hercules System/370, ESA/390, and z/Architecture Emulator

Hercules is an open source software implementation of the mainframe System/370 and ESA/390 architectures, in addition to the new 64-bit z/Architecture. Hercules runs under Linux, Windows 98, Windows NT, and Windows 2000.

Hercules was created by Roger Bowler and is maintained by Jay Maynard. Jan Jaeger designed and implemented many of the advanced features of Hercules, including dynamic reconfiguration, integrated console, interpretive execution and z/Architecture support.

Follow these links to find out more:

- [Hercules Frequently-Asked Questions](#)
- [Hercules Installation and Operation](#)
- [What's new in this release](#)
- [The Q Public Licence](#)

<http://www.cornmicro.cx/hercules>

Download the current release version, 2.15:

- [hercules-2.15.tar.gz](#): Source tarball
- [hercules-2.15-1.i686.rpm](#): Intel Pentium Pro/Pentium II RPM
- [hercules-2.15-1.i586.rpm](#): Intel Pentium RPM
- [hercules-2.15-1.i386.rpm](#): Intel 386 RPM
- [hercules-2.15-1.alpha.rpm](#): Alpha RPM
- [hercules-2.15-1.src.rpm](#): Source RPM (if you want to build RPMs yourself)

The complete source code for the current *development* version of Hercules is also available via anonymous access from our cvs source code repository. The cvs root is **CVSROOT=:pserver:anonymous@cvs.cornmicro.cx:/usr/cvs/hercules**. Doing a checkout on module "hercules" will get you the source for all of Hercules, and checking out "wingui" will get you the complete source for the [Windows GUI](#) front end (HercGUI).

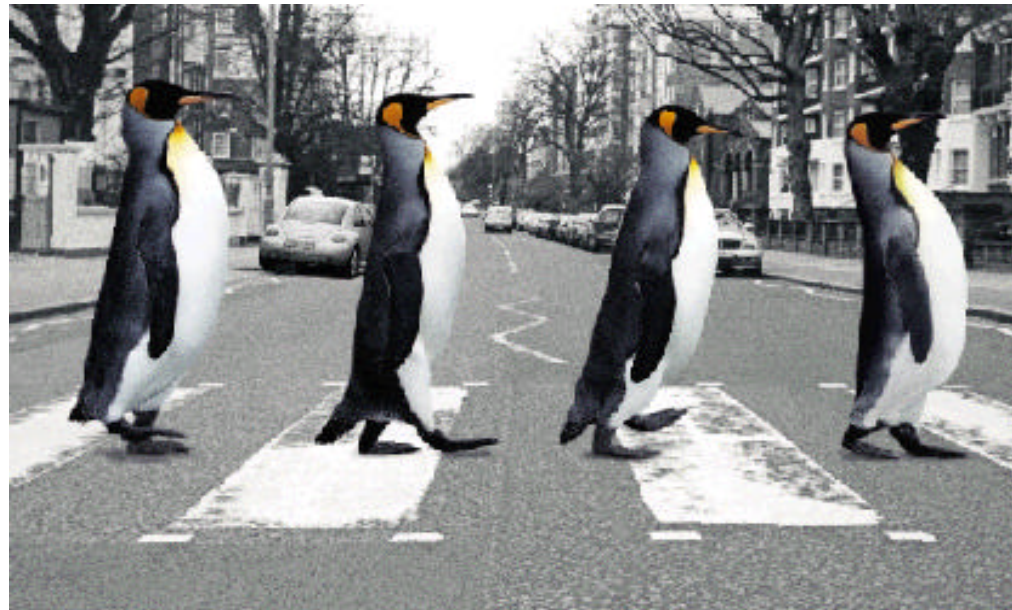


WWW.

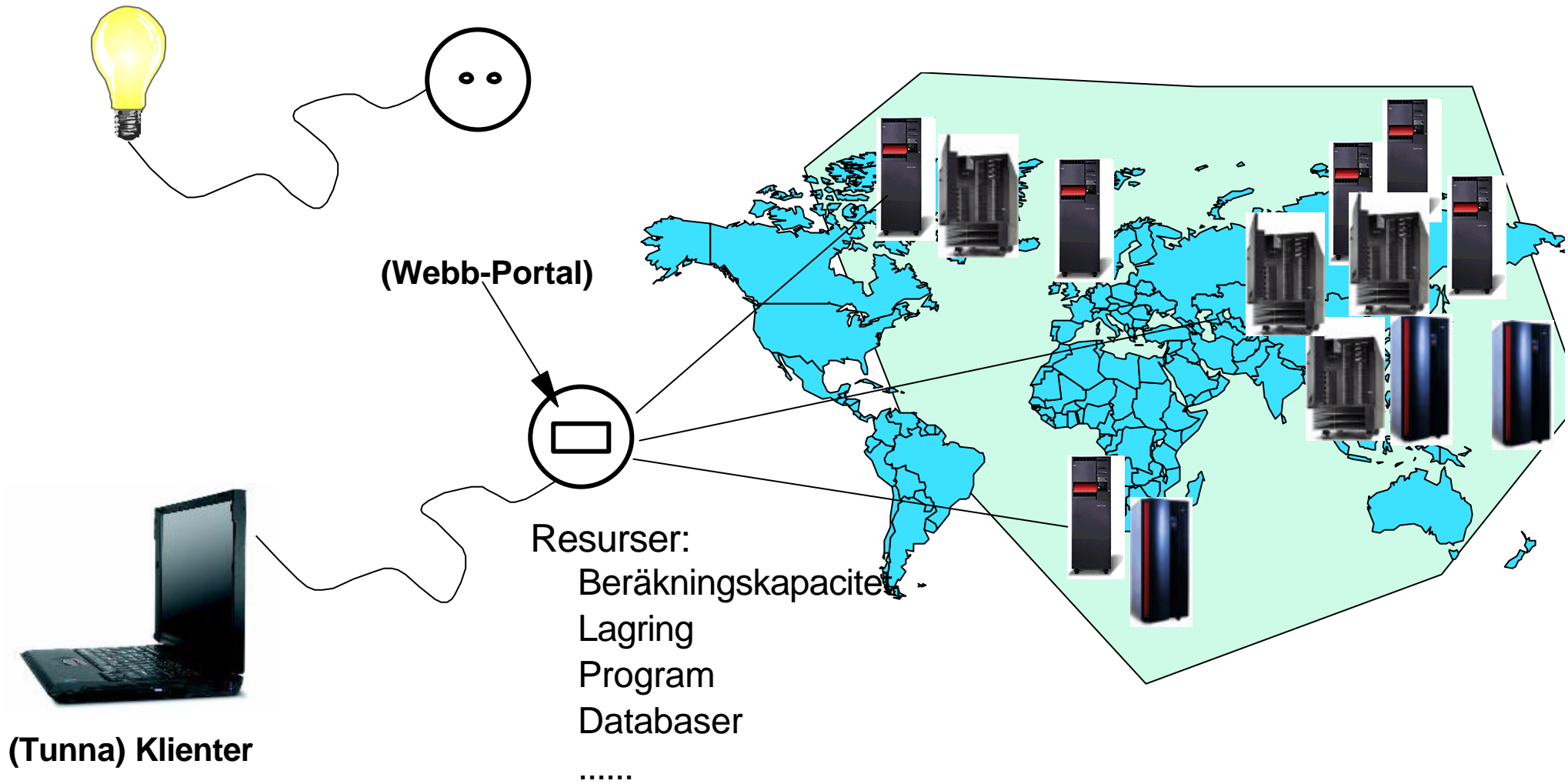


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# Frågor?



# Grid Computing - IT-tjänster som infrastruktur



"Infrastructure must be open...."

IBM @server. For the next generation of e-business.