Changing the Game with Linux

Linux Gets Down to Real Business

Steve Solazzo
General Manager, Linux

Recent Linux News

- German Department of Interior chooses Linux
  "With the contract with IBM we meet three key targets: we raise the level of IT security by avoiding monocultures; we lower the dependency on single software vendors; and we reach costs savings in software and operation costs."
  Otto Schily, German Minister of the Interior

- Walmart selling $299 Linux PCs
  Lindows distribution
  (allows some Windows programs to run on Linux)
  Full compliment of Linux client software

- VA Software chooses DB2, WebSphere Application Server for SourceForge.net
  World's largest Open Source collaborative development web site

- Red Hat and IBM expand relationship
  Red Hat Advanced Server to be ported to all IBM platforms
  IBM Middleware to support Advanced Server
  Red Hat / IBM Global Services to collaborate on services
Linux Momentum

Linux will become the dominant server operating system in the United States by 2005.

*Stacey Quandt, Giga, Business 2.0, June 17, 2002*

Linux will have a "breakout year" in 2002. Now it seems clear that Linux has become a viable alternative for enterprise use.

*IDC, January 2002*

By 2006, Linux will be a key foundation for a strategic, cross-development-platform environment, accelerating Unix server consolidation, while creating a powerful alternative to Windows .NET.

*Gartner, May 2002*

Linux Value

"It's going to be almost 30 times cheaper to run and maintain" (than Sun systems)

Josh Levine
Chief Administrative Officer and President, e*Trade Technologies
2001 Linux Function Review

Source: D.H. Brown Associates

How Customers are Deploying Linux

Workload Consolidation

Linux Clusters

Application Solutions

Distributed Enterprise

Infrastructure Solutions

ISV Applications
IBM Middleware
eServer
**Infrastructure Solutions**

*Optimized eServer and IBM Software for Linux*

- **Infrastructure Servers**
  - File/Print
  - Web/Application
  - Application dev.
  - Content/Caching
  - Security

- **Advantages:**
  - Low cost
  - Highly reliable
  - Turnkey
  - Rapid setup
  - Innovative packaging

- **Infrastructure Software**
  - DB2 Universal Database
  - Domino collaboration
  - Tivoli Systems Management
  - MQSeries messaging
  - WebSphere Family for application development

- **Advantages:**
  - Scalable
  - Open standards
  - Industry proven

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**Infrastructure Successes**

- Hundreds of Successful Customers
**Linux Clusters**

*IBM Solutions for Complex Workloads*

- **Clusters with Linux:**
  - Computationally intensive workloads
  - High performance computing
  - Horizontal scalability

- **Advantages:**
  - Supercomputing performance at "mass market" prices
  - Choice of eServer architecture
    - IA 32, IA 64, or PowerPC
  - Industry leading IBM cluster software
    - GPFS - General Parallel File System
    - CSM - Cluster Systems Manager
  - IBM factory installed and delivered

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**Dupont Photomask**

*Linux Clusters*

**Challenge**

- Minimize photomask development by increasing computational speed
- 99.9 percent availability

**Solution**

- Linux cluster of 10 xSeries servers
- RedHat V7.1

**Value**

- 3X the processing power of existing NT servers
- Reduced run time from days to less than 4 hours
- Reduced photomask development/test cycle
Challenge
- Insight into subsurface, increasing hit rate in the quest for new oil fields.
- Reduce the risk of drilling dry holes
- More accurate tera-scale seismic processing with outstanding price/performance
- Grow processing power by an order of magnitude
- Cost pressures

Solution and Benefits
- 1024 IBM xSeries servers for +Tflop capability
- IBM Global Services to design, build, and implement
- Improved modeling accuracy -- critical in deciding where to invest in oil/gas exploration

"With this Linux cluster, we find a cost-effective solution to apply the algorithms we've already developed in-house to run them faster than was possible before."
Jack Buur, Principal Research Physicist Shell Exploration and Production B.V.

**Dresdner Kleinwort Wasserstein**

**Linux Clusters**

Challenge
- Reduce time to assess portfolio risk
- Increase efficiency in the pricing and relations of the whole bank interest rate position

Solution
- Linux cluster solution with 80 Netfinity nodes
- Own distribution framework with Linux in-house

Value
- From 17 hours to calculate the whole position to 11 minutes
- Cost efficient for SW licenses and HW requirements
- Competitive advantage
Linux Clusters Success

Dozens of successful deployments in all industries

IBM Blade Center
The Technology That Outperforms

- **Performance Density**
  - 2X density of existing 1U rack solutions
  - Latest, highest performance Intel processors
  - Comprehensive set of storage alternatives

- **Affordable Availability**
  - Unprecedented redundancy
  - No single point of failure = 24x7 availability

- **Network Integration**
  - Integrated Ethernet Switch = increased density
  - Simple management of switches with Common Director interfaces

- **Modular Scalability**
  - Ideal platform for "Scale Out" enterprise applications
  - Power/packaging/cooling designed with room to grow
  - Infiniband ready = investment protection
Is It Real?
The Myths of Linux

- Linux doesn't scale
- Linux isn't ready for the Enterprise
- Linux porting is difficult
- Linux lacks business applications
- Linux isn't secure
- Linux skills are scarce
**Fact: Linux Scales**

- **Database** - world record TPC-H benchmark
  - DB2 v7.2; 4 Intel(R) 900MHz PIII Xeon processors
  - 74% faster than the best Windows-based result

- **File Serving**
  - PC Mag's file servers performance tests... Linux with Samba
    - significantly outperformed Windows 2000, 11/01
  - Linux’s throughput was 78% faster

- **xSeries - record ECperf Linux performance**
  - WebSphere v4.03; 9 node xSeries 330 cluster with 2 x 1.266 GHz PIII processors
  - Near linear scalability from 1 to 9 servers
  - 86% of the performance; 29% of cost of top HP-UX/BEA benchmark

- **zSeries 12-way Server running WebSphere - Linux vs Solaris**
  - 12-way zSeries Linux partition = 36-way (9 X 4 CPU) Sun 420R servers at 100% utilization
  - Linear scalability for multiple Linux instances and users

"We chose DB2 running on Linux based on its **stability, scalability and performance**. There’s almost no end to DB2’s advantages, which include high efficiency, fast querying and search speed, and the ability to store very large amounts of data."

Dr. Napthali Rishe  
Director, Florida International University High Performance Database Research Center

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**Fact: Porting to Linux is Easy**

- Porting Solaris applications to Linux*
  - 80+% of APIs are identical
  - Less than 15% require simple translations or masks
  - Less than 5% of APIs may require rework

- D.H. Brown**:
  - Migrating UNIX web servers to Linux is one of the easiest migration scenarios in the industry.
  - Some users and deployment specialists report one day or less time to migrate small installations.

"Several large projects of moving Unix-based applications from 100 KLOC to 600 KLOC have been completed. Most were completed in about two 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 13, 2002

Source:  * IBM Canada  
** "Migrating Mail and Web Servers to Linux", D.H. Brown  
*** "Unix-to-Linux Migration ? An Easy Journey", Giga

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**Fact: Linux is Secure**

- The Open Source development process
  - Darwinian -- structured/disciplined
  - Exposed vs. hidden
- "World Governments Choosing Linux", AP, 12/1/01
  - "Chinese, French and German govs ... adopting Linux over MS"
  - "Security experts ... agree computers are less prone to hacking and viruses when running open-source software like Linux"
- The US National Security Agency embracing Linux
  - Investing to develop Linux security enhancements
- "...Window's inherent instability and susceptibility to hacks are now becoming major issues to corporate and government buyers."
  
  Microsoft's Global Insecurity Complex, Business2.0, June 17, 2002

"Gartner recommends that enterprises continue to weigh open source review as a positive factor in the security of software."

**Gartner Group,**

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Fact: Linux Skills are Easy to Learn, Widely Taught, Transferable from UNIX

- IBM Linux Scholars Challenge
  - 1,462 students entered
  - 664 colleges represented

- IBM Learning Services
  - 40 courses
  - www.ibm.com/training/spotlight/linux

- Universities embracing Linux
  - MIT, UC Berkley, City Univ. of NY, Univ. of Texas, Loyola College, Univ. of Cincinnati
  - National Univ. of Korea, Beijing Univ., Osaka Univ.

"If your IT organization supports UNIX today, you are well positioned to support Linux. UNIX skilled programmers can easily and quickly develop into Linux programmers."

Harry Roberts
SVP and CIO, Boscov’s, Inc.

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Linux @ IBM

A Commitment to Linux across the Entire Business

- 1100+ servers WW

- Internal Linux Projects:
    - redundant xSeries Linux servers
  - Intranet search engine
    - xSeries servers; Inktomi search engine
  - IGS Internet Vulnerability Security Scanning
    - 61 xSeries scanning 30k IP addresses/week
  - Performance monitoring
    - 24 xSeries servers
    - 75% fewer Linux servers than NT servers for same workload
  - IBM Global e-Mail Anti-virus Management
    - xSeries scans incoming/outgoing mail for viruses
  - 300mm Wafer Manufacturing Equip. Control
    - Much more reliable than Win2000
    - 159 xSeries; 300-400 by year end
**IBM's Contribution to Linux**

- 250+ developers worldwide
- 70+ active projects
- Significant contributions to 2.4 and upcoming 2.5 kernel:
  - Scalability
  - Scheduler
  - Security
  - Serviceability
  - Internationalization
  - Journaled Filesystem
  - Cluster Management
  - System Management
  - Network security
  - Networking
  - POSIX Threading
  - Reliability

- Trusted, valued members of the Linux Community
  - Linux Standards Base
  - Open Source Development Lab
  - Free Standards Group
  - Linux ATM Project
  - Linux Token Ring Project
  - USAGI (IPV6) Project
  - GNOME Foundation
  - KDE League

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**Why IBM for Linux?**

*Innovation & Leadership!*

**The First...**

- ...Vendor pursuing a *broad* strategy
- ...Vendor to issue full public endorsement of Linux
- ...Linux eSourcing solution
- ...Organization *dedicated* to Linux open-source projects
- ...Linux-based Integrated Solution platform for e-business
- ...Integrated Linux Cluster offering
- ...Comprehensive Linux channel program
- ...Linux industry-specific CoC
- ...workload consolidation offering for Linux
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