

A Fresh Look at the Mainframe

Consolidate and Save with Mainframe Linux

ODI is Wasting Money!

Your last report showed an average utilization of less than 5% for our distributed Linux servers – isn't that wasteful?



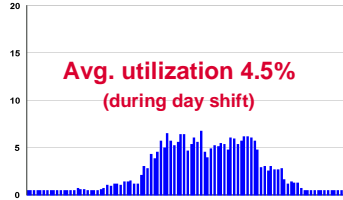
**On Demand Insurance
CEO**



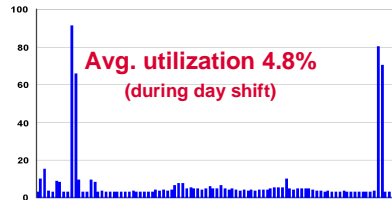
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UNIX and Windows Server Utilization – Typical Examples

App Server, Prod, PL6400R 4-way, Win2K



Exchange, Prod, PL 6400R 1-way, Win2K



App Server, Sun E10000 24--way, Solaris



Mainframes Aggregate Daytime Utilization 70-100%
Unix Servers Aggregate Daytime Utilization 15-20%
Windows Servers Aggregate Daytime Utilization < 5%

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Sprawling Server Farms Are Also Costly To Manage

- A Financial Services Company
 - ▶ 68 Windows support staff at \$100K/year, fully burdened
 - ▶ 16 servers per person
 - ▶ \$6,000 per year per server for labor
- Another Financial Services Organization
 - ▶ 7 Windows support staff at \$125K/year fully burdened rate
 - ▶ 19 servers per person
 - ▶ \$6,500 per year per server for labor

Source: IBM Scorpion Customer Studies

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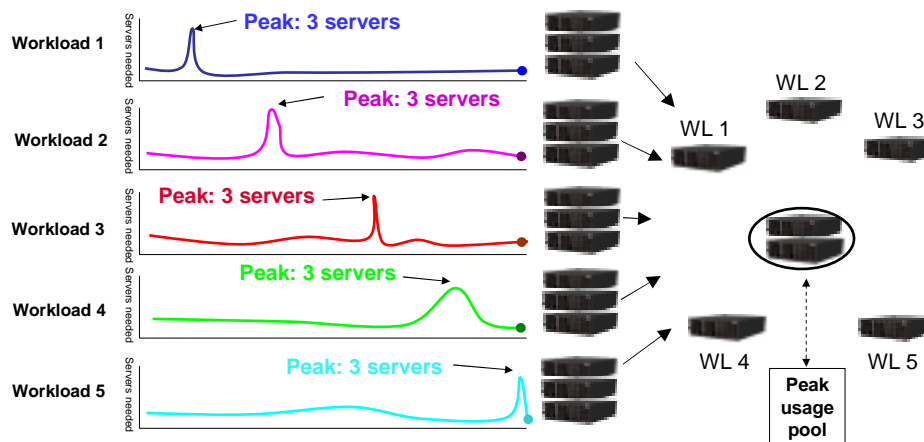
Why Does Server Sprawl Happen?

- Applications cannot run together
 - ▶ Distributed server architecture strongly favors single application deployment
 - Low level hardware architecture affects performance & integrity
 - Need to isolate applications from intrusive software maintenance (reboot!)
- Many sets of servers required per application
 - ▶ Production, Development, Testing, Disaster/recovery, Training, Support
 - ▶ New versions require new stacks, often leading to new server-sets
- Branch-style deployment scaled out over time or through acquisitions
- Deployed by different lines of business using 'private' resources
 - ▶ Ease and speed of acquisition and deployment
 - ▶ Little concern for standardization
 - ▶ Centralization is perceived as slow, inflexible & expensive
 - ▶ Politically difficult to centralize important line of business resources

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Theoretically Run the Same Workloads with Less Resources



What's Required: Virtualization and Intelligent Workload Management to Accommodate Shifting Workloads – automatic on the mainframe!

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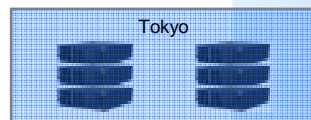
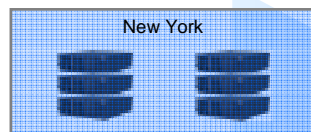
Mainframe Supports Virtualization and Workload Management

- Virtualization is where the available resources remain pooled
- Each OS sees a 'truly virtual' machine
- As workload demands, real resources are *dynamically* allocated
- Enables massive over-commitment of real resources
- Works well for real-life, mixed business workloads
- Works significantly better on mainframe hardware
 - ▶ Mainframe architecture is "shared-everything", distributed is not
- Extremely fine granularity in memory, CPU, I/O bandwidth etc.

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Consolidate Branch-style Linux Workloads onto System z to Save Money



5% utilization
Local staffing and
infrastructure required in
each location

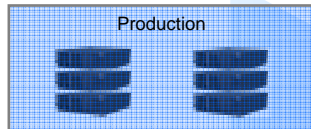


**All of the qualities of services
of the System z platform**

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Consolidate Server Farm Linux Workloads onto System z to Save Money



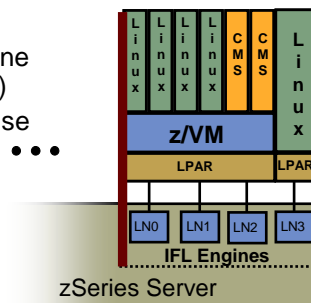
5% utilization
 Separate servers for each task – all require infrastructure, staff



95% utilization of fewer processors
 All of the qualities of services of the System z platform

Integrated Facility for Linux (IFL) Makes Linux Consolidation Even More Attractive

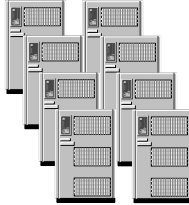
- Same as general purpose processor
 - ▶ Specifically limited to Linux workloads
- Attractive pricing
 - ▶ Hardware is \$95K - \$125K per processor one time charge (14% of general purpose price)
 - ▶ IBM Linux middleware is charged one license per IFL
 - The same rate as a distributed processor
- Requirements
 - ▶ z9-109, z990, z900, z890 or z800 hardware platform
 - ▶ No z/OS requirements
 - ▶ No limit on the number of IFLs



ODI Will Save with Linux Consolidation

\$1.1M saving over 3 years

60 Linux Servers



1 IFL

	Distributed Linux/Intel @ low utilization				Mainframe IFL @ high utilization			
	Unit cost	Quantity	Sub Total	3 year total	Unit cost	Quantity	Sub Total	3 year total
Hardware & OS - every 3 years	\$4,000	60	\$240,000	\$240,000	\$125,000	1	\$125,000	\$125,000
HW Maintenance		Included			\$19,944	1	\$19,944	\$39,888
VM virtualization		N/A			\$22,500	1	\$22,500	\$22,500
VM S&S (25%)		N/A			\$5,625	1	\$5,625	\$16,875
Annual Linux support	\$1,000	60	\$60,000	\$180,000	\$14,000	1	\$14,000	\$42,000
OTC Software license – WAS*	\$4,000	60	\$240,000	\$240,000	\$4,000	1	\$4,000	\$4,000
WAS S&S for 2 years	\$800	60	\$48,000	\$96,000	\$800	1	\$800	\$1,600
Annual labor for support	\$3,333	60	\$200,000	\$600,000	\$60,000	1	\$60,000	\$180,000
Annual power & cooling	\$920	60	\$55,188	\$165,564	\$920	1	\$920	\$2,759
Grand Total				\$1,521,564				\$434,622

* IBM WebSphere Application Server for Linux

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Background to Financial Case Study

■ Approach

- ▶ Compared the costs of 60 distributed Intel servers doing Web (including some J2EE), File and Print Serving and one IFL
 - 60 distributed servers to 1 IFL is a typical ratio according to customer studies
 - OS standardization and guest automation enables significantly lower staffing
- ▶ Used a 3 year horizon, savings continue linearly over longer (eg. 9 years)
- ▶ Included hardware maintenance and software support

■ Assumptions

- ▶ PC service included in the price
- ▶ Base WAS used, 1st year's service included in license
- ▶ Used z/VM to optimize virtualization
- ▶ 24 by 7 hour operation
- ▶ PC servers consume 400W each, 15¢/kWh
 - Cooling costs ~ power costs
- ▶ Cost of capital/inflation ignored

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DEMO: Linux Server Provisioning

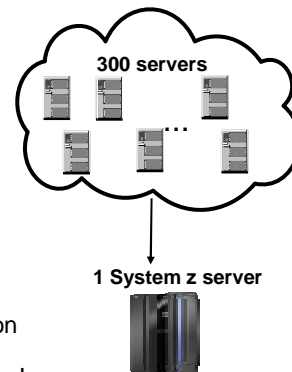
- ODI wants a proof-of-concept of automated provisioning
 - ▶ Allow developers and testers to obtain machines immediately
 - ▶ Fully configured machines 'created' in minutes
- For their POC, the ODI mainframe system administrator decides to 'learn a little Linux'
 - ▶ There are tools from IBM and others for automated provisioning...
 - ▶ ...but also plenty of freely accessible tools and redbooks
- Let's see what they managed to create...

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Hannaford Supermarket Chain Goes Real Time with Linux on System z

- North-eastern United States supermarket chain
- Reduced costs while improving customer and partner satisfaction using Linux on System z
- Consolidated 300 store servers on to a single mainframe
 - ▶ Running 62 virtual servers instead
 - ▶ **Orders now direct from the aisles, just-in-time inventory management**
 - ▶ Introduced new web portal for business partners
 - ▶ Significant labor savings across the IT organisation
- See <http://biz.yahoo.com/iw/051205/0103015.html>



"The only way we'd consider consolidating critical data from hundreds of servers onto one system was by choosing an IBM mainframe for its legendary reliability and availability,"

- Bill Homa, senior vice president and CIO of Hannaford

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Nationwide® Saves \$16+ Million with Linux on System z On Your Side™ System z

- **Nationwide** is a US-based Fortune 100 insurance & financial services company
 - ▶ \$21B+ revenue, 30,000+ employees (6,000 in IT)
- **Situation:**
 - ▶ 5000+ distributed servers under management with low utilizations
 - ▶ Linux and J2EE being used for new applications, with no single point of failure
- **Problems:**
 - ▶ High TCO including data center power and floor space scarcity (new facility would cost \$10M+)
 - ▶ Long server provisioning process
 - ▶ Need to "over-provision" for peaks leading to inefficient utilization
- **Solution:**
 - ▶ Server Consolidation using System z Virtualization (System z990, IFLs, z/VM...)
- ▶ **Result:** **Vastly improved TCO, Speed & Simplification**
 - ▶ 50% reduction in Web hosting monthly costs, 80% reduction in floor space & power conservation
 - ▶ 50% reduction in hardware & OS support efforts; significant savings on middleware costs
 - ▶ 350 servers virtualized with 15 z990 IFLs, supported by 3 FTEs
 - ▶ 12 mission critical applications with 100,000+ users/day
 - ▶ Fast deployment (4 months)
 - ▶ Significantly faster provisioning speed (months → days)
 - ▶ Provisioned 22x the anticipated load for SuperBowl AD using CoD (1 processor for 2 weeks)
 - ▶ Dynamic allocation of compute power eliminates need to "over-provision"
 - ▶ Simple, robust mainframe high availability & disaster recovery

PGATOUR.COM Move to Utility Computing with Linux on System z

- PGATOUR.COM website provides fee-based live golfing data and views
- Faces huge surges of demand for the application when events are ongoing
- An early Linux adopter across their entire shop, wanted to use Linux
- Serve the main PGATOUR.COM application from virtual Linux servers
 - ▶ The System z server is hosted by IBM
 - ▶ PGATOUR.COM only pay for the capacity they use
 - ▶ Linux servers are automatically provisioned on demand
 - ▶ Save the time and expense associated with many new Linux servers
 - ▶ Application won a 2005 Emmy award (Emmy for Outstanding Achievement in the category of Advanced Media Technology)
- See <http://esj.com/news/article.aspx?EditorialsID=396>

"On Sunday night at 6:00 p.m., there's not much planning you can do for the next day. You can't just roll a pile of servers in for Monday morning..."

- Steve Evans, PGA TOUR's Vice President of Information Systems

ODI Linux Server Consolidation Solution

I saved \$5.5M over 9 years by consolidating our Linux servers to System z!



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