

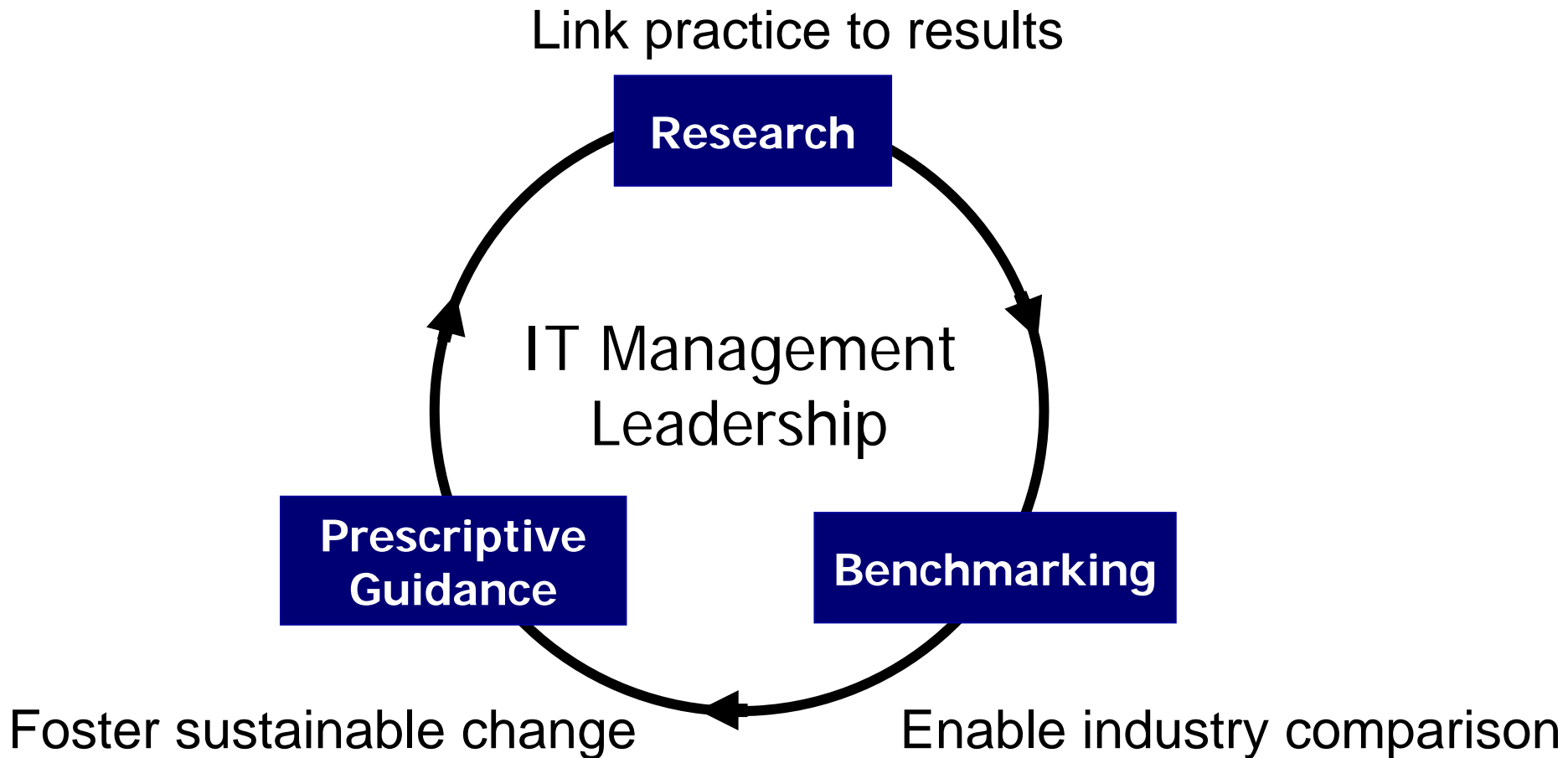
Server Virtualization Best Practices, Performance Benchmarks, Risk Reduction Strategies

Based on IT Process Institute
Server Virtualization Maturity Study
including data from 323 companies

Brian Uhelski
IT Process Institute

IT Process Institute

Mission - advancing the science of IT management



Why study top performers?

- What makes top performers different?
- How does your organization stack up?
- How to best close the gaps?

Agenda

- Research study – analysis of 11 executive interviews and data from 323 IT organizations
- Suggests 5 key findings:
 1. Top performers are virtualizing business critical systems
 2. Server Virtualization objectives are evolving
 3. Top Performers modify procedures and controls as virtualization objectives evolve
 4. Top performers know widespread adoption doesn't happen in a vacuum
 5. Top performers leverage tools and automation

ITPI Server Virtualization Maturity Study

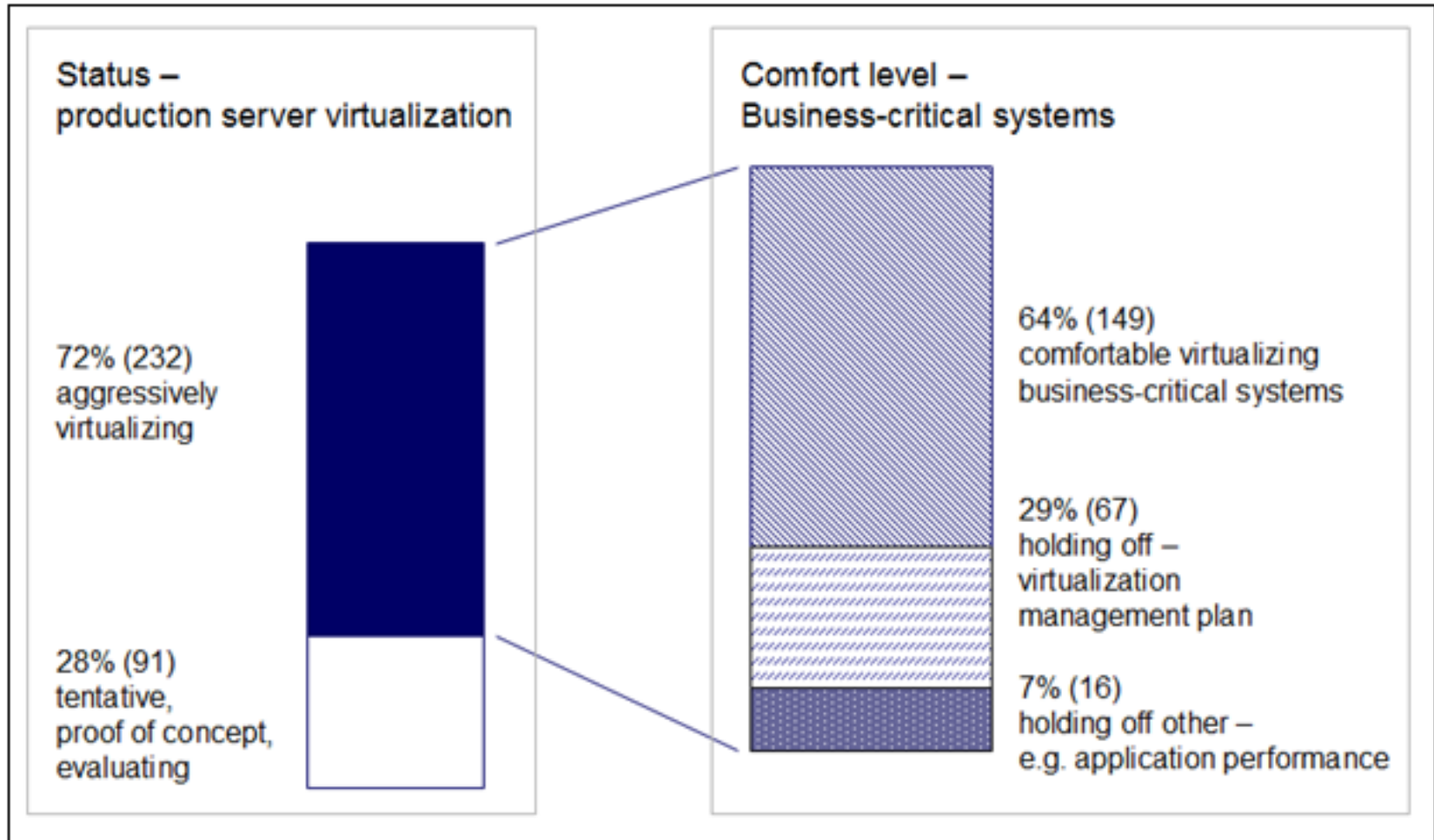
- Objective
 - Identify procedures and controls that should be in place to enable aggressive virtualization of production systems.
- Methodology
 - 15 executive interviews – virtualization does impact compliance and IT controls
 - Web-survey – data collected from 323 IT organizations – range of practices and measures
 - Assess operational maturity related to broad range of virtualization related practices
 - Assess performance from 14 operational measures
- IT executives can use findings to ...
 - Understand production management procedures and controls aligned with virtualization objective
 - Identify performance impact for different use cases
- Answers Key Questions:
 - **What changes as we move virtualization into production?**
 - **What should we expect as we expand virtualization footprint?**
 - How can we leverage our investment in people and tools?

Do you see any control issues?

- “It doesn’t matter what server the application is on because virtualization breaks the link between hardware and software...”
- “During peak load – we create multiple instances of the application and data – and run on multiple clusters and pull them back after demand goes back to normal...”
- “I can push this patch out to all the virtual machine OSs on this host simultaneously...”
- “During maintenance – we live migrate the servers to another cluster and move back when done...”

Key Finding 1

- Top performers are virtualizing business critical systems



Source – ITPI Server Virtualization Maturity Study

Key Finding 2

- Server Virtualization objectives are evolving

Virtualization Objectives	Consolidation	High Availability / Disaster Recovery	Dynamic Capacity	Total # (%)	
Aggressively deployed in production – 232 companies	X	X	X	65 (28%)	
	X			61 (24%)	
	X	X		41 (18%)	
			X	30 (13%)	
	X			X	26 (11%)
			X	X	6 (3%)
				X	4 (2%)

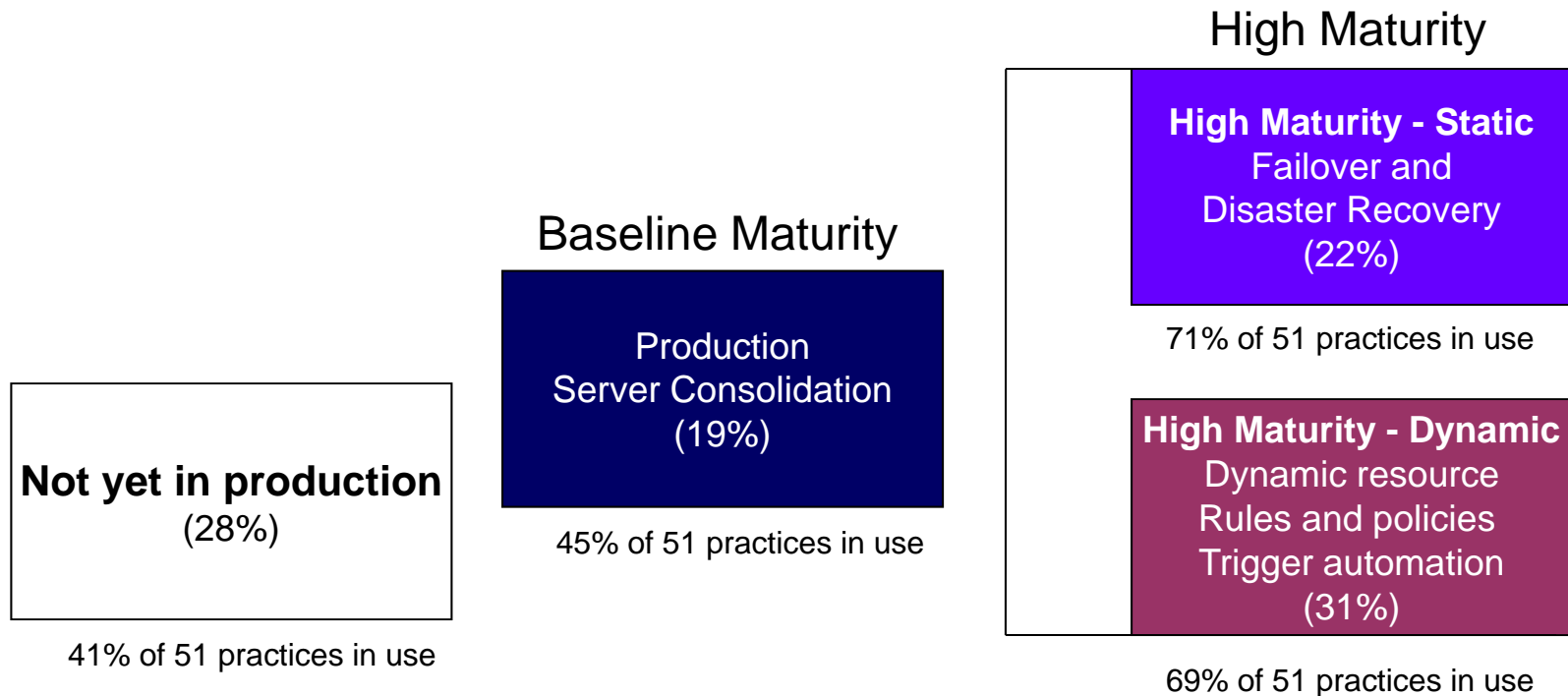
What changes as move from consolidation to other objectives?

Source – ITPI Server Virtualization Maturity Study

Key Finding 3

- Top Performers have a virtualization management plan

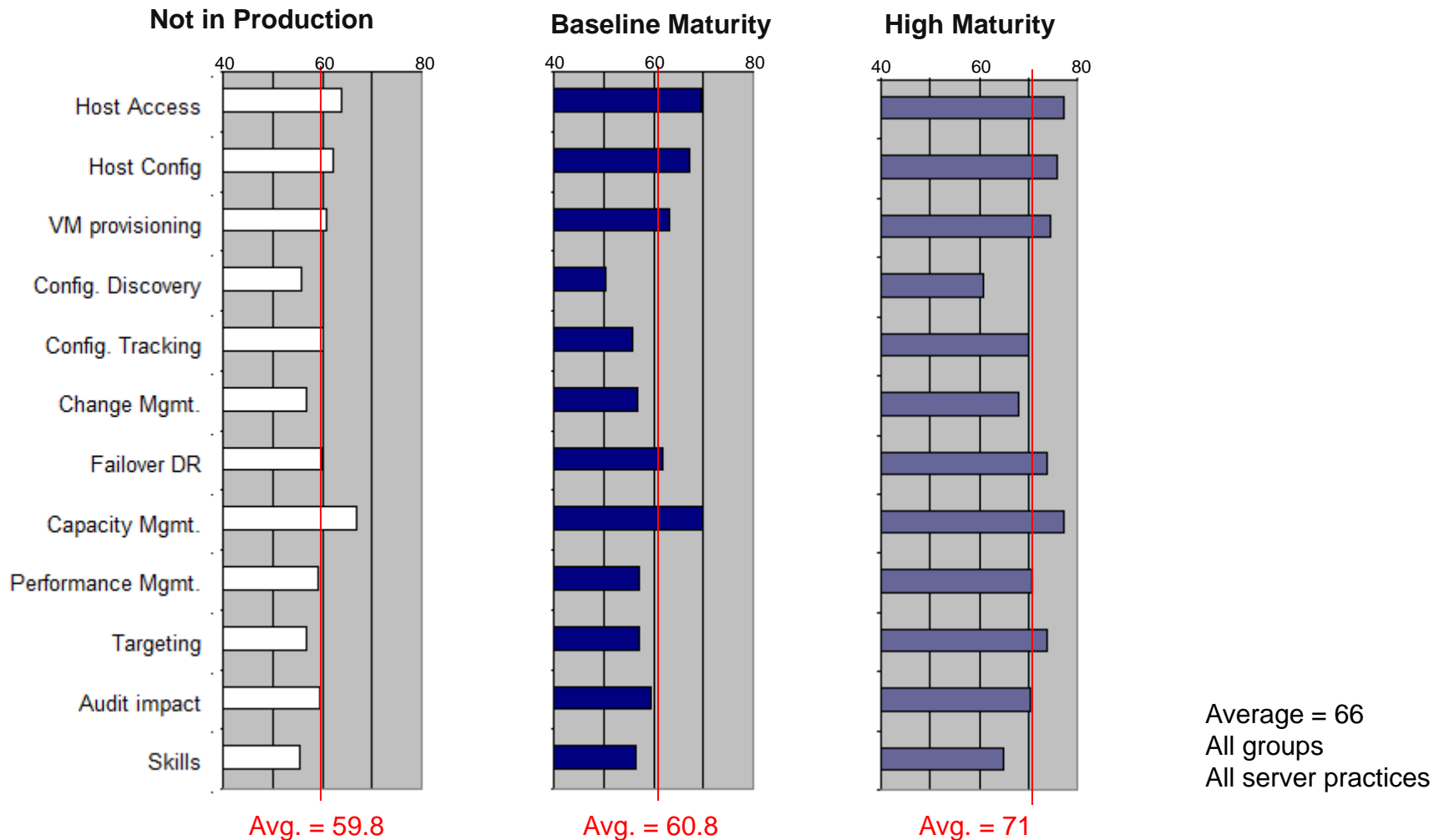
Use of virtualization management practices evolves as organizations extend virtualization objectives



Source – ITPI Server Virtualization Maturity Study

Operational Maturity – by management area

- Average scores (100pt scale) for server controls/procedures in 12 areas



Source – ITPI Server Virtualization Maturity Study

Management Practices - Consolidation

Assume – start with strong foundation of best practices

- **Host Access and Configuration**
- Define host admin role
- Restrict privilege based on role
- Document admin and maintenance procedures
- Document host configuration standards
- **Virtual Machine Provisioning**
- Define and enforce an image build process
- Strictly follow production change management and tracking process
- **Capacity and Performance Management**
- Actively monitor capacity and performance
- Consider capacity issues when making targeting decision
- Add capacity and performance evaluation to change approval criteria

Management Practices – HA and DR objectives

Improve practices to ensure speed and quality of re-provisioning

- Virtual Machine Provisioning
 - Use a tiered build approach – OS, middleware, application
 - Test images together
- Tracking
 - Identify actions that result in CMDB/asset repository update
 - Track license usage during rebuild
- Change Management
 - Enforce change process compliance to keep virtual environments in known state
 - Use discovery tools to periodically scan and identify configuration drift
- Failover Policy
 - Targeting criteria includes failover/DR requirements
 - Formalize failover/DR procedures
 - Implement guidelines to specify when to re-provision in lieu of repair

Management Practices – Dynamic Infrastructure

Requires highest level of operational maturity

- Virtual Machine Provisioning
 - Use a lifecycle tool to control automated provisioning
- Configuration Discovery and Tracking
 - Increase frequency of drift scanning
 - Track cloning and moving within and between clusters
 - Update policies about what to track in CMDB/repository
- Change Management
 - Modify standard change categories to include dynamic tool actions
 - Expand list of pre-approved changes to include actions triggered by rules and policies.
- Capacity and Performance Management
 - Integrate and consolidate host, VM, and application capacity/performance data

Key Finding 4 -

- Top performers know widespread adoption doesn't happen in a vacuum
- Fellow IT professionals are more likely to support a large virtualization footprint if they are included in expansion decisions
- Invite other functional groups for input on virtualization-related decisions
- Identify touch points with other key process owners
- Consider and communicate how virtualization improves other's work procedures and helps meet their objectives

Key Finding 5

- Top performers leverage tools and automation

Point of automation % that agree or strongly agree with statement	Consolidation	High Availability / Disaster Recovery	Dynamic Capacity
Overall, Virtualization has resulted in the increased use of process and procedure automation.	51%	54%	72%
Use of virtualization has resulted in improving or streamlining failover and rebuild process so it is more repeatable and automated.	49%	69%	69%
Virtualization tool actions trigger automated workflow to update change records.	26%	45%	56%
Automation standardizes the provisioning process to maintain configuration compliance, using a library of version controlled build images.	33%	51%	55%
Virtualization tool actions trigger discovery tools to verify configuration details and update configuration records (i.e. update CI in CMDB).	30%	35%	52%

Focus Automation Efforts

- Provisioning test and Development
 - Leverage tools to provision/de-provision environments with standard configurations and short lifespan.
- Provisioning production
 - Integrate with service desk and service catalogue.
- Change Tracking
 - Trigger change workflow for virtualization tool actions.
- Configuration verification
 - Trigger automated discovery and config update from virtualization tool actions.
- Standard build library
 - Version control and lifecycle management .
- Failover and rebuild
 - Automate failover and re-provision to restore service. Regularly test to verify.
- Chargeback or showback
 - Automate data collection to track service usage.

Summary - Net recommendations

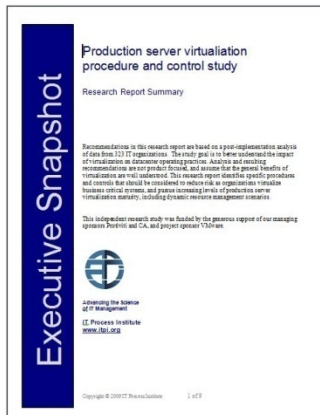
- Match virtualization management practices with server virtualization objectives.
- Proactively work with other groups to drive widespread adoptions – doesn't happen in a vacuum.
- Assess risk impact with business continuity office, disaster recovery planning.
- Use these lists to evaluate audit checklist, as part a governance risk and compliance review process.
- Benchmarking opportunity – compare practices in use based on current and planned virtualization objectives.

ITPI study content available www.itpi.org

Executive Summary Paper
[link](#)

Summary Presentation

- List of recommended practices
- Recommendations



Full Research Report
[link](#)

Comprehensive Presentation

- Summary of all survey data
- Segmentation details
- Practices – analytics
- Measures – analytics



On-line Benchmark
[link](#)

Compare practices – based on virtualization objectives



Other ITPI Studies and Benchmarks

- IT Controls Performance Study and benchmark
- Change Configuration and Release Performance Study and benchmark
- IT Strategic Alignment Performance Study and benchmark
- IT Governance Maturity Study

Contact

Brian Uhelski

Director

IT Process Institute

(678) 248-1557

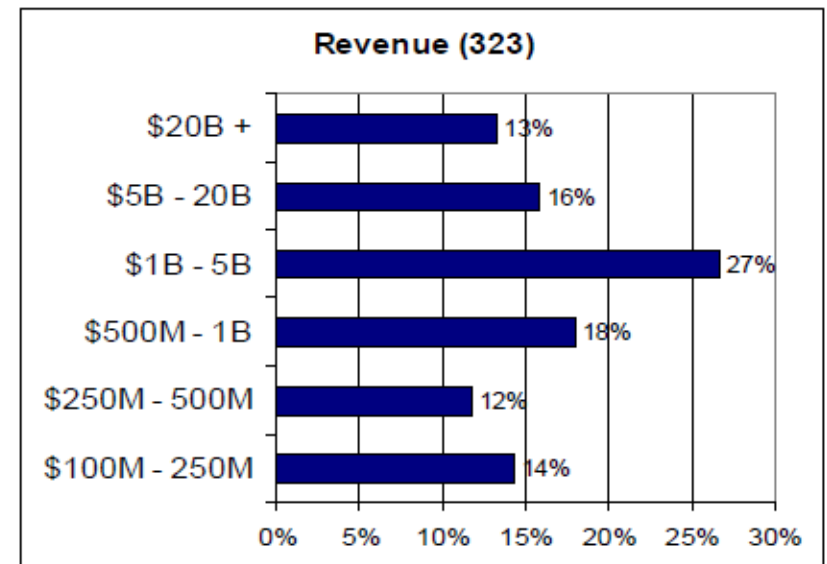
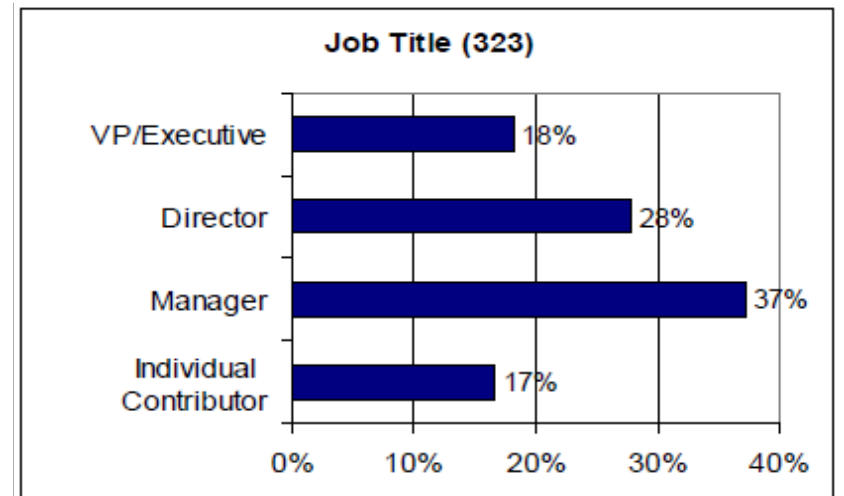
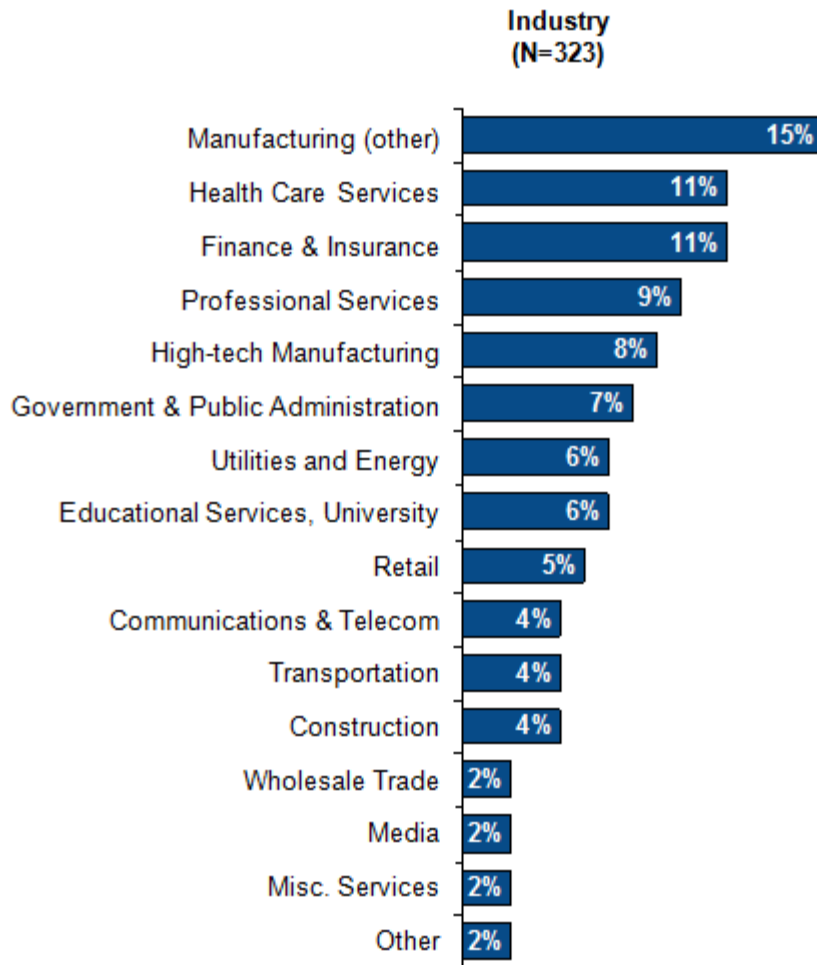
Brian.uhelski@itpi.org

Additional Data

- Server Virtualization Study Demographics

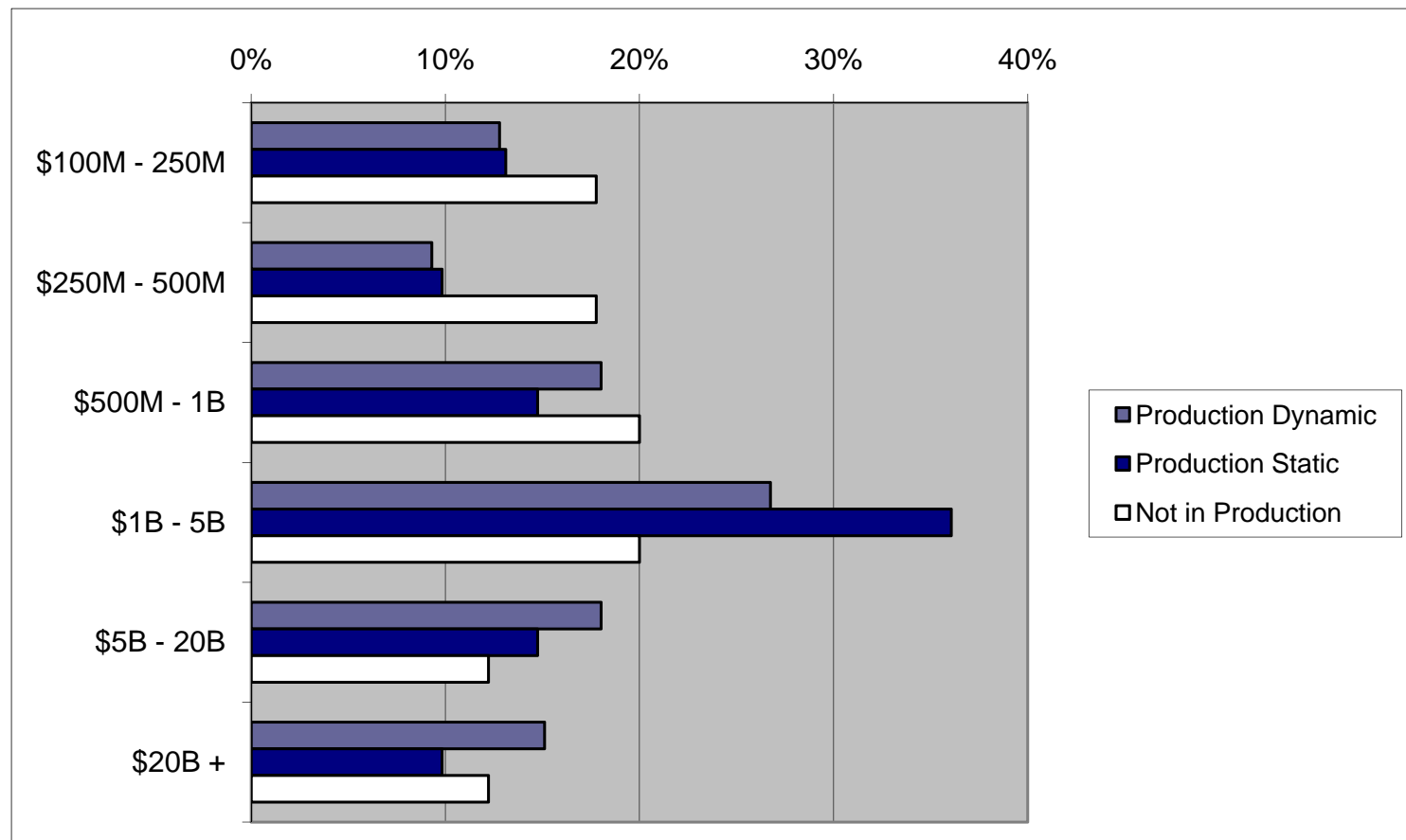
Demographics

46% of respondents director level or above



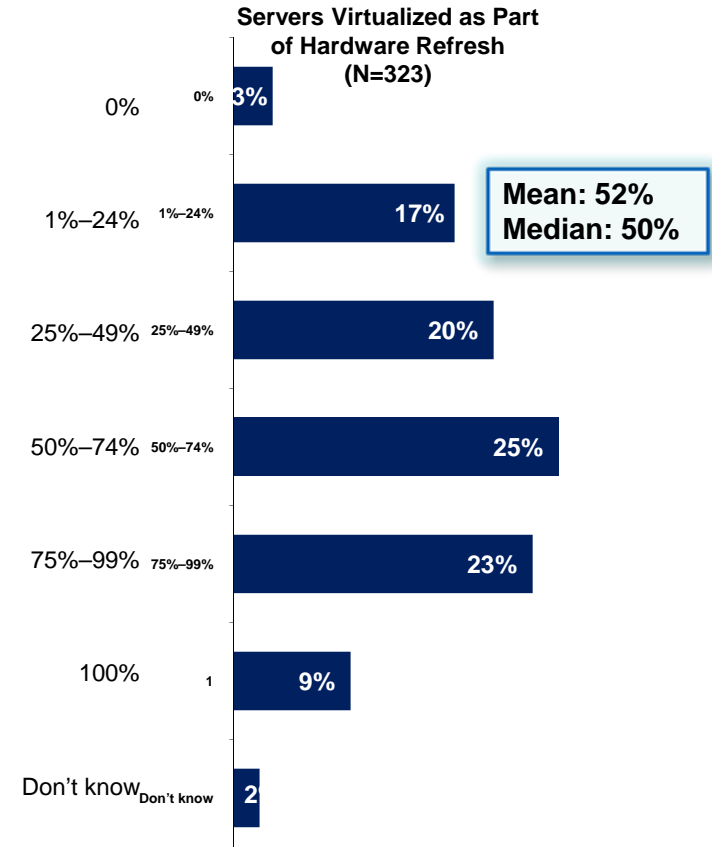
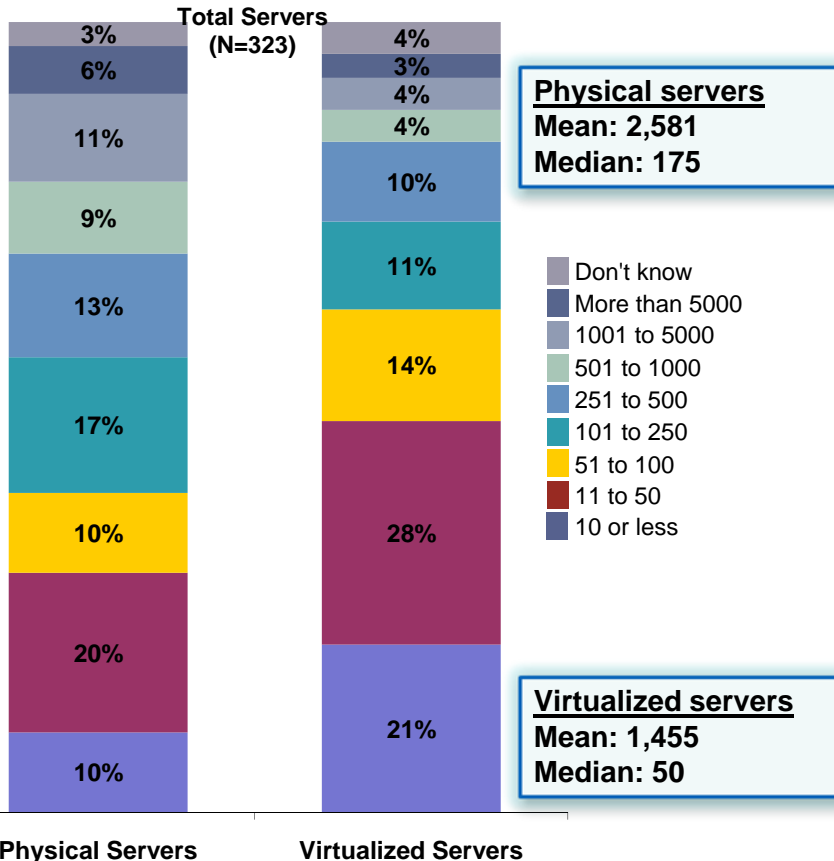
Company Size

- Small - \$100M to \$1B – more likely to not be in production
- Medium \$1B to \$5B – most likely to be using static virtualization
- Larger \$5B + - more likely to be using dynamic virtualization



Number of Physical and Virtualized Servers

- Respondents have an average of 2,581 physical servers and 1,455 virtualized servers; half of organizations have 50 or fewer virtualized servers.
- About half of those virtualized servers were virtualized as part of a hardware refresh.



Q11. How many physical servers (including all types Windows, AIX, Solaris etc) are there managed by your IT organization? Include estimate of servers managed by 3rd party service providers.

Q12. How many virtualized servers (including all types Windows, AIX, Solaris etc) are there managed by your IT organization? Include estimate of servers managed by 3rd party service providers

Q14. Please estimate the percentage of those virtualized servers that were virtualized as part of a hardware refresh; that is, moved from older legacy configuration that is being phased out to newer OS or server configuration.

Survey Questions – “cast a wide net”

Firmographic

- Revenue
- IT Budget
- Number of Employees
- Number of IT Staff
- Number of Datacenters
- Number of Servers
- Number of Desktops
- Number of Virtualized servers
- Number of Virtualized desktops
- Patch frequency
- Planned maintenance hours/wk
- Hardware refresh
- CMDB track rate

(51) Procedures and Controls

- (9) Host access and configuration controls
- (8) VM provisioning
- (8) Configuration discovery and tracking
- (7) Change management
- (4) Failover and disaster recovery
- (6) Capacity and performance management
- (4) Risk and Audit
- (5) Other

(12) Hard Measures

- Resource utilization (2)
- Change and release management (5)
- Service and support (3)
- Configuration control (2)

(9) Soft Outcomes (1-5 scale)

- Sprawl and variance (2)
- Agility and speed (1)
- Service management effort and automation (2)
- Risk and control (4)

Study goal – link practices to performance

Summary data – 323 organizations

- Server virtualization has moved beyond test and development
 - 72% aggressively virtualizing production servers
 - 44% of the rest are tentatively deployed in production
- Mix of production virtualization objectives:
 - Not aggressive in production (28%)
 - Aggressive - Server consolidation (19%)
 - Aggressive - High availability (22%)
 - Aggressive - Dynamic resource optimization (31%)
- Of those aggressively pursuing production virtualization
 - 58% had at one point paused adoption to review security and operating risks to get comfortable with new technology in the production environment
 - 64% are now comfortable virtualizing business critical systems
 - 69% have virtualized systems “in scope” for compliance audit.