

CLOUD ECONOMICS

CORPORATE STRATEGY GROUP
JANUARY 2011

THE HORSELESS CARRIAGE SYNDROME



COMPUTING PARADIGM DISRUPTIONS

More than just a technology shift...

TECHNOLOGY

ECONOMIC

MAINFRAME



CLIENT-SERVER



CLOUD



COMPUTING PARADIGM DISRUPTIONS

More than just a technology shift...

TECHNOLOGY

ECONOMIC

MAINFRAME



- Centralized compute & storage, thin clients

CLIENT-SERVER



- PCs and servers for distributed compute, storage, etc.




CLOUD



- Large DCs, commodity HW, scale-out, devices

COMPUTING PARADIGM DISRUPTIONS

More than just a technology shift...

	TECHNOLOGY	ECONOMIC
MAINFRAME 	<ul style="list-style-type: none">• Centralized compute & storage, thin clients	<ul style="list-style-type: none">• Optimized for efficiency due to high cost
CLIENT-SERVER 	<ul style="list-style-type: none">• PCs and servers for distributed compute, storage, etc.	<ul style="list-style-type: none">• Optimized for agility due to low cost
CLOUD 	<ul style="list-style-type: none">• Large DCs, commodity HW, scale-out, devices	<ul style="list-style-type: none">• Order of magnitude better efficiency and agility

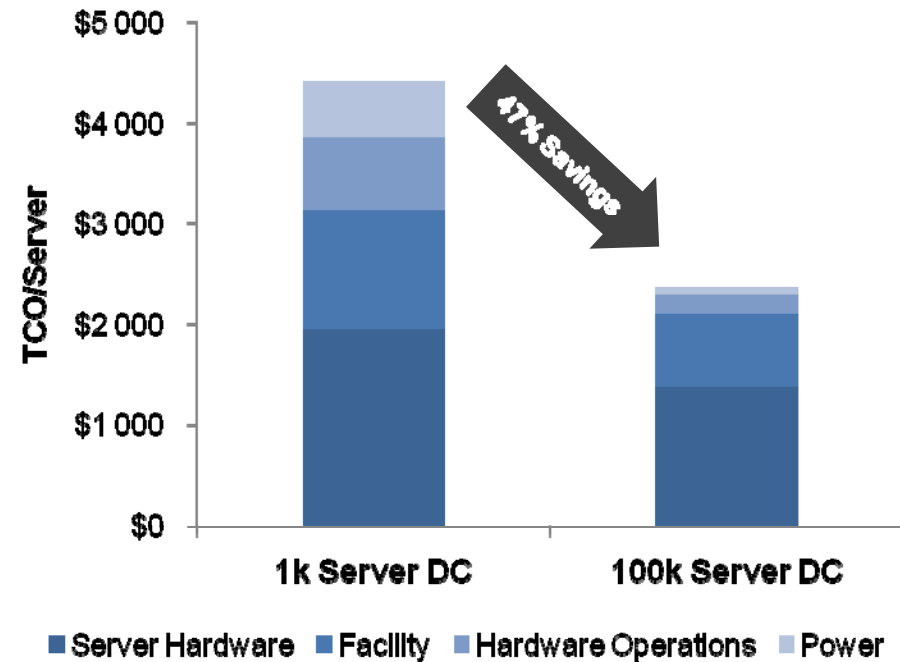
1. SUPPLY-SIDE ECONOMIES OF SCALE

Larger datacenters have almost 50% lower TCO per server

MAIN DATA CENTER COST BUCKETS

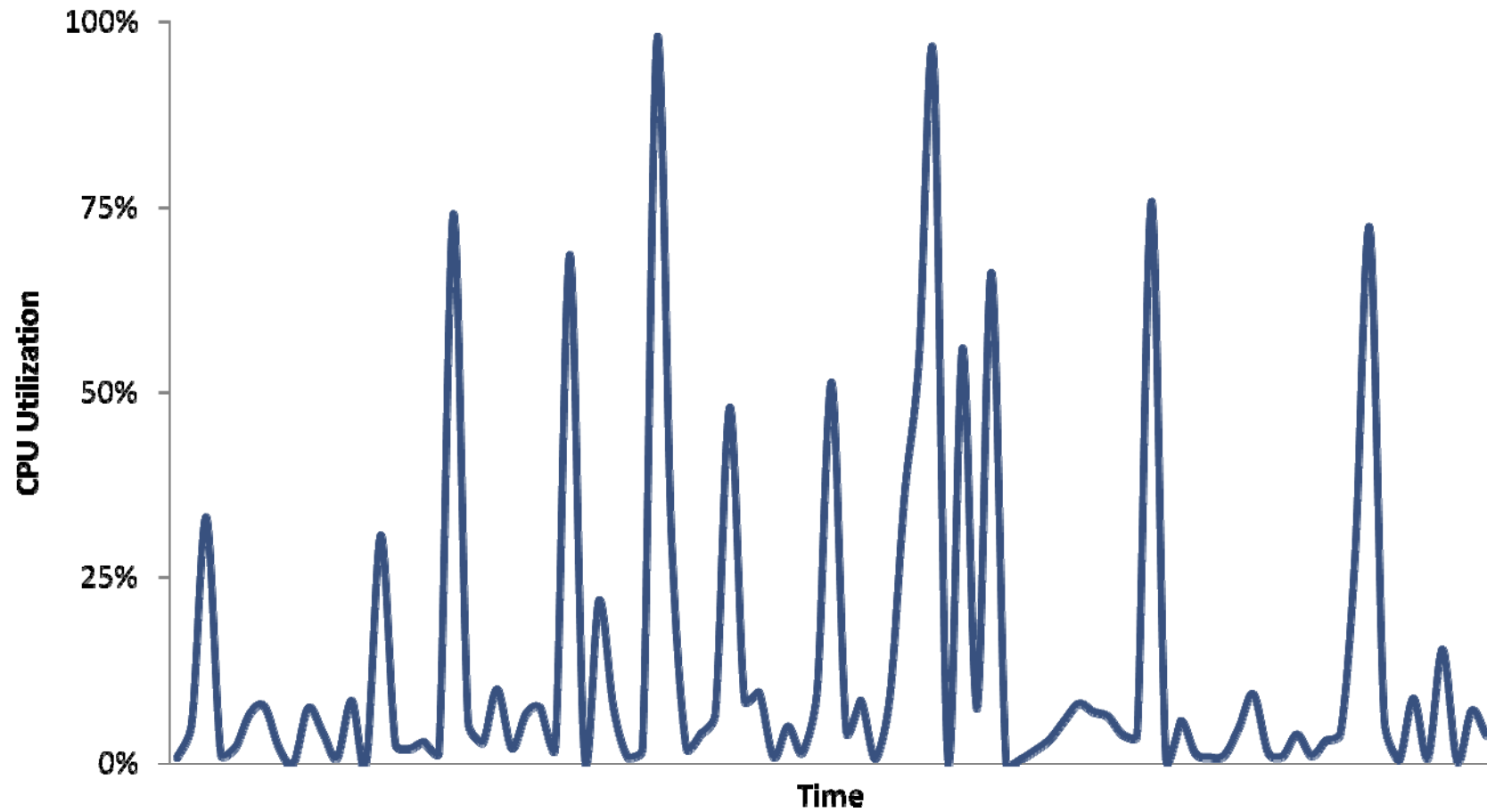
- Server hardware costs (~45%)
- Facility & operations (~25%)
- Hardware labor costs (~15%)
- Power costs (~15%)

ANNUAL TCO/SERVER DECLINES W/SCALE

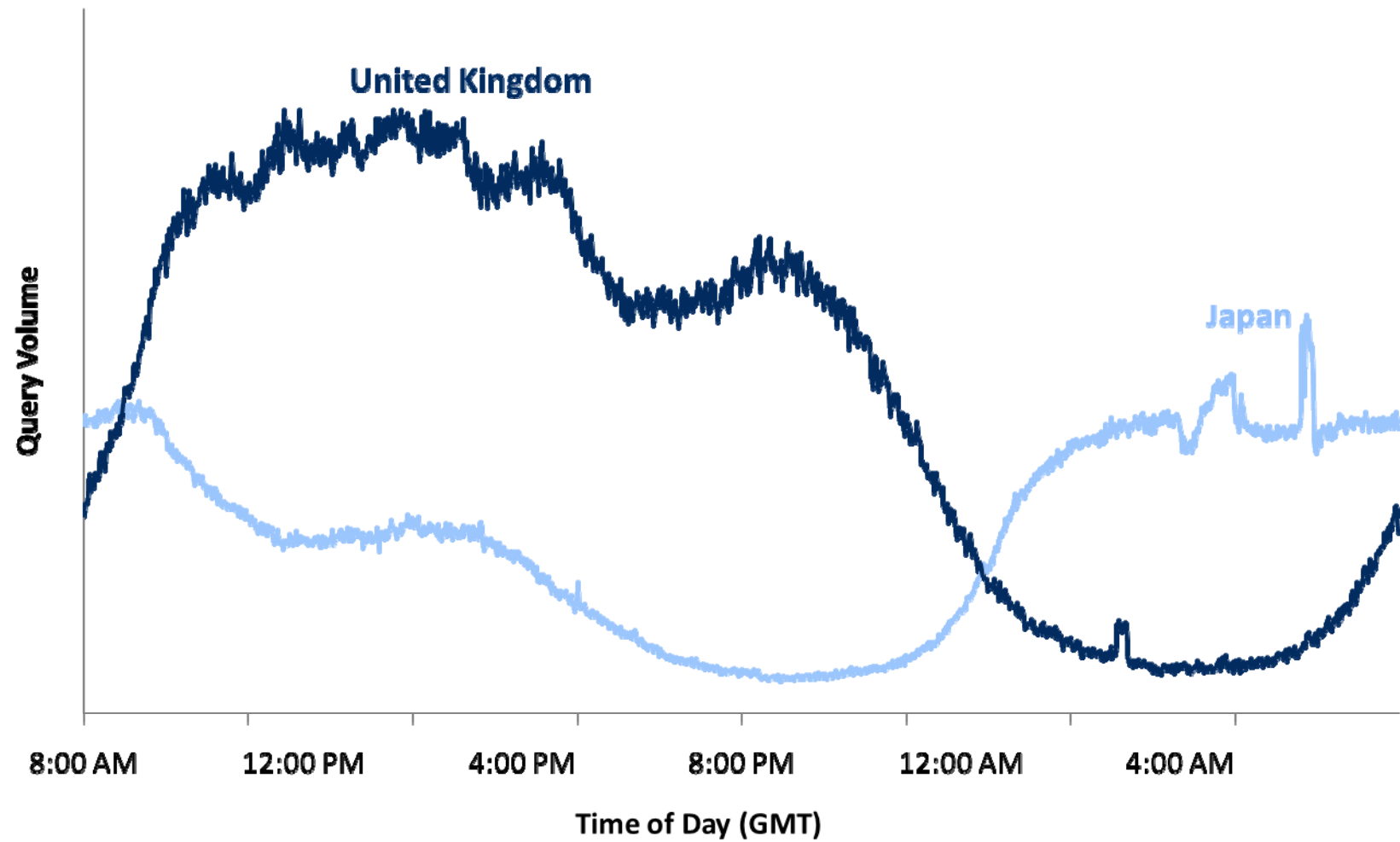


2. DEMAND SIDE ECONOMIES OF SCALE

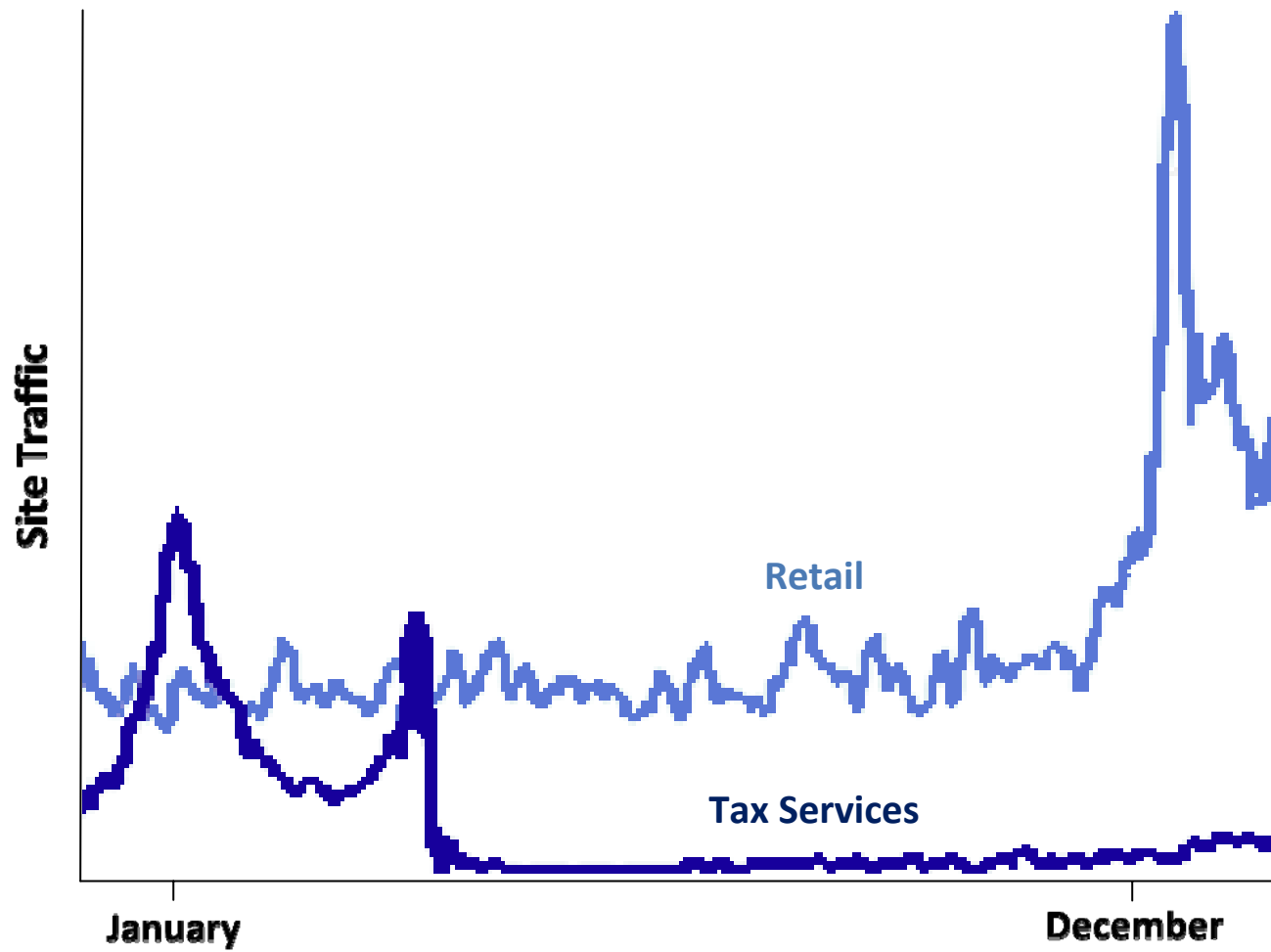
Average server utilization rates are 5-10%



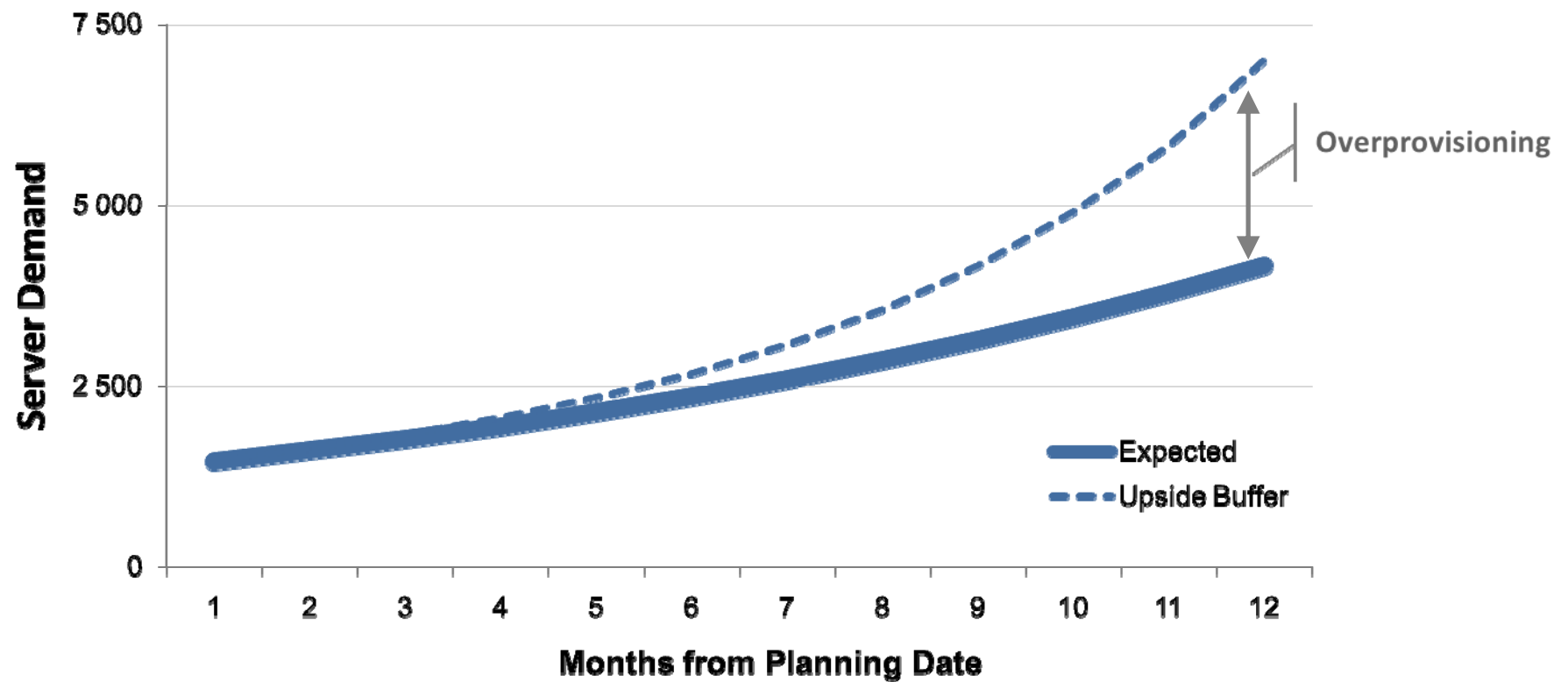
TIME OF DAY VARIABILITY



INDUSTRY VARIABILITY

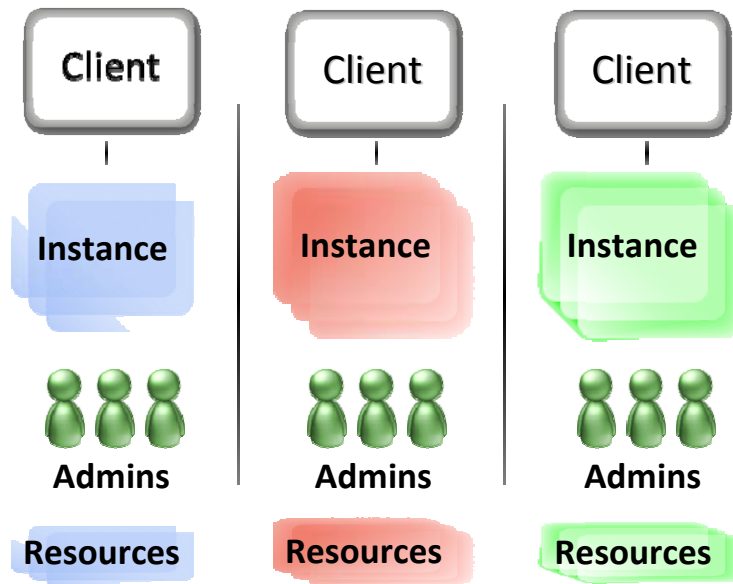


UNCERTAIN GROWTH



3. BENEFITS OF MULTI-TENANCY

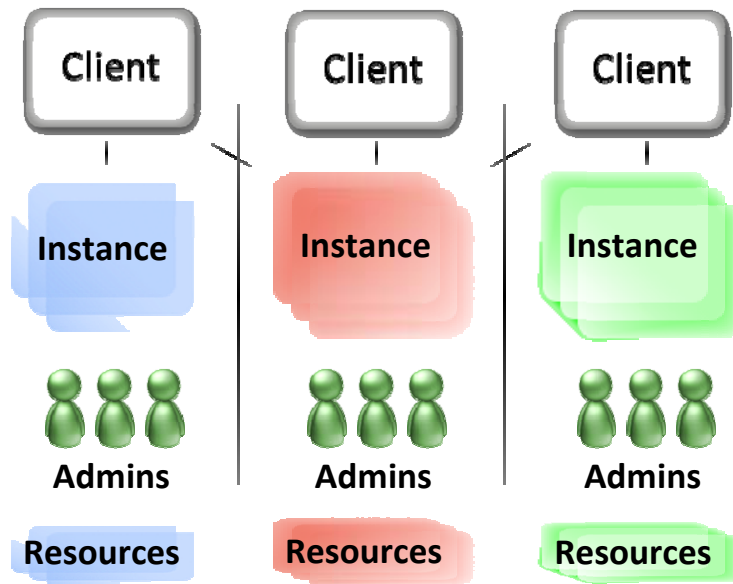
SINGLE-TENANT APPLICATION



- Each client has a dedicated instance
- Instances separately administrated
- Dedicated resources
- Costs grow with scale

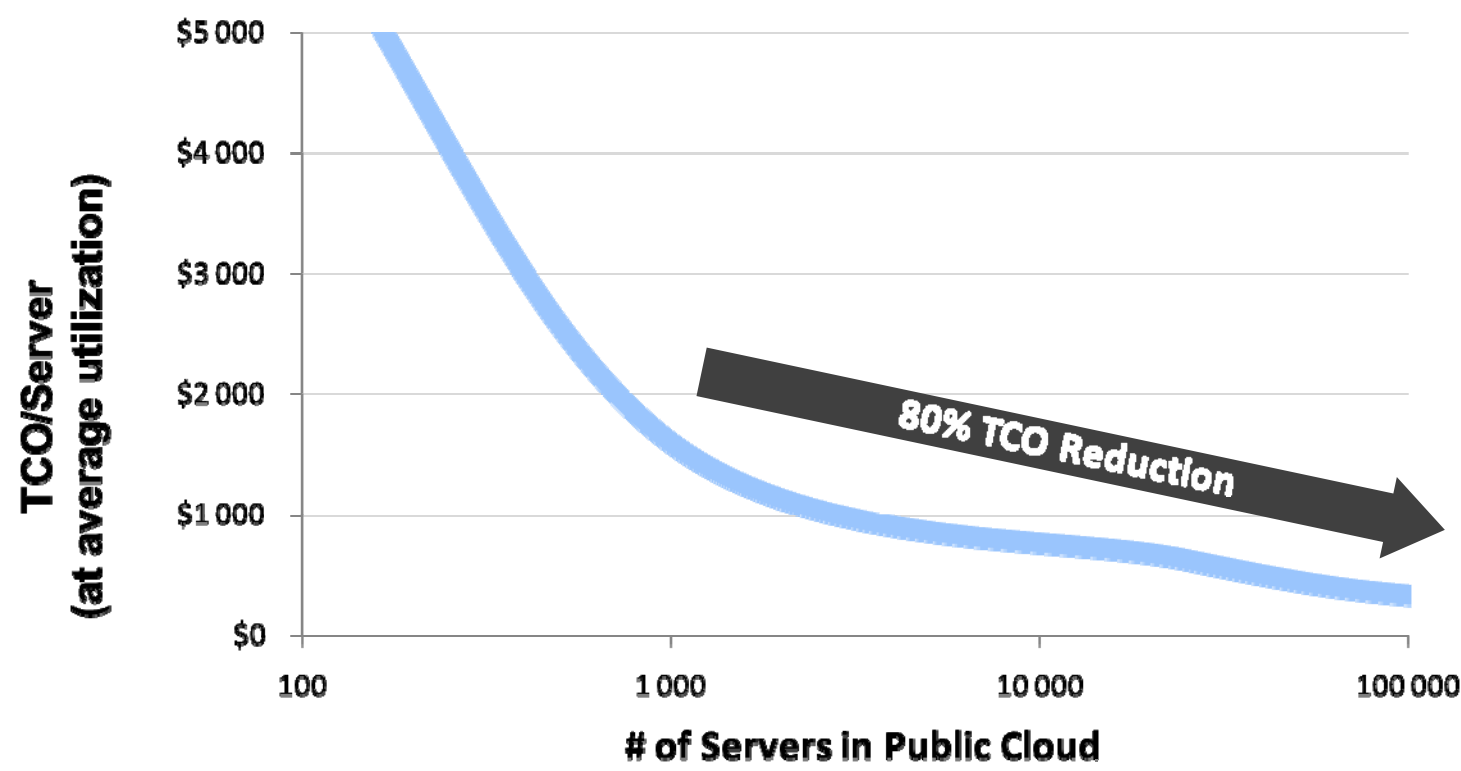
3. BENEFITS OF MULTI-TENANCY

MULTI-TENANT APPLICATION

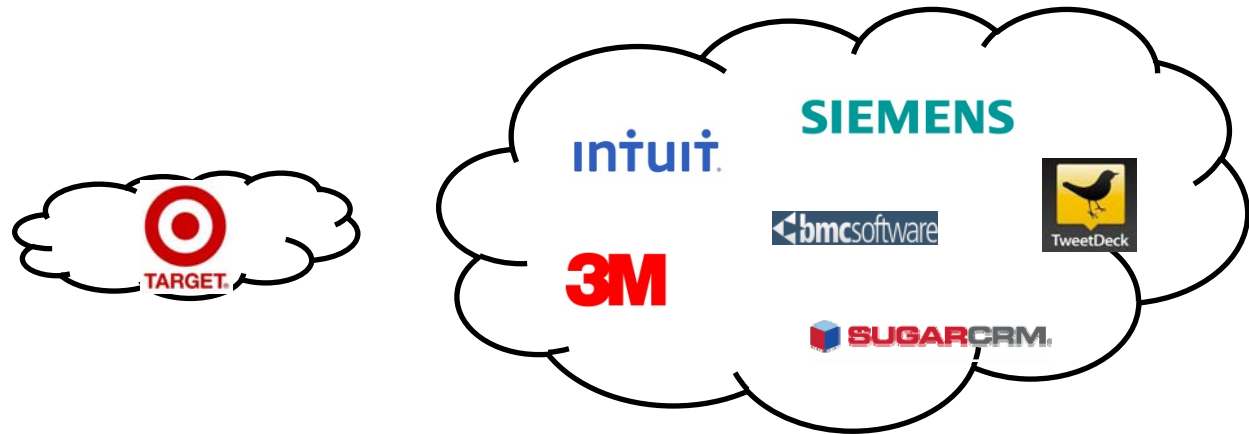


- One instance for all clients
- One group of administrators
- Fixed resources are shared
- Costs go towards zero with scale

OVERALL ECONOMIES OF SCALE



PUBLIC vs. PRIVATE



1) Supply-side

✗

✓

2) Demand-side

✓

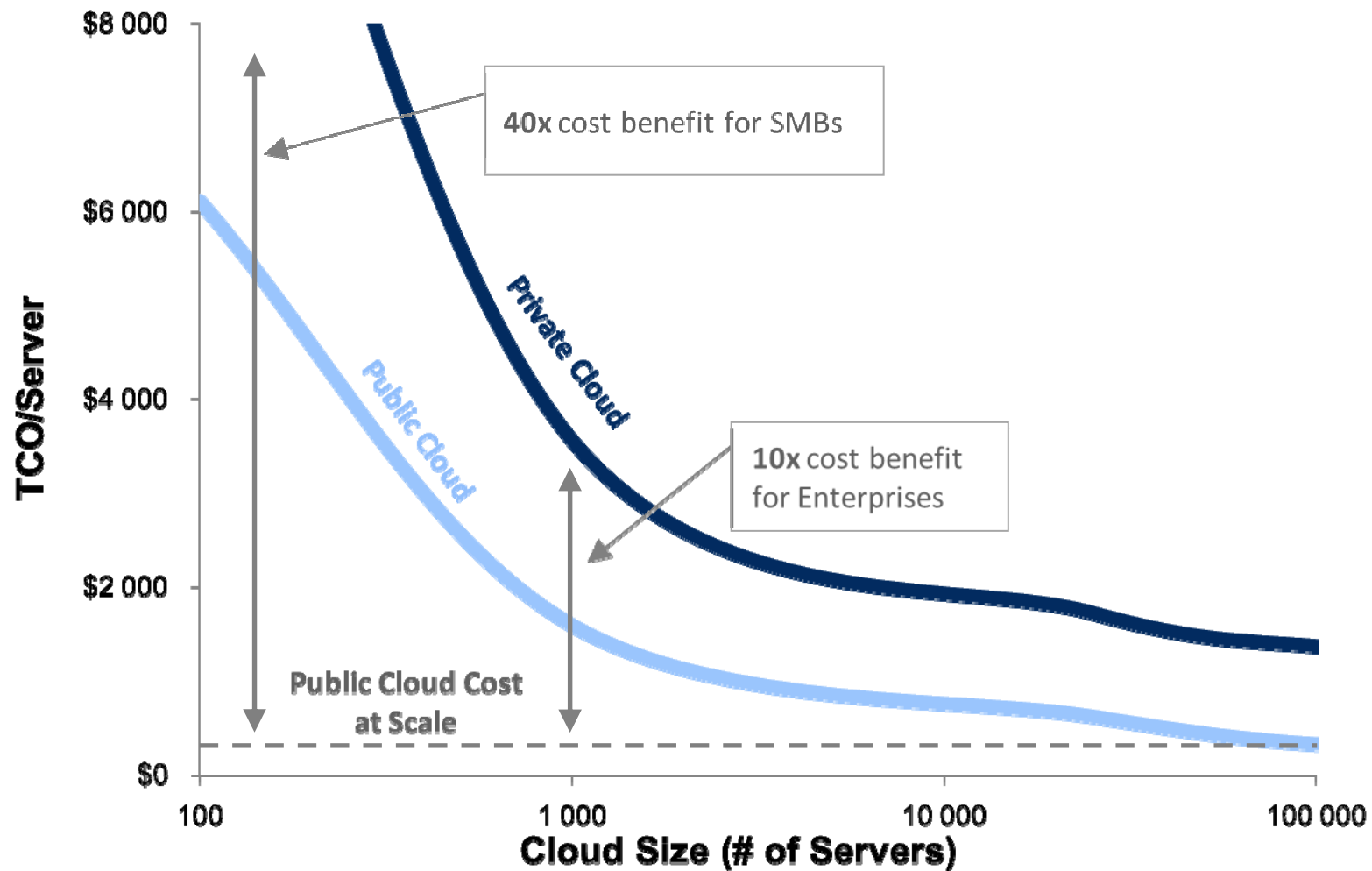
✓

3) Multi-tenancy

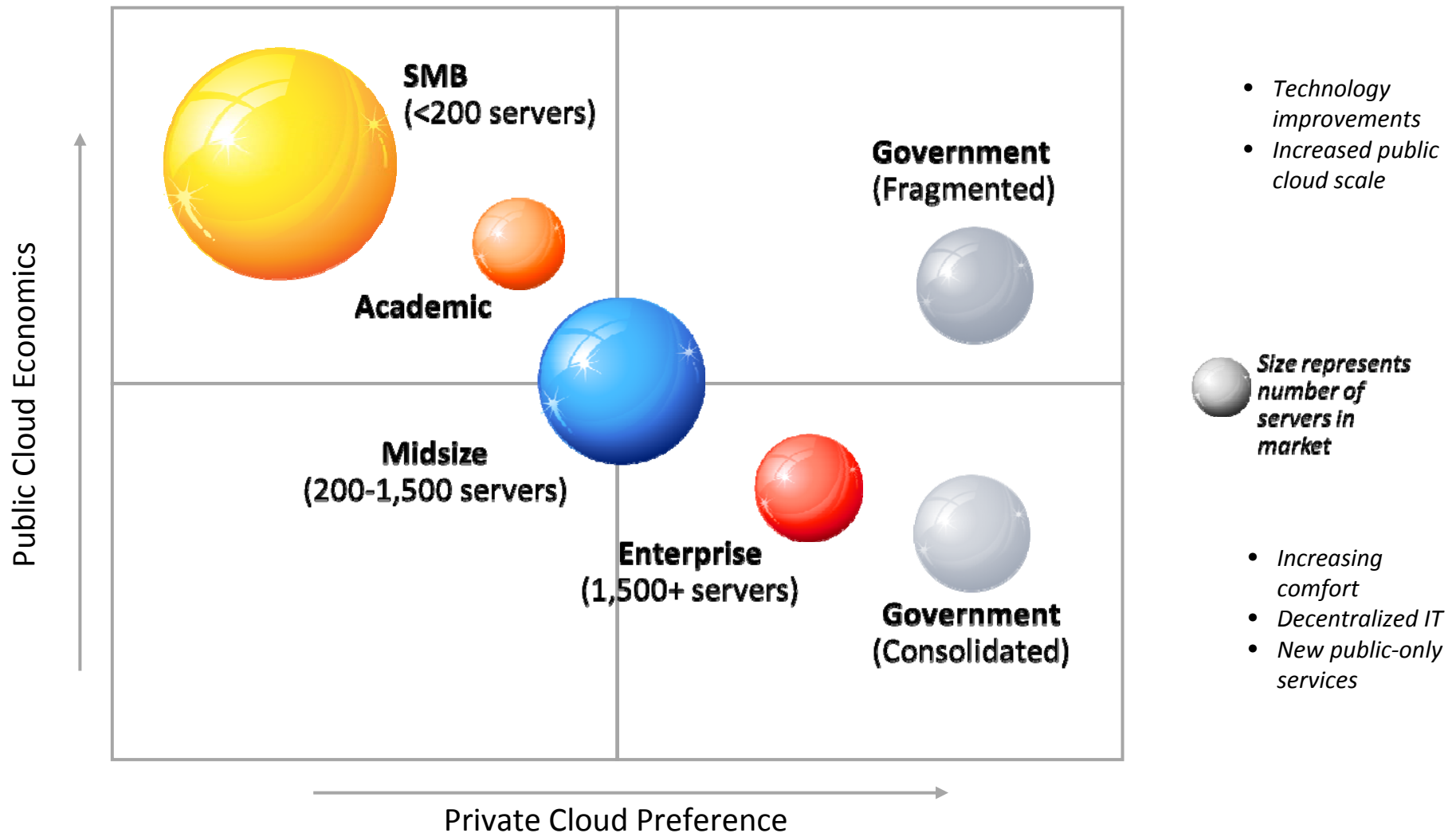
✗

✓

PUBLIC vs. PRIVATE CLOUDS

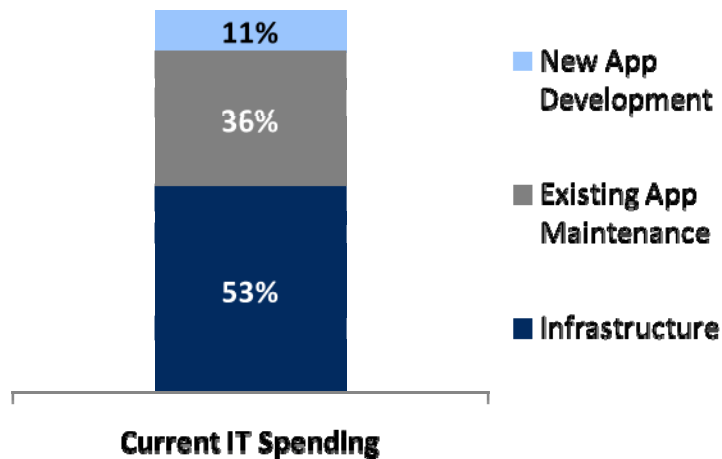


TRANSITION OVER TIME



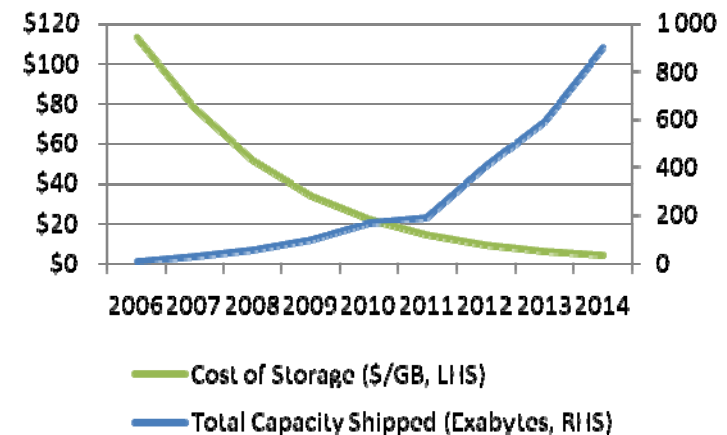
LOWER PRICES WILL DRIVE ADDITIONAL IT INNOVATION

'KEEPING LIGHTS ON' DOMINATES IT BUDGETS



... IT DEMAND HIGHLY PRICE ELASTIC...

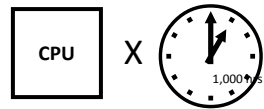
PRICE ELASTICITY OF STORAGE



Source: Coughlin Associates

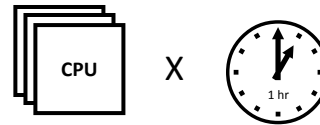
LOWER FRICTION WILL ENABLE NEW SCENARIOS

Traditional IT



1 CPU for 1,000hrs

Cloud



1,000 CPUs for 1hr

CAPEX

OPEX

Weeks/months to
provision resources

Minutes/hours to
provision resources

Rigid, disconnected
systems

Loosely coupled,
flexible, & connected
systems

SUMMARY

1. Cloud represents both a technology and an economic shift
2. Cloud characterized by strong economies of scale
3. Long term shift towards shared, public clouds
4. Drastically lower cost & friction will boost innovation

WE PUBLISHED A WHITEPAPER WITH OUR FINDINGS..



The screenshot shows a Microsoft TechNet blog post. The header features a dark blue background with a world map and the text 'MICROSOFT ON THE ISSUES' and 'News, perspectives and analysis on legal and policy issues'. The Microsoft logo is in the bottom right of the header. Below the header, the breadcrumb trail reads 'TechNet Blogs > Microsoft on The Issues > Economics of the Cloud'. The post title is 'Economics of the Cloud', dated '11 Nov 2010 9:00 AM', with 5 comments. The author is 'Rolf Harms, Director, Corporate Strategy Group' and 'Michael Yamartino, Manager, Corporate Strategy Group'. The post text discusses the seismic shift towards the cloud and the need for a clear vision. The right sidebar contains a 'Search Blogs' section with a search bar and radio buttons for 'Search this blog' and 'Search all blogs'. Below that is a 'Subscribe' section with links for 'Blog Home', 'Send to friend', 'RSS for Posts', 'Atom', 'RSS for Comments', and 'Email Blog Author'. At the bottom is a 'Tags' section with links for 'Citizenship', 'Cloud Computing', 'Economy', 'Education', 'Environment', 'European Commission', 'FCC', 'Fraud', and 'Governance'.

MICROSOFT ON THE ISSUES
News, perspectives and analysis on legal and policy issues
Microsoft

TechNet Blogs > Microsoft on The Issues > Economics of the Cloud

Economics of the Cloud

11 Nov 2010 9:00 AM | 5

Posted by **Rolf Harms**, Director, Corporate Strategy Group
Michael Yamartino, Manager, Corporate Strategy Group

Information technology is undergoing a seismic shift towards the cloud, a disruption we believe is as game-changing as the transition from mainframes to client/server. This shift will impact every player in the IT world, from service providers and systems architects to developers and end users. We are excited about this transformation and the vast improvements in efficiency, agility and innovation it will bring.

To prepare for the cloud transition, IT leaders who make investments in infrastructure, architectures, and skills have a critical need for a clear vision of where the industry is heading. We believe the best way to form this vision is to understand the underlying economics driving this long-term trend. We've done extensive analysis of these economics in Microsoft's Corporate Strategy Group, leveraging Microsoft's experience with cloud services like **Windows Azure**, **Office 365**, **Windows Live**, and **Bing**. We decided to share these insights with our customers, partners and the broader industry by publishing a new whitepaper, "**The Economics of the Cloud**."

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Questions? rolfh@microsoft.com or miyamart@microsoft.com