CLOUD ECONOMICS

CORPORATE STRATEGY GROUP

JANUARY 2011

THE HORSELESS CARRIAGE SYNDROME

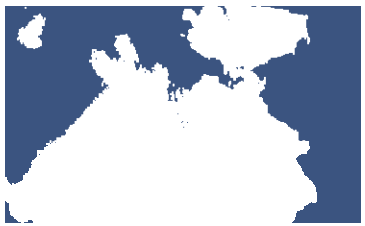
COMPUTING PARADIGM DISRUPTIONS

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 	• Centralized compute & storage, thin clients	• Optimized for efficiency due to high cost
CLIENT-SERVER 	• PCs and servers for distributed compute, storage, etc.	• Optimized for agility due to low cost
CLOUD 	• Large DCs, commodity HW, scale-out, devices	• Order of magnitude better efficiency and agility

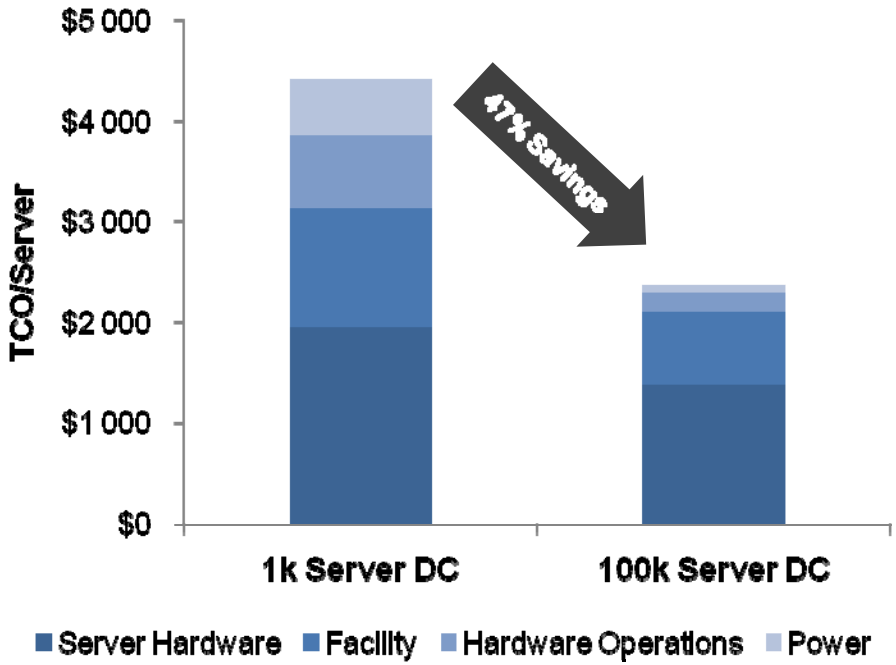
1. SUPPLY-SIDE ECONOMIES OF SCALE

Larger datacenters have almost 50% lower TCO per server

MAIN DATA CENTER COST BUCKETS

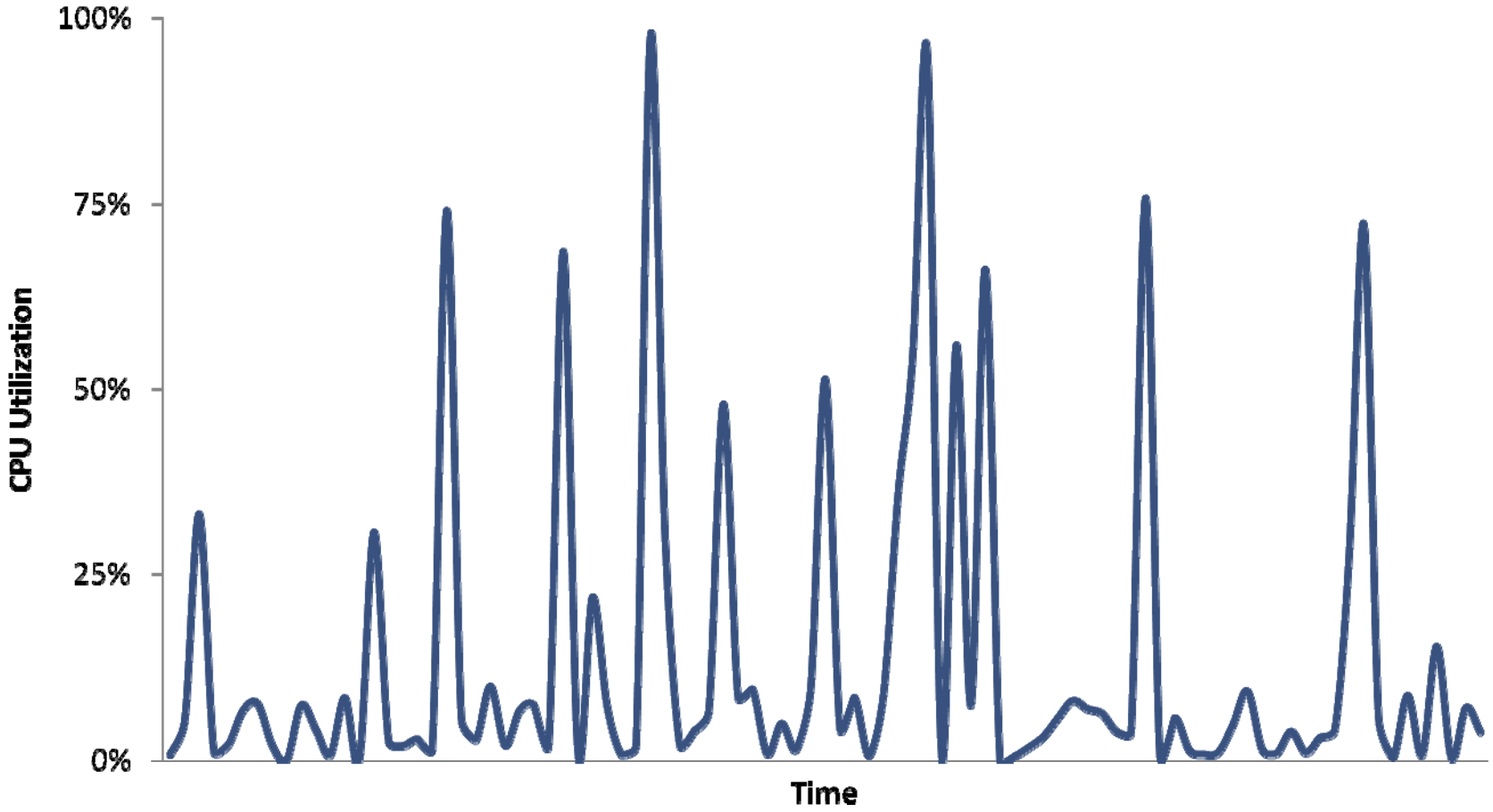
- **Server hardware costs** (~45%)
- **Facility & operations** (~25%)
- **Hardware labor costs** (~15%)
- **Power costs** (~15%)

ANNUAL TCO/SERVER DECLINES W/SCALE

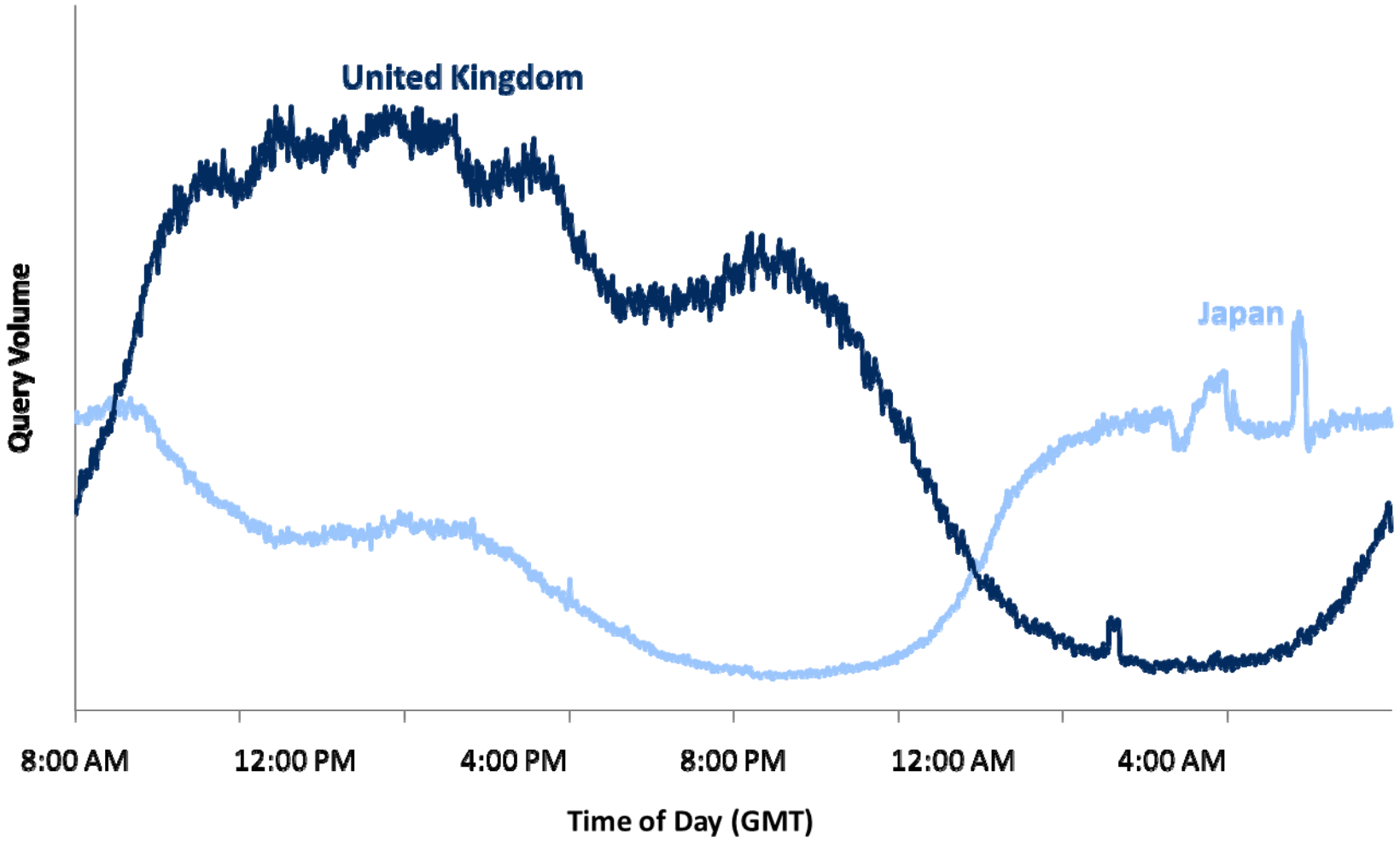


2. DEMAND SIDE ECONOMIES OF SCALE

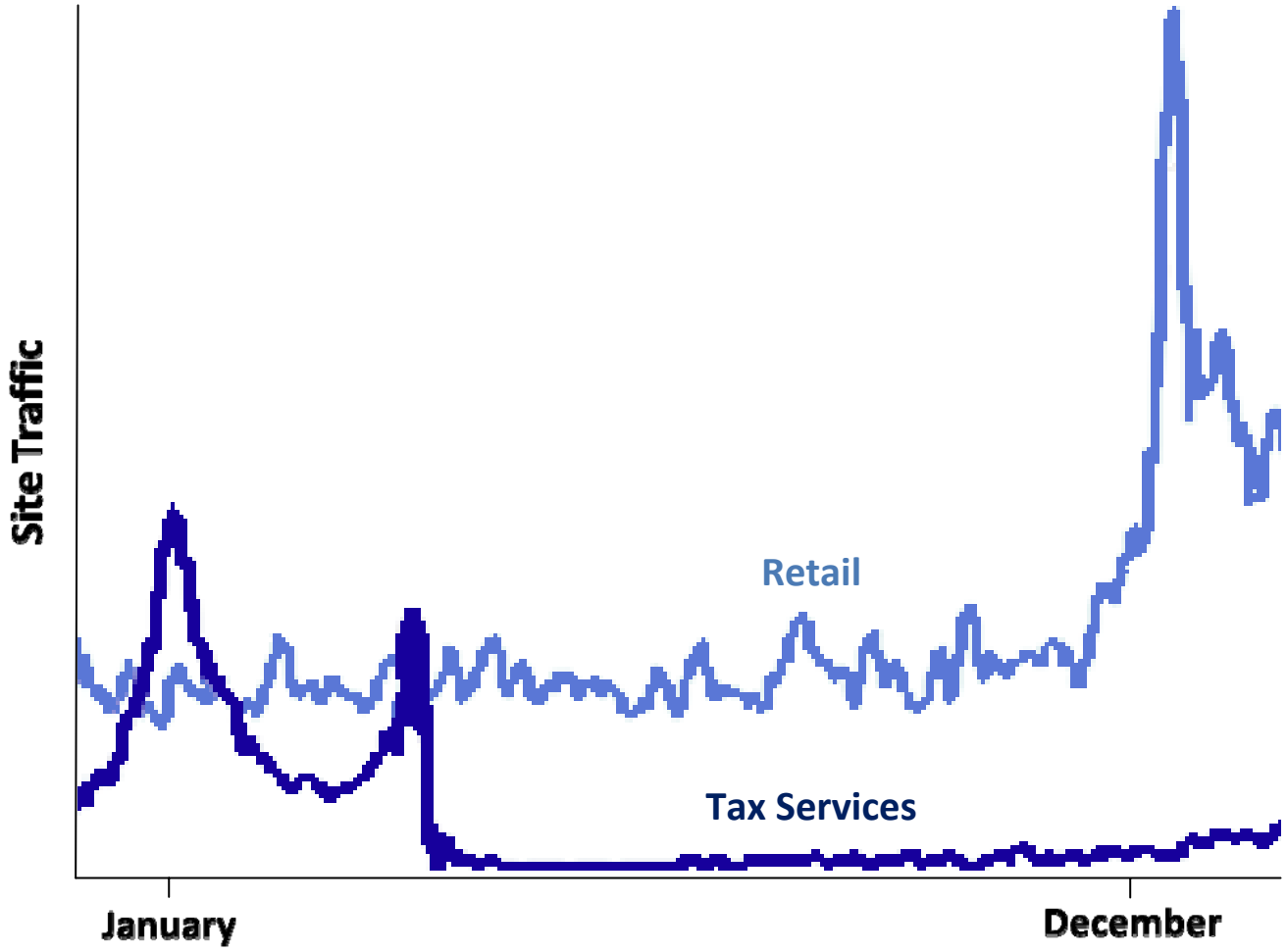
Average server utilization rates are 5-10%



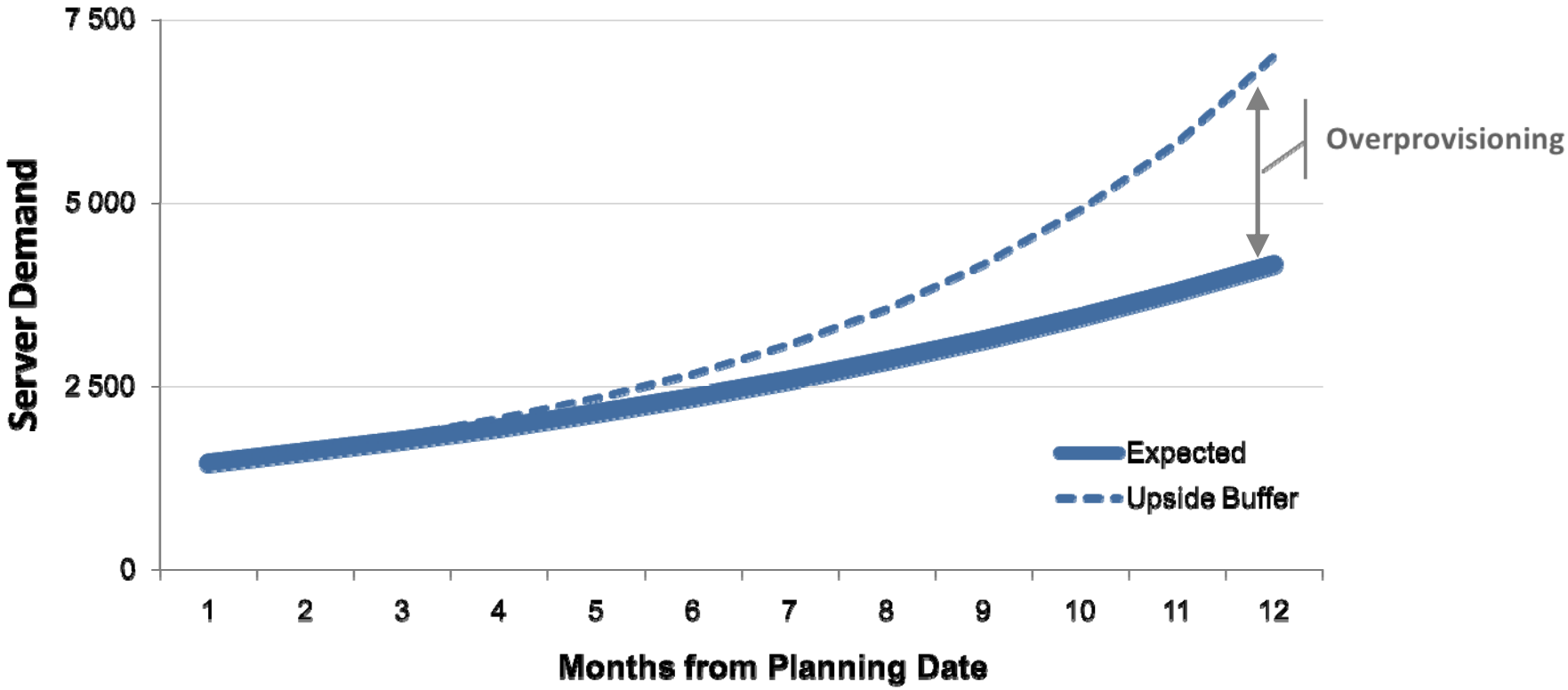
TIME OF DAY VARIABILITY



INDUSTRY VARIABILITY

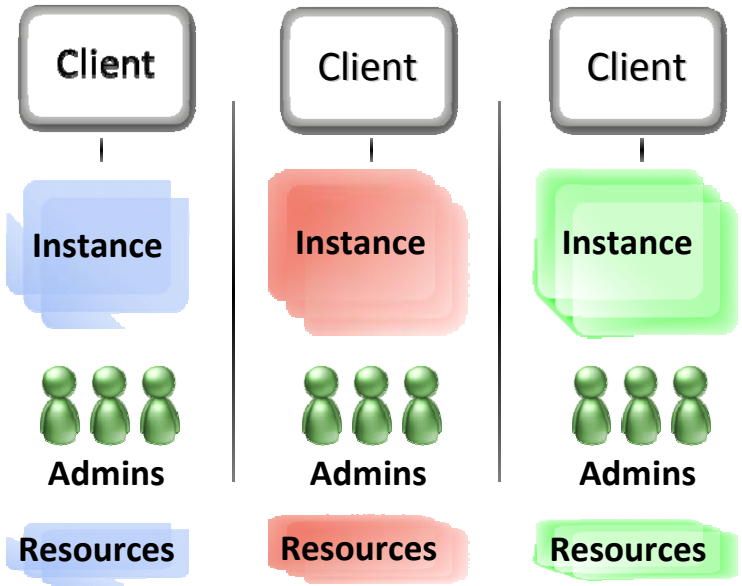


UNCERTAIN GROWTH



3. BENEFITS OF MULTI-TENANCY

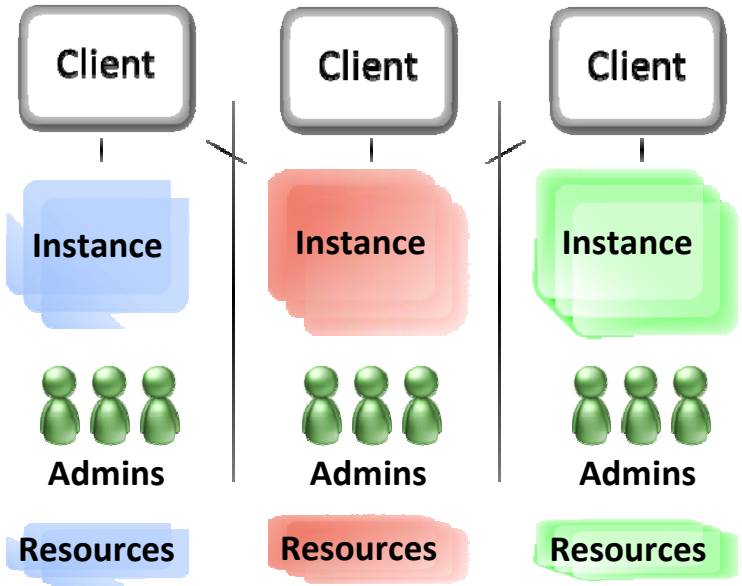
SINGLE-TENANT APPLICATION



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

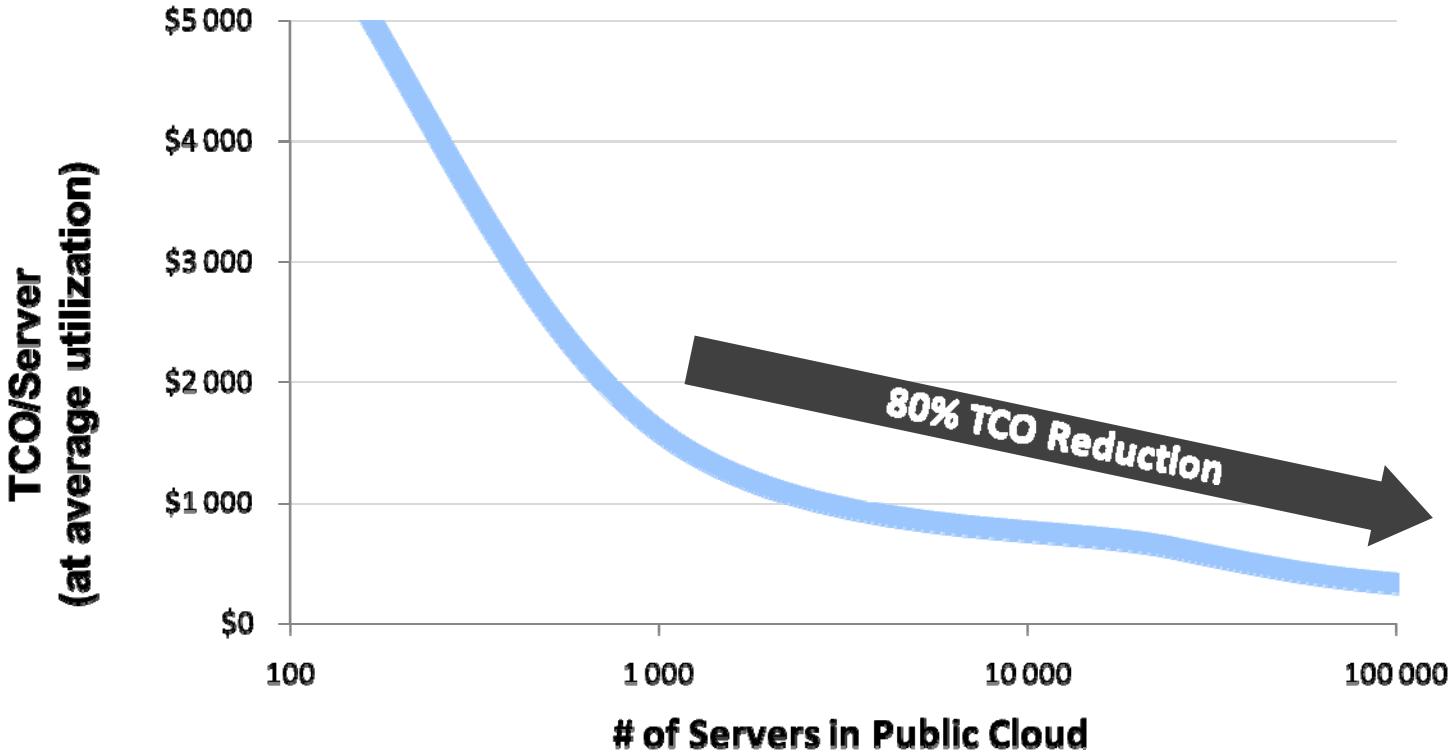
3. BENEFITS OF MULTI-TENANCY

MULTI-TENANT APPLICATION



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

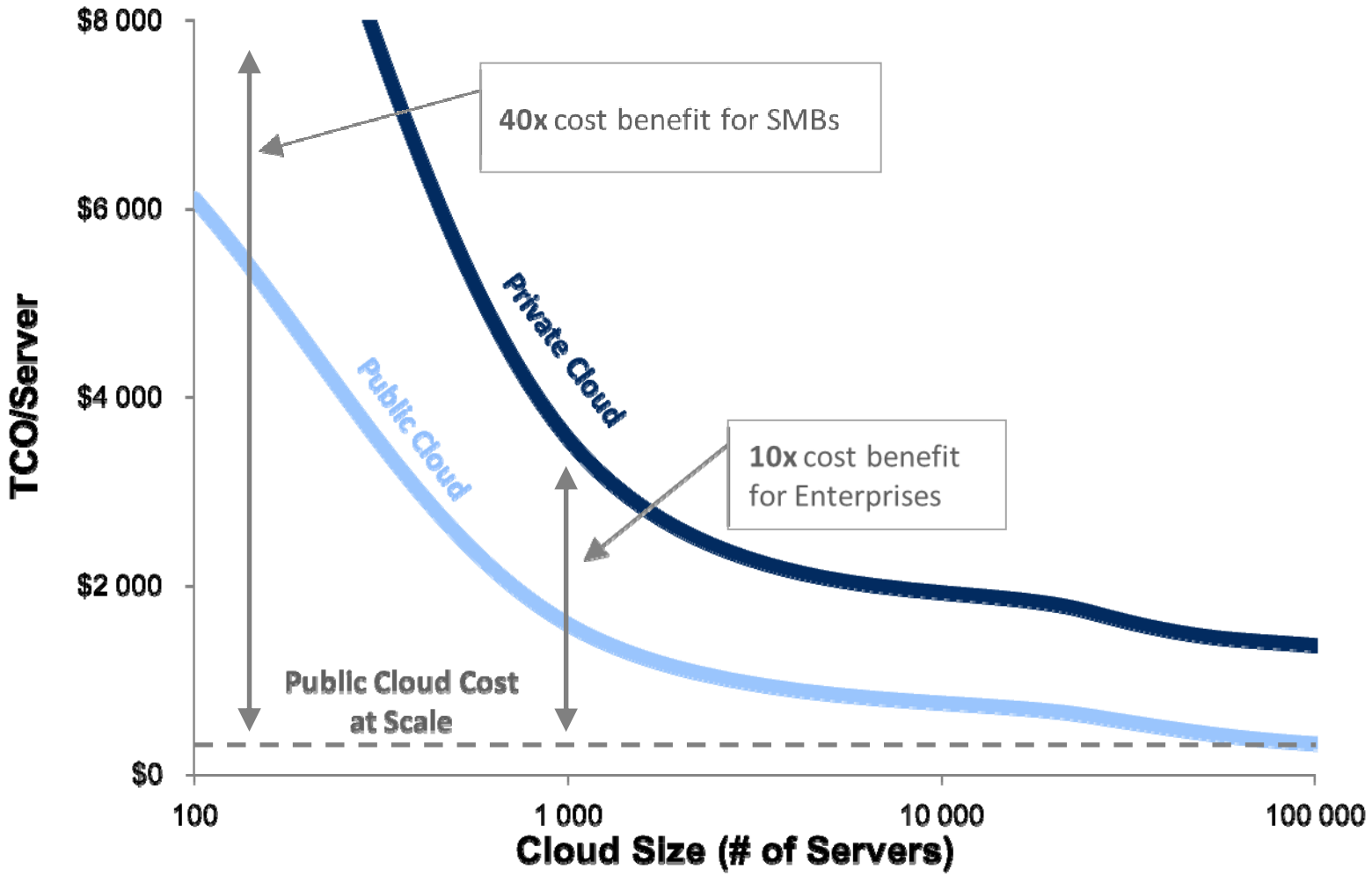
OVERALL ECONOMIES OF SCALE



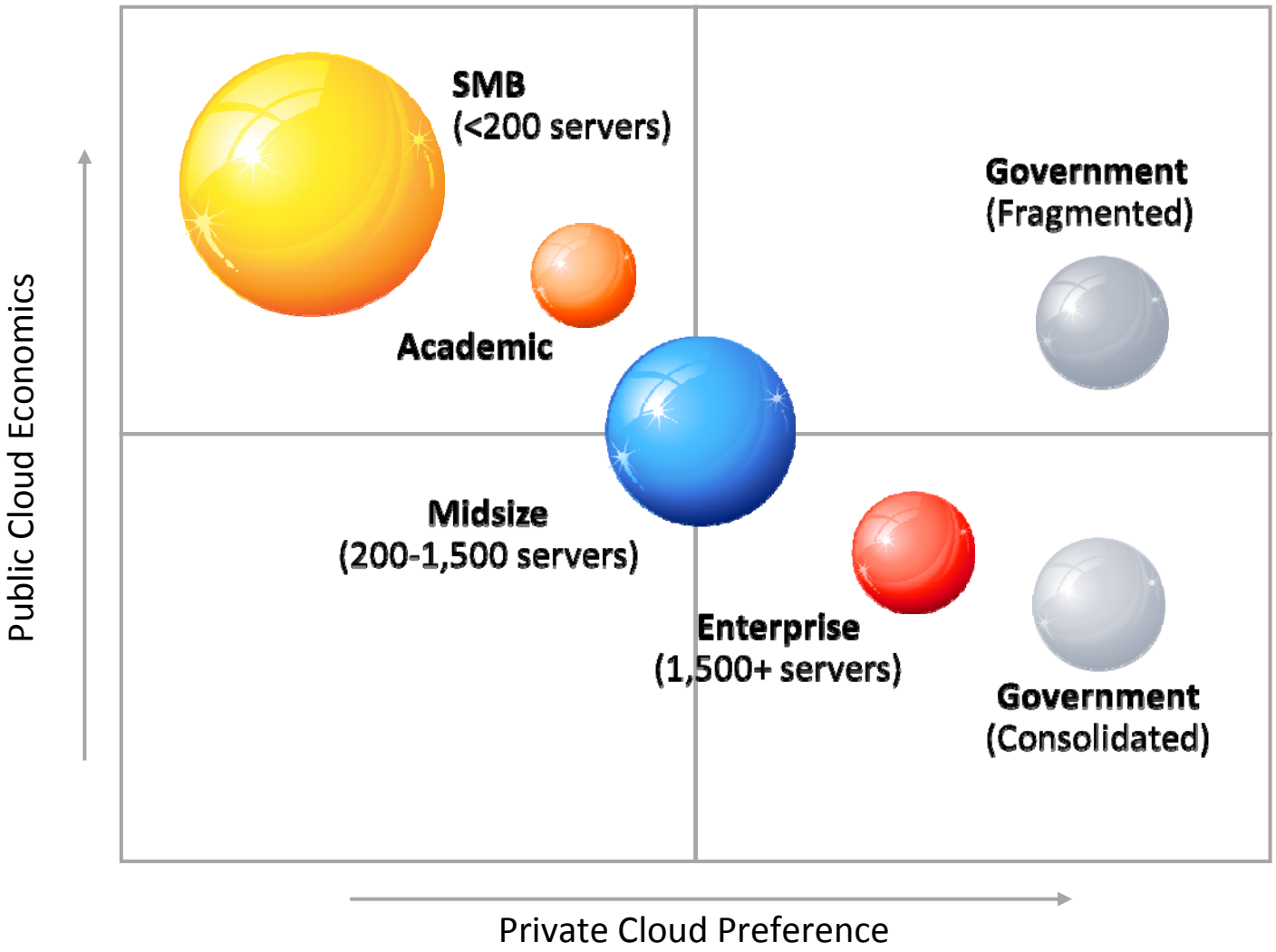
PUBLIC vs. PRIVATE

1) Supply-side	✗	✓
2) Demand-side	✓	✓
3) Multi-tenancy	✗	✓

PUBLIC vs. PRIVATE CLOUDS



TRANSITION OVER TIME



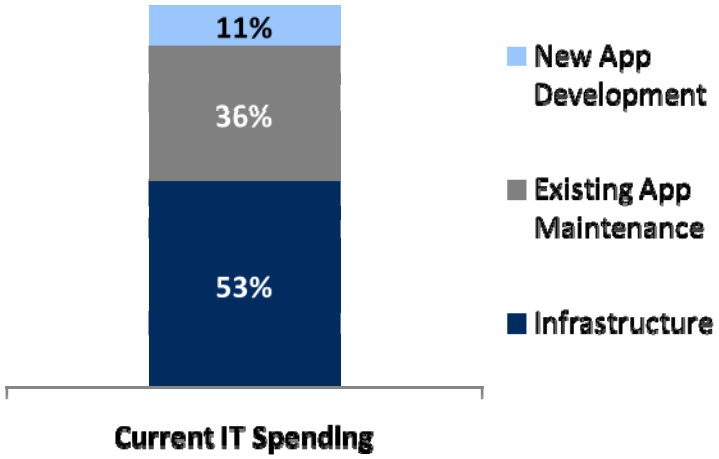
- *Technology improvements*
- *Increased public cloud scale*

Size represents number of servers in market

- *Increasing comfort*
- *Decentralized IT*
- *New public-only services*

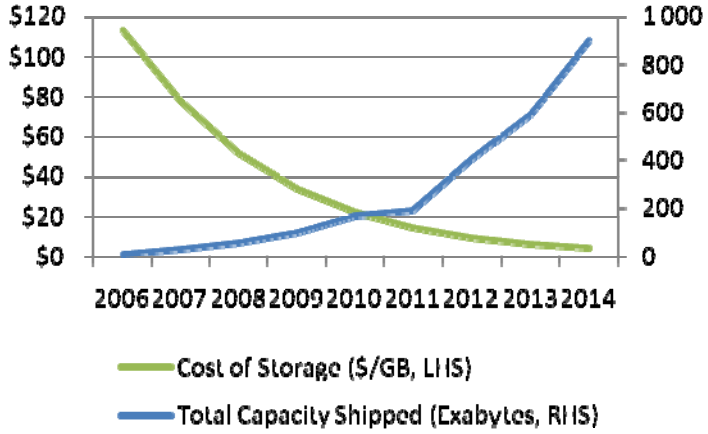
LOWER PRICES WILL DRIVE ADDITIONAL IT INNOVATION

'KEEPING LIGHTS ON' DOMINATES IT BUDGETS



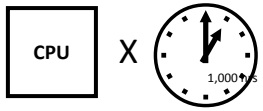
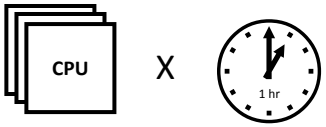
… IT DEMAND HIGHLY PRICE ELASTIC…

PRICE ELASTICITY OF STORAGE



Source: Coughlin Associates

LOWER FRICTION WILL ENABLE NEW SCENARIOS

Traditional IT		Cloud
	→	
1 CPU for 1,000hrs	→	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..

Go to: http://ow.ly/38glf

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