Business requirements for the Cloud

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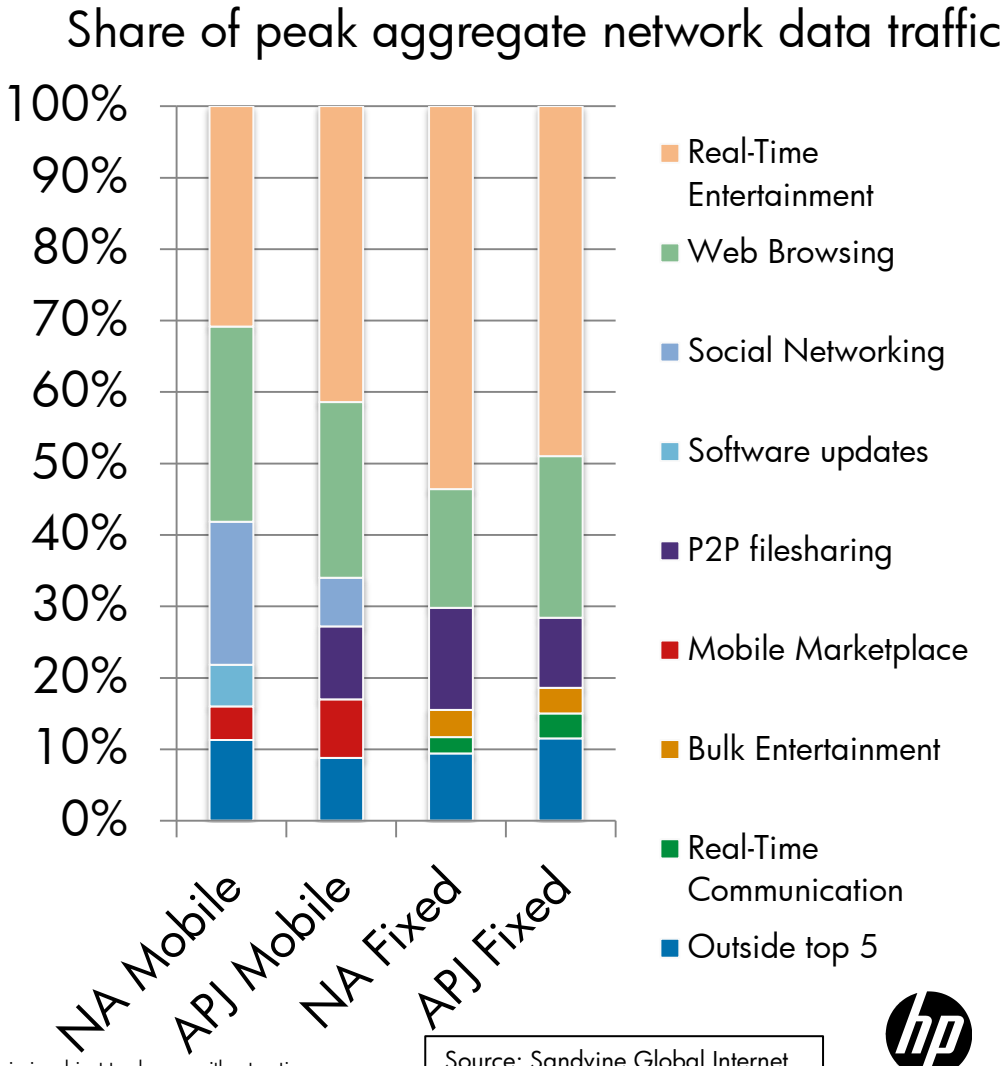
Agenda

- Changing Business Models
- What cloud means for service providers
- Security
- Availability
- Architectural shifts
- Network and cloud
- Being Neighborly
- Privacy
- Cloud Governance
- Management (OSS/BSS)
- M2M
- Cloud Economics
- What's the path forward?

Changing business models

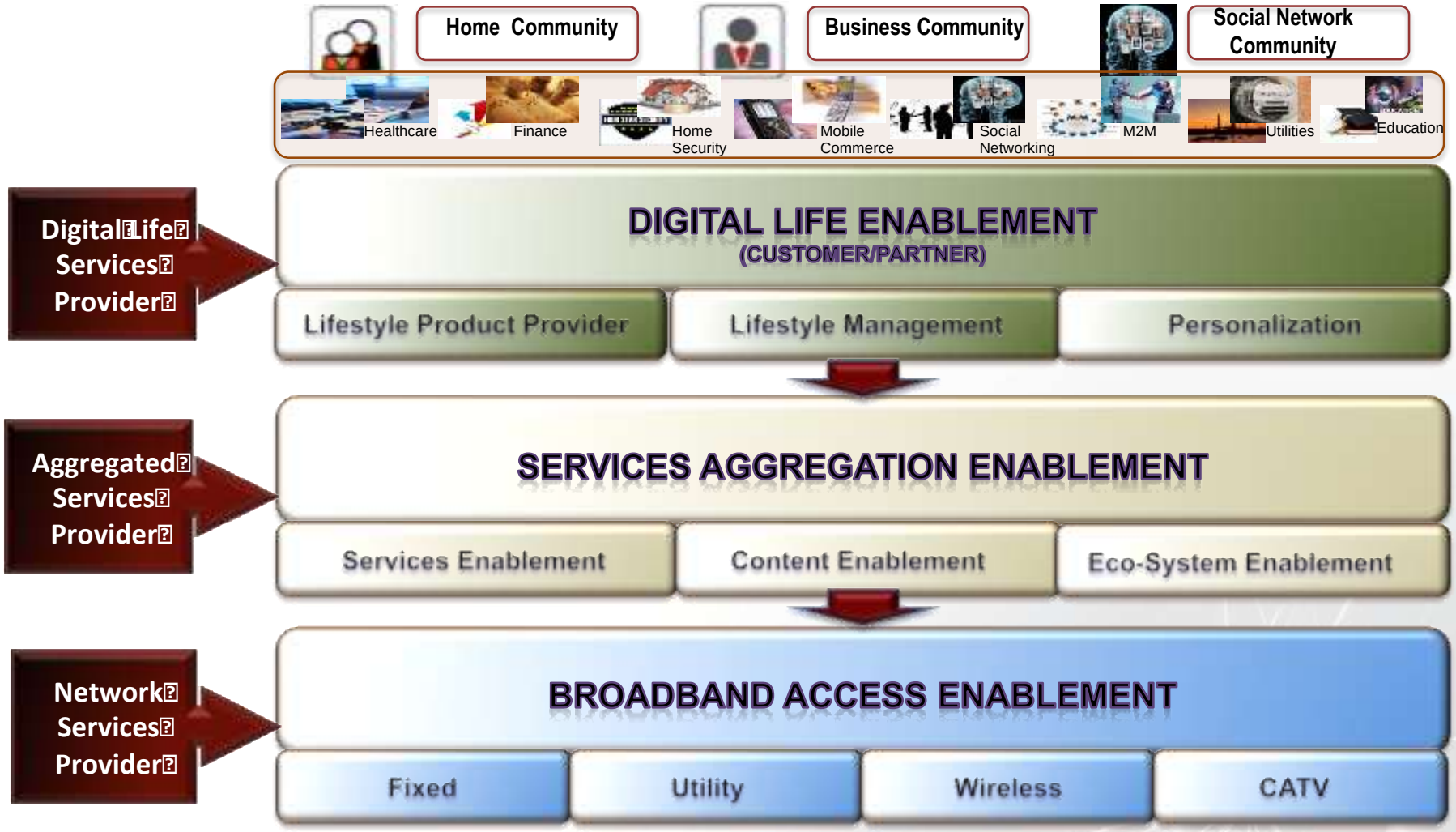
Traditional models is being severely challenged

- The Broadband explosion impacts service provider economics
- Unconventional and over the top players
- "Voice is Free" – Decline in traditional fixed line revenue
- Service Providers are forced to run two business models
  - a full service operator
  - a wholesale pipe provider



Source: Sandvine Global Internet Phenomena Report October 2011

Target High Level Business Model – a perspective



Source: **Parhelion GCA**, reproduced with permission.

Which layer(s) are your core business?

What Cloud Could Mean To Service Providers

Leverage Cloud For Internal Transformation And Differentiated Cloud Services

TODAY'S NETWORK

- Static
- Slow to introduce new services
- Off the innovation curve (Moore's law)
- High CAPEX/OPEX

PRIVATE CLOUD

- Enterprise data center redux

CURRENT PUBLIC CLOUD - "CASUAL"

- Cheap compute
- Cheap storage
- High bandwidth costs
- No performance control

SERVICE PROVIDER CLOUD

NETWORK LEVERAGING CLOUD

- Elastic
- Agile
- Cost effective

CARRIER-CLASS CLOUD "PERFORMANCE"

- Performance optimization via network (latency, redundancy, bandwidth)
- Lower bandwidth costs
- Carrier grade
- Secure

A new source of much needed revenues

What Do Enterprises Want From Public Cloud Providers?

Security

One of the biggest impediment to firms adopting public cloud

- High profile breaches at Sony, Epsilon, others
- Concentration of high value targets makes public cloud particularly attractive to hackers
- Will your neighbors in the cloud try to peek at your data?
- Regulatory compliance and governance issues
- Giving customers some control over their security in the cloud?
- Governance issues include timely notification of breeches, escalation procedures to shut down compromised systems, etc.

Until these are fully addressed most enterprises will be reluctant to trust critical data to the public cloud.

Availability and disaster recovery

Recent failures point out some of the issues

- Issues behind multi-day outages in 2011must be addressed including governance issues
- Must be more reliable than traditional IT
- Disaster recovery better than traditional IT
- Governance is key

Bottom line: Carrier Grade IT

Tying networks to cloud

Could be a key differentiator for a facilities based carrier

- Best effort internet not acceptable for many workloads
- Network as a Service NaaS needed
- Linking workloads to appropriate NaaS offer a key differentiator for service providers

Being Neighborly

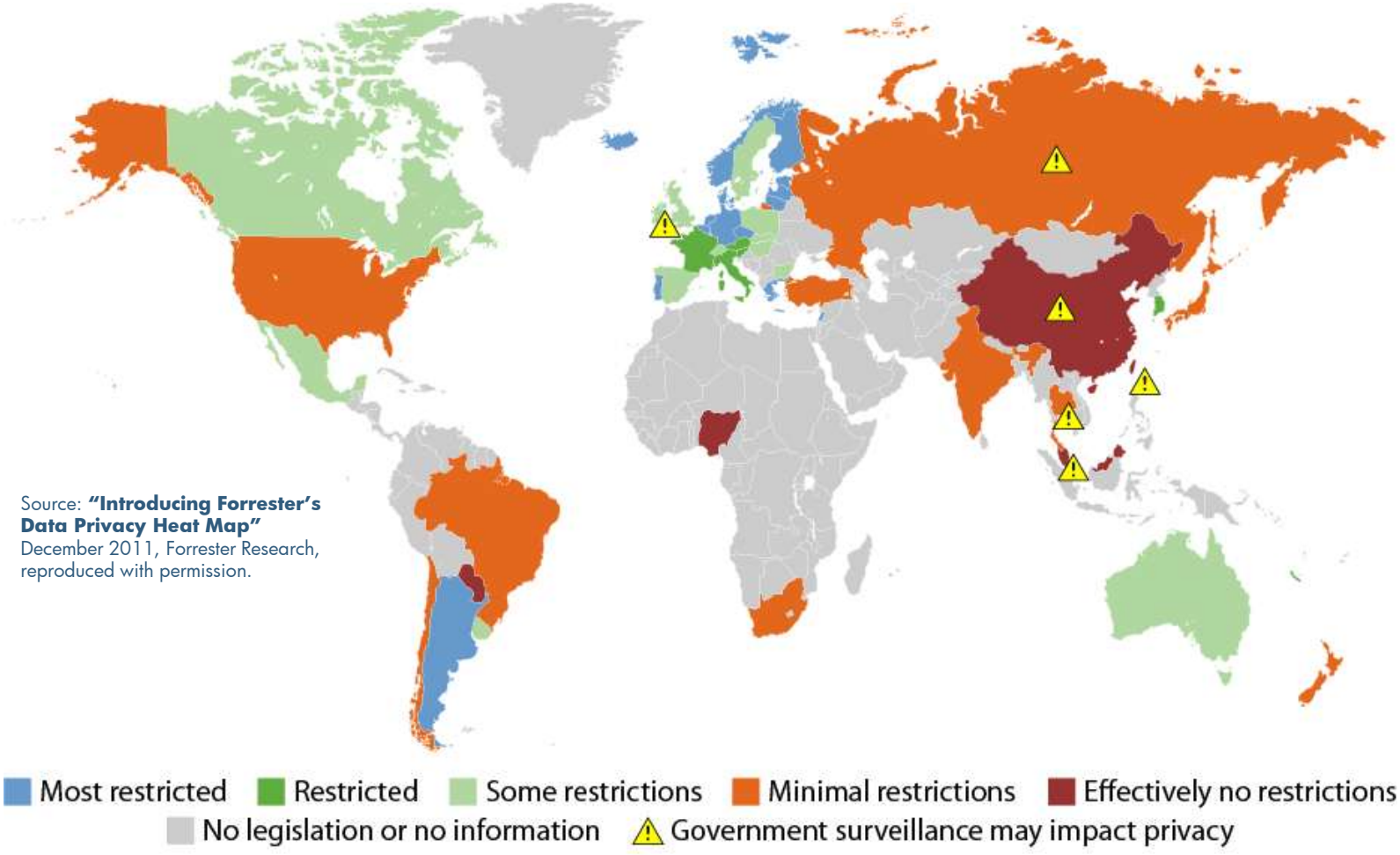
Is the application running on the other side of the fence friendly?

The Noisy Neighbor problem

- Insuring that an application does not impact other users of the same underlying infrastructure.
- Consistent performance and availability regardless of the workloads of other users.
- Insuring all instances with the same advertised compute power have the same performance regardless of underlying infrastructure

Privacy and trans border data

Privacy laws, particularly in Europe impact the cloud



Source: **"Introducing Forrester's Data Privacy Heat Map"** December 2011, Forrester Research, reproduced with permission.

Source: US Department of Commerce and country specific legislation

Cloud Governance

Impact goes well beyond IT

Software licenses

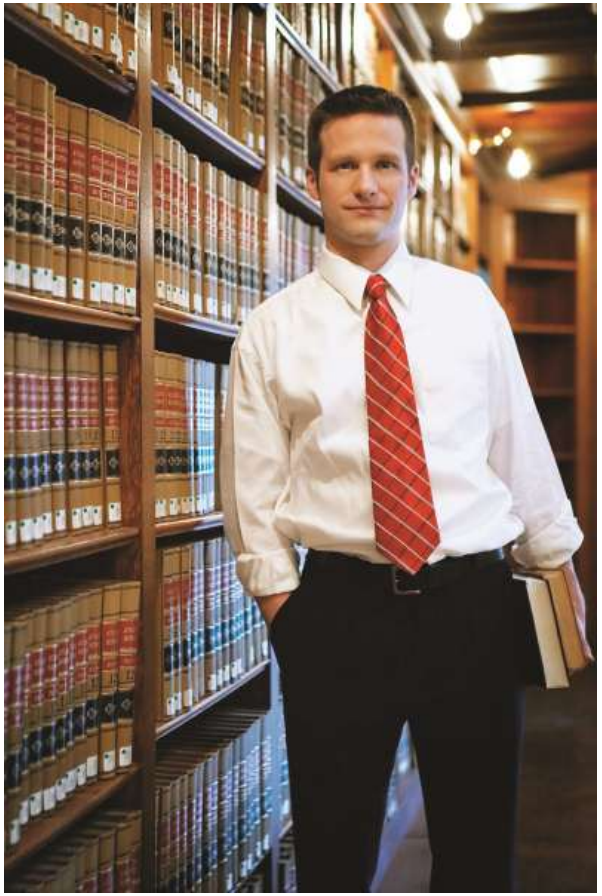
- Many conventional license schemes don't take into account the cloud

Data protection and privacy management

- Value of data (what is the risk?)
- How and where is data stored in cloud (how many replicas, can it be deleted, can it be recovered, …)
- Disaster and recovery options
- Who "owns" the data in SaaS?
- Who can access the data?
- Encryption?

Governance, Risk and Compliance

- SLA obligations, ensuring privacy, audit issues (SOX, PCI)
- Logging and reporting
- EU data regulation, US Patriot Act



Managing the Cloud

OSS/BSS

- User interface/portal
- Provisioning
- Alarm management and monitoring
- Element management
- Billing
- Matching workloads to appropriate resources including network
- Etc.

Machine 2 Machine

The internet of things

A natural affinity with Cloud Services and with Service Provider connectivity

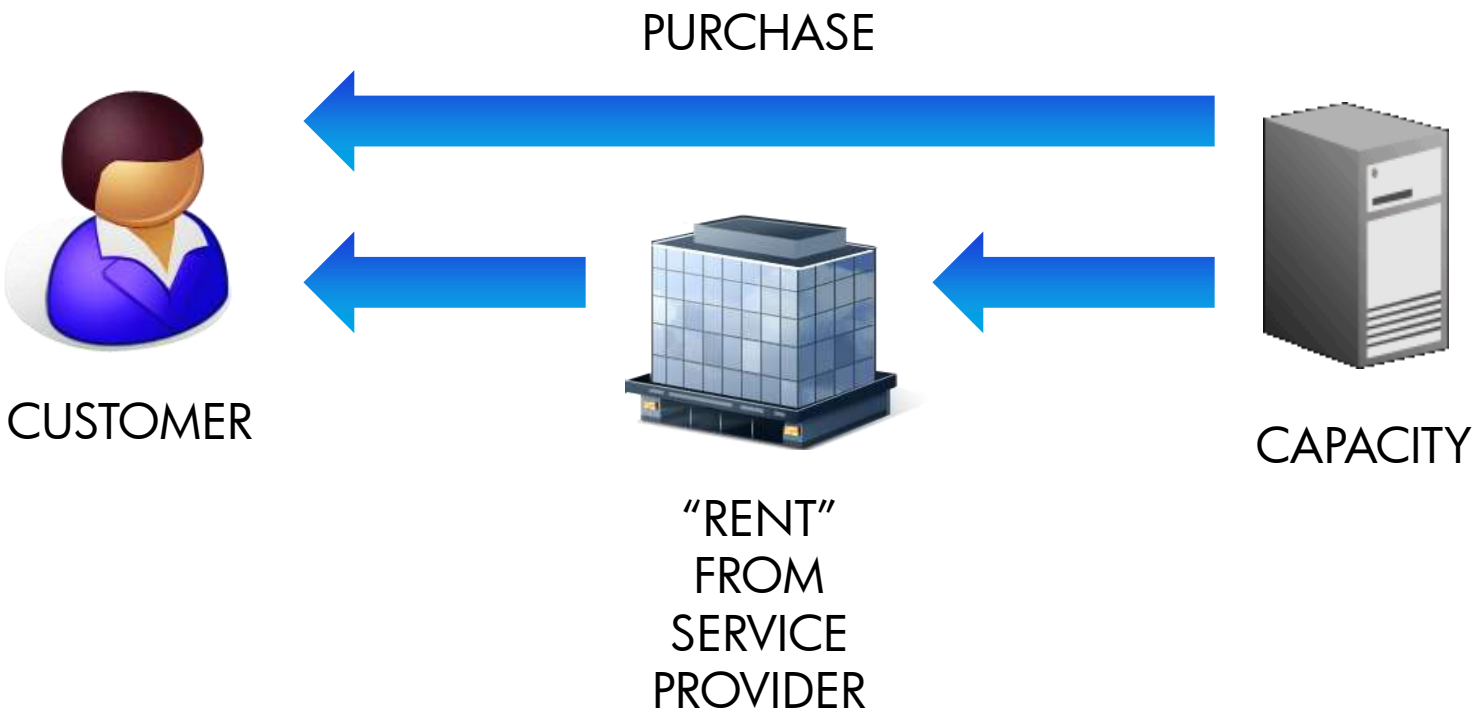
Current “hot” areas in M2M include:

- Transportation
- Utilities
- Healthcare
- etc.

Architectures need to be friendly to the internet of things in addition to traditional IT workloads

Buy or Rent?

Cloud Economics



Typical Cost CONSIDERATIONS

Physical Hardware
Power & Cooling
Space
Virtualization Software
Networking
Security
Mgt. & Admin. Labor & Tooling
Multitenancy Overhead
Economies of Scale
Learning Curve Effects

Quantization Discontinuities
Statistics of Scale
Utilization Factors
Capacity Planning & Engineering
SG&A
Margin
Uncollectables
Transaction Costs
Switching Costs
GAAP & Tax Laws

The Basic economics…

All other things being equal:

1. If cloud services cost **less** than enterprise IT, then…

   …use them

2. If cloud services cost **more** than enterprise IT, then…

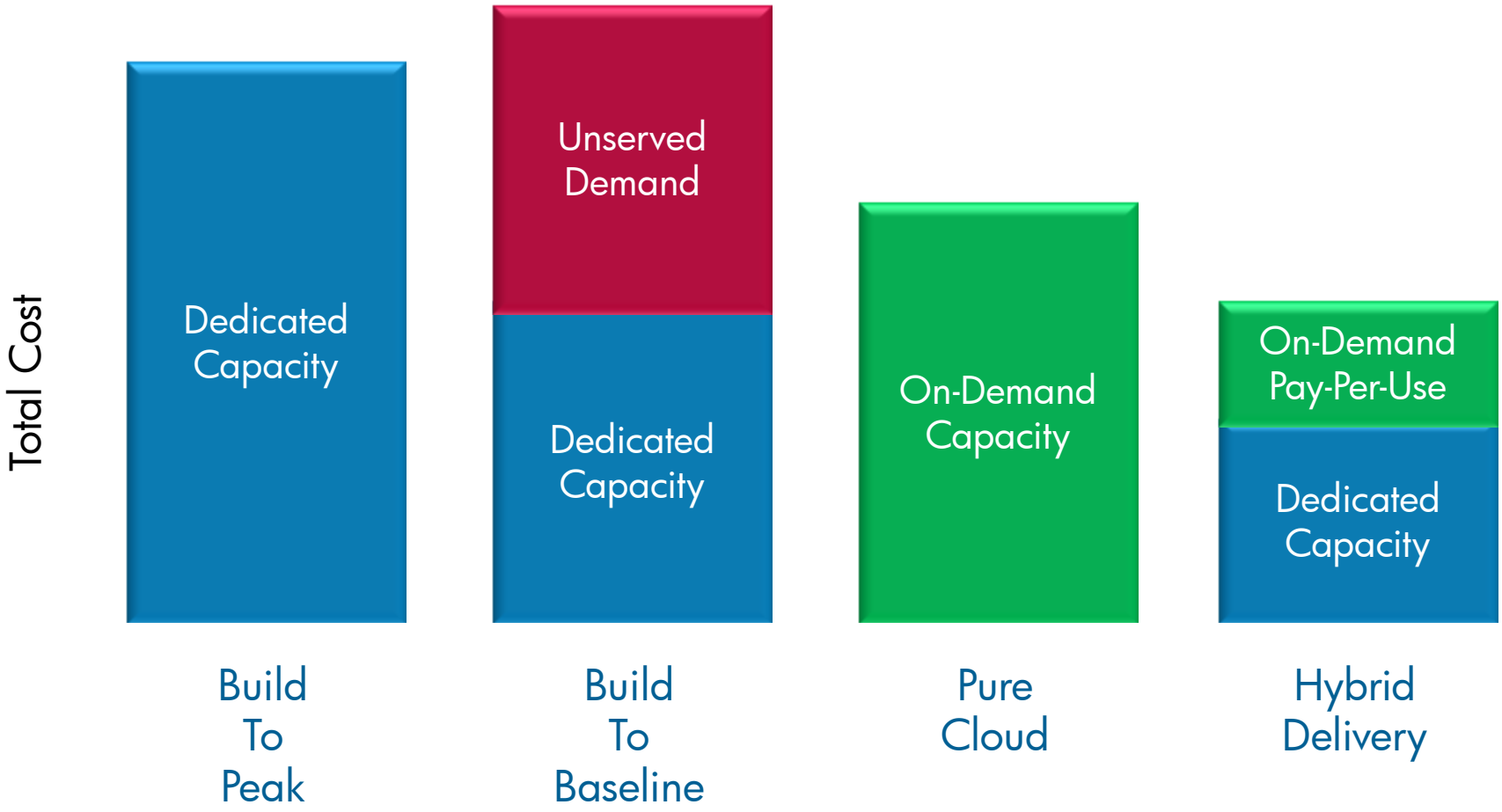
   …don't…

   …jump to conclusions, because if demand is "spikier" than the cloud is "costly," a pure cloud solution will cost less than a dedicated one

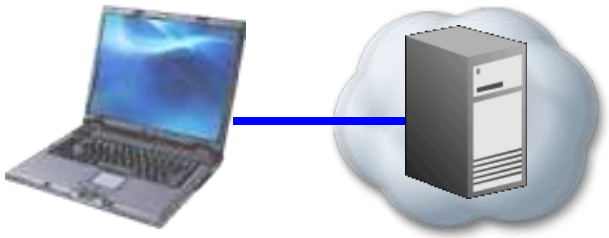
3. If demand has any variation, a hybrid solution is optimal

Joe Weinman, "Time to Do the Math on Cloud Computing," InformationWeek.com

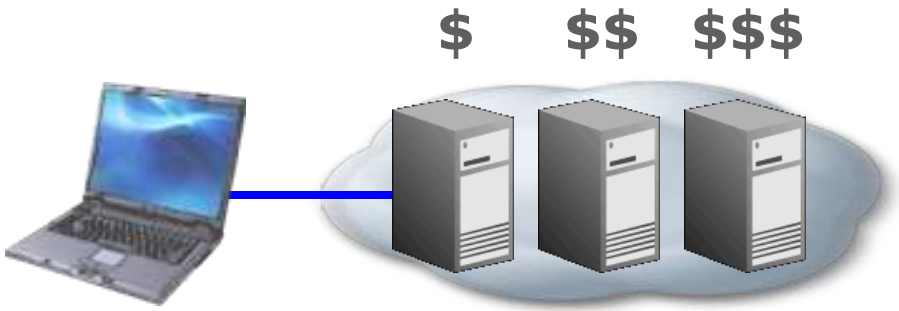
TYPICAL Comparison of Alternatives



Some Architecture Options



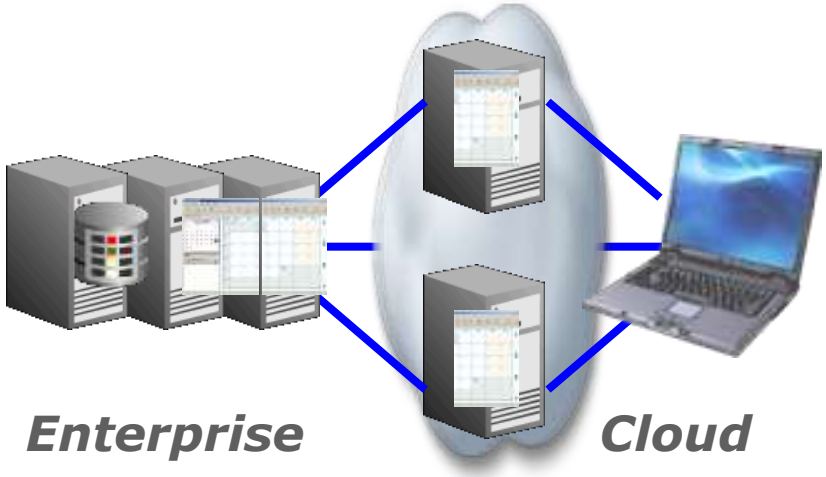
Pure Utility Cloud



Mixed-Rate Hosting/Cloud

Enterprise *Cloud*

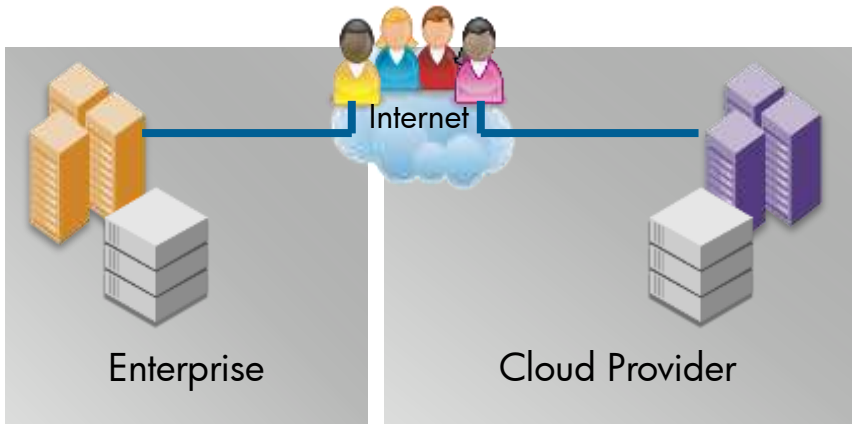
Cloudbursting



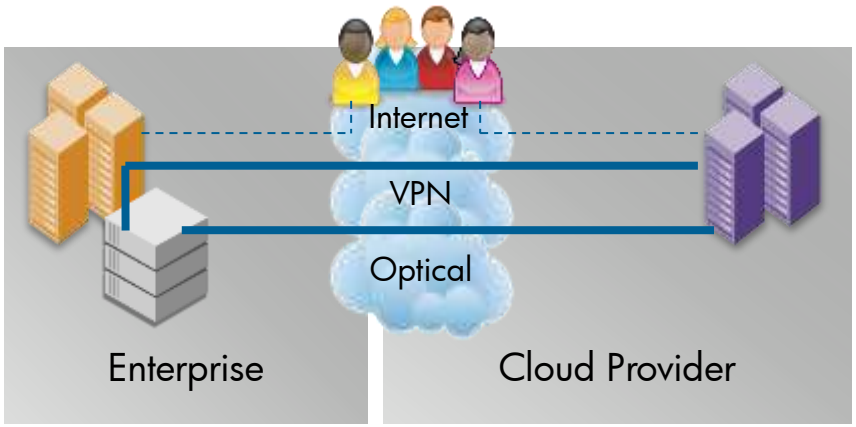
Enterprise *Cloud*

Front-End / Back-End

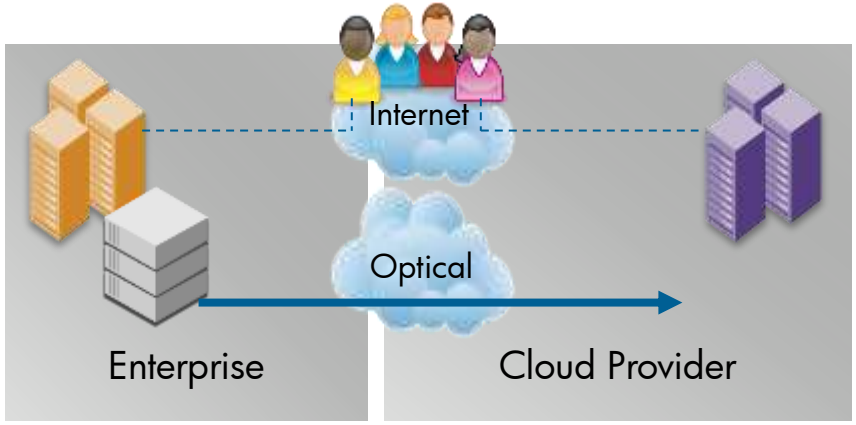
CAVEAT: COSTS OF Dealing with Data



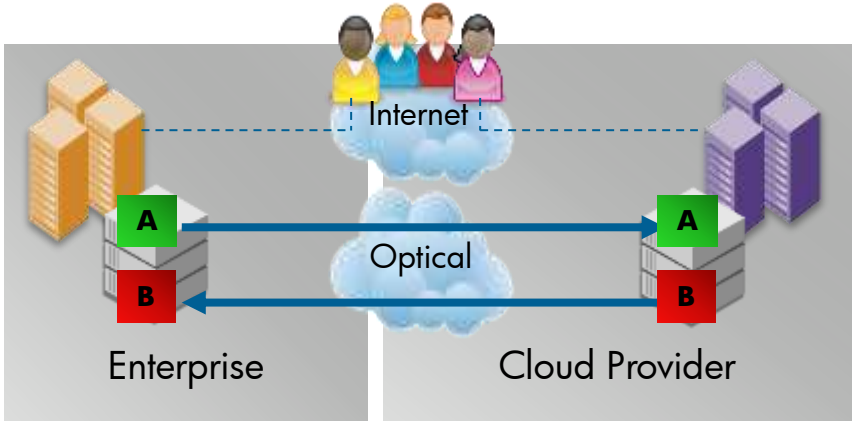
Non-Persistent Session Data



Remote Access



Dynamic Migration



Coherent

Source: Joe Weinman, "4 ½ Ways to Deal with Data During Cloudbursts," GigaOM.com

What's the path forward?

Service Providers need Public cloud architectures that

- Provide Security
- Offer better than IT Reliability – Carrier Grade IT
- Respect Privacy
- Take into account governance issues
- Exploit "owning" the network
- Are "neighborly"
- Are manageable
- Consistent with cloud economics
- Support the Internet of things
- Don't depend on owning the whole value chain.

Thank you