The Wisdom of Clouds
Setting the stage

- 1960: Single Computer
- 1970: Mainframes with terminals
- 1990: Client/Server Computing
- 2000: Network Computing
- 2010: Cloud Computing

Graph showing the evolution of computing from centralized to distributed systems over time.
For Vendors, Everything is “Cloud”

Cloud Computing
everything and the kitchen sink

“Cloud Washing” ☺️

Image source: http://infreemation.net/cloud-computing-linear-utility-or-complex-ecosystem
Actually, it’s Hosting Evolved

- **ISP 1.0**: Provided access to the Internet (dial-up, ISDN, T1, T3)
- **ISP 2.0**: Access to servers at the Internet access point
- **Colo (ISP 3.0)**: Racks for your equipment at the Internet access point
- **ASP (ISP 4.0)**: Hosted (traditionally designed) applications on servers at the Internet access point
- **Cloud (ISP 5.0)**: Dynamic, Internet-optimized infrastructure for hosting your applications
- **SaaS**: Internet-based applications and services

Source: Forrester Research, Inc.
### The Promise of Clouds

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<thead>
<tr>
<th>The classical problem</th>
<th>The promise:</th>
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<tbody>
<tr>
<td>• Under-utilized server resources waste computing power (and energy)</td>
<td>• Server resources are delivered on-demand as usage-metered compute utilities</td>
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<td>• Over-utilized servers cause interruption or degradation of service levels</td>
<td>• Cloud-user does not need to forecast demand</td>
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<td>• Turn fixed costs into variable costs</td>
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<table>
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<th>The emerging problems</th>
<th>The promise:</th>
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<tr>
<td>• Highly dynamic scalability demands</td>
<td>• Reduced provision lead times</td>
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<tr>
<td>• Time to market</td>
<td>• Scalability</td>
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<td>• Sophisticated infrastructure is available as Services</td>
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<th>Leveraging the modern Web</th>
<th>The promise:</th>
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<tr>
<td>• Evolution of Desktop apps to Software-as-a-Service</td>
<td>• A stable, reliable platform to develop, test and deploy network-centric end-user applications</td>
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<td>• Programmable Web</td>
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Cloud computing is the leveraging of third-party computing capability over the network to cut costs, increase scale, improve agility, and access best practices.
Cloud Taxonomy

- PaaS
- SaaS
- IaaS

Cloud Computing

Utility Computing

Grid Computing

Cluster Computing

Super Computing

Brokers

Mosso
Google App Engine
Rails One

Salesforce
Gmail
Gliffy

Joyent
Amazon Web Svcs
Nirvanix
XCalibre
Akamai
Yes, the Cloud is Real

We have agreements on Terminology

Private Clouds are in use

Multi-tenant cloud providers are having success

Trust us, we’ve got it covered.

Don’t worry, we’ll handle everything.

Our guys know what they’re doing.

We’re more secure than you are.

Cloud Observations
Where Hype meets Reality

What happens when the Network fails?

Does it make economic sense?

How will we handle legal matters?

Once we’re in, how do we get out? (portability)

Who’s blamed when I get hacked?

How will we handle security and compliance?

Will there be a “big switch”?

Is computing really like electricity?

Will it perform well?

How do we interoperate with our existing “stuff”?

Reliability?

Maturity?

Stability?
Senior Officials are Tech Savvy and Cloud aware and we even had a Czar

GSA is busy working on Apps.gov and other initiatives

FIPS, FISMA, NIST, Privacy, Portability, & Security are being worked

TIC, Auditing, Data Integrity issues come next