

Data-Driven Education, Research, & Trade Using the Cloud



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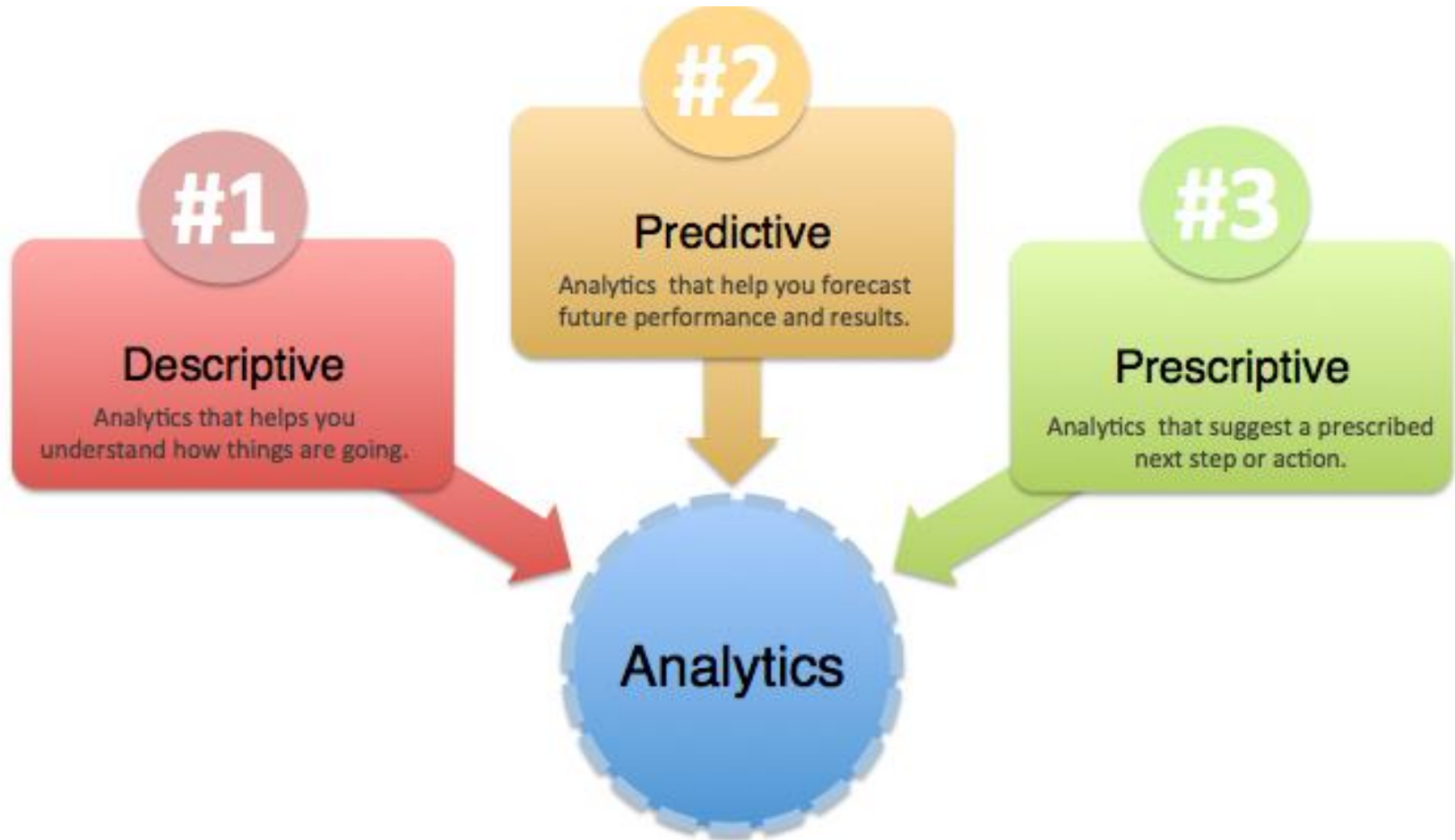
Seychelles and Sri Lanka: Investment and Education – 2016

Big Data, Cloud, & Analytics



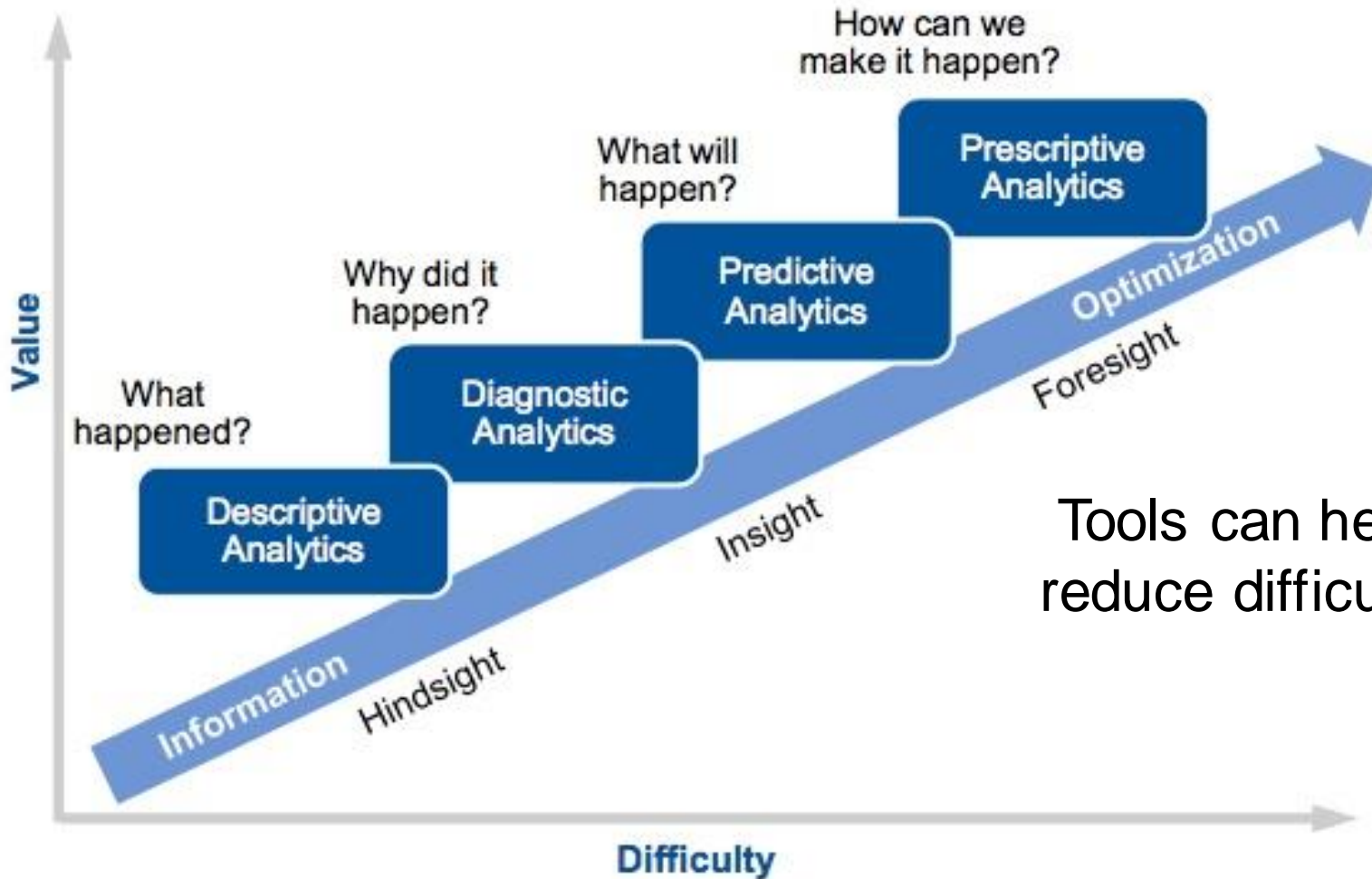
Cloud Computing	Big Data	Data Analytics
<ul style="list-style-type: none">• Computing as a Utility• Pay as You Go• XaaS	<ul style="list-style-type: none">• Volume• Velocity• Variety• Veracity	<ul style="list-style-type: none">• Science of examining data• Data driven decisions

Data Analytics



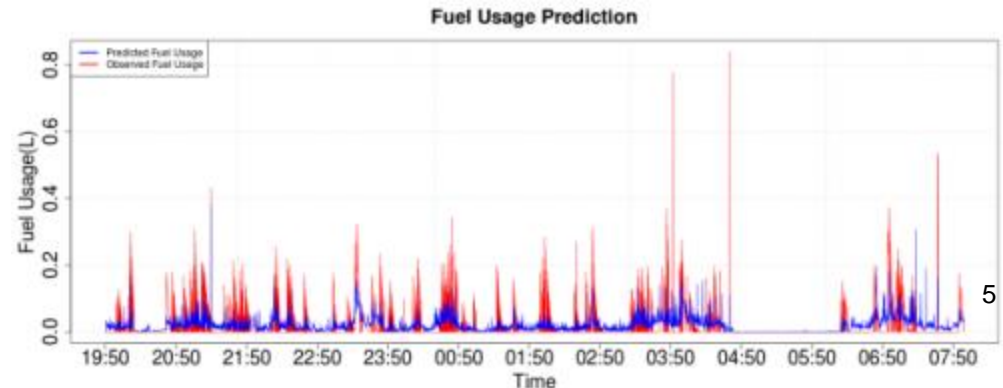
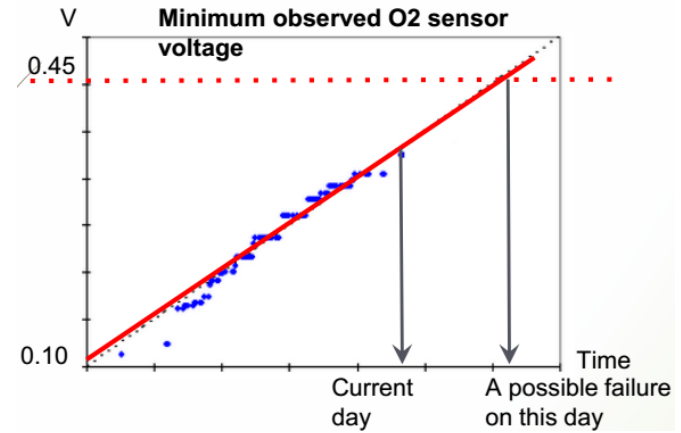
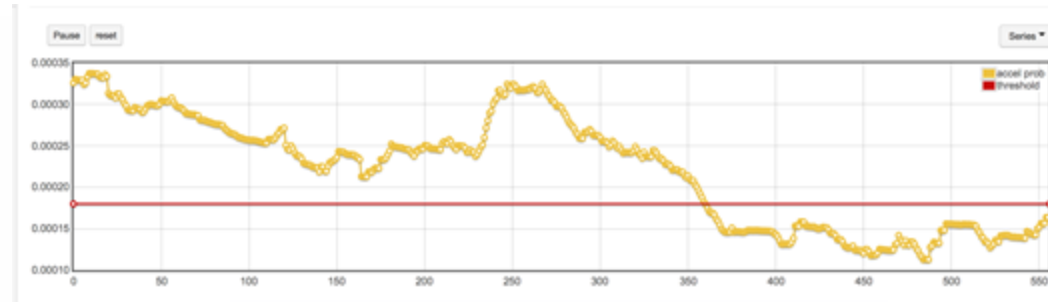
Source: <https://moz.com/blog/when-it-comes-to-analytics-are-you-doing-enough>

Figure 2. Gartner Analytic Ascendancy Model



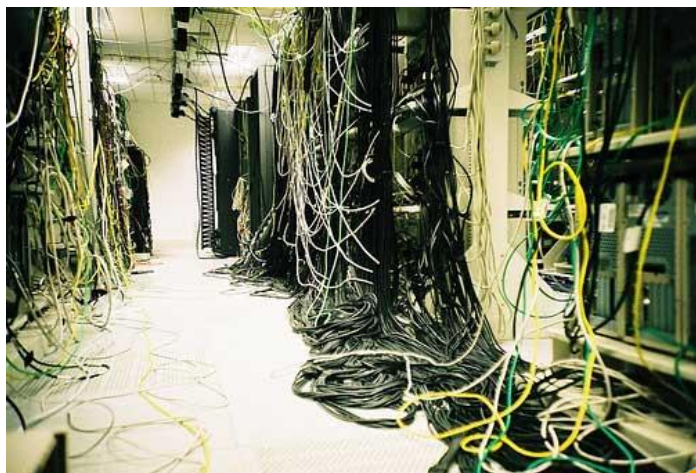
Tools can help reduce difficulty

Case Studies – Data Analytics



Your Options

Consolidation



Colocation

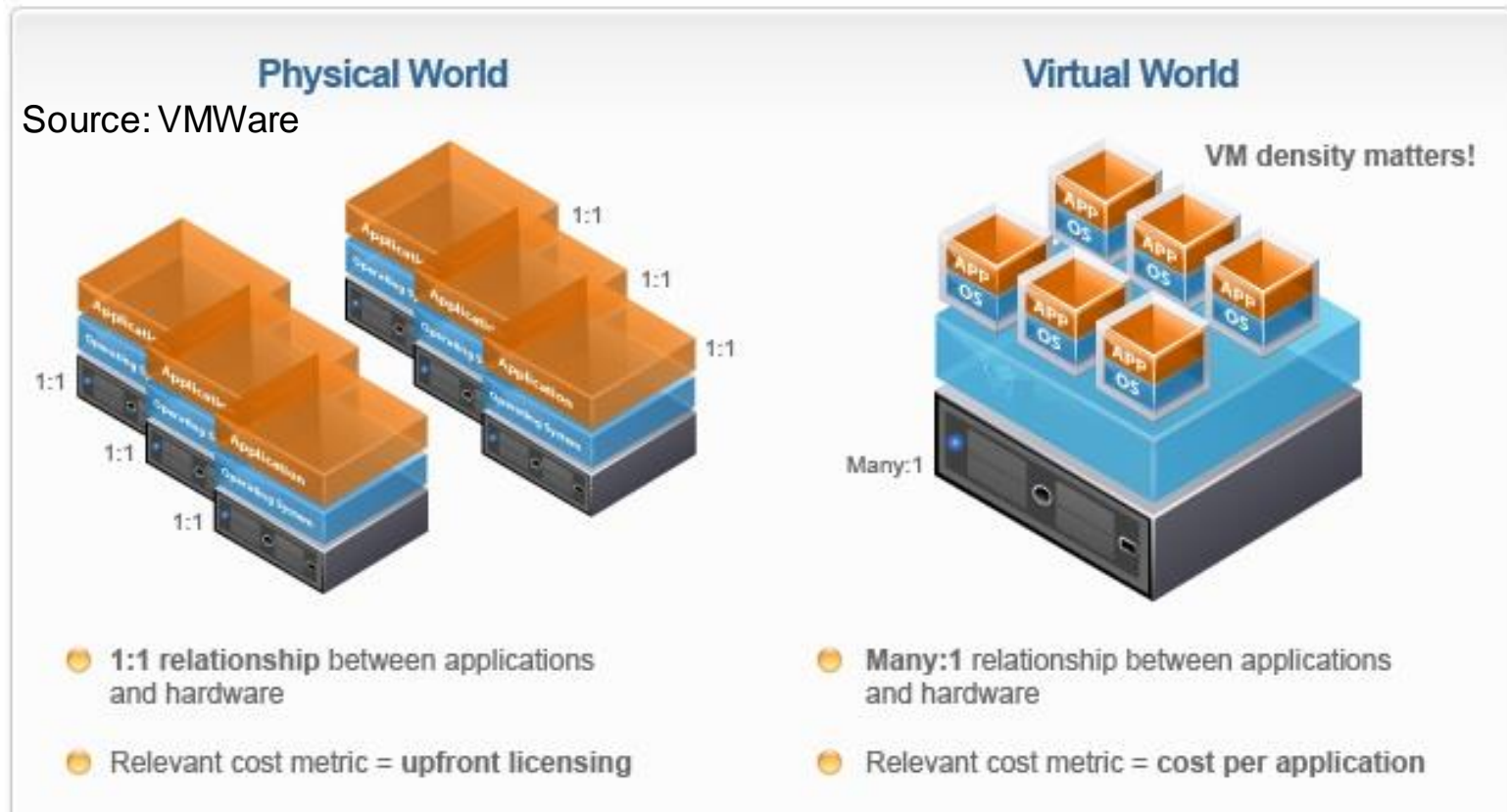


Public Cloud



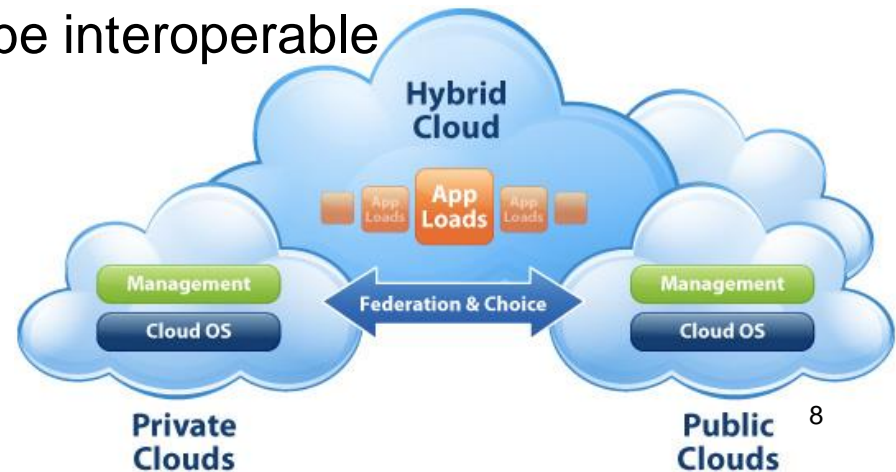
Virtualization

- Act of creating a virtual version of something
 - Hardware platforms, operating systems, storage devices, & computer network



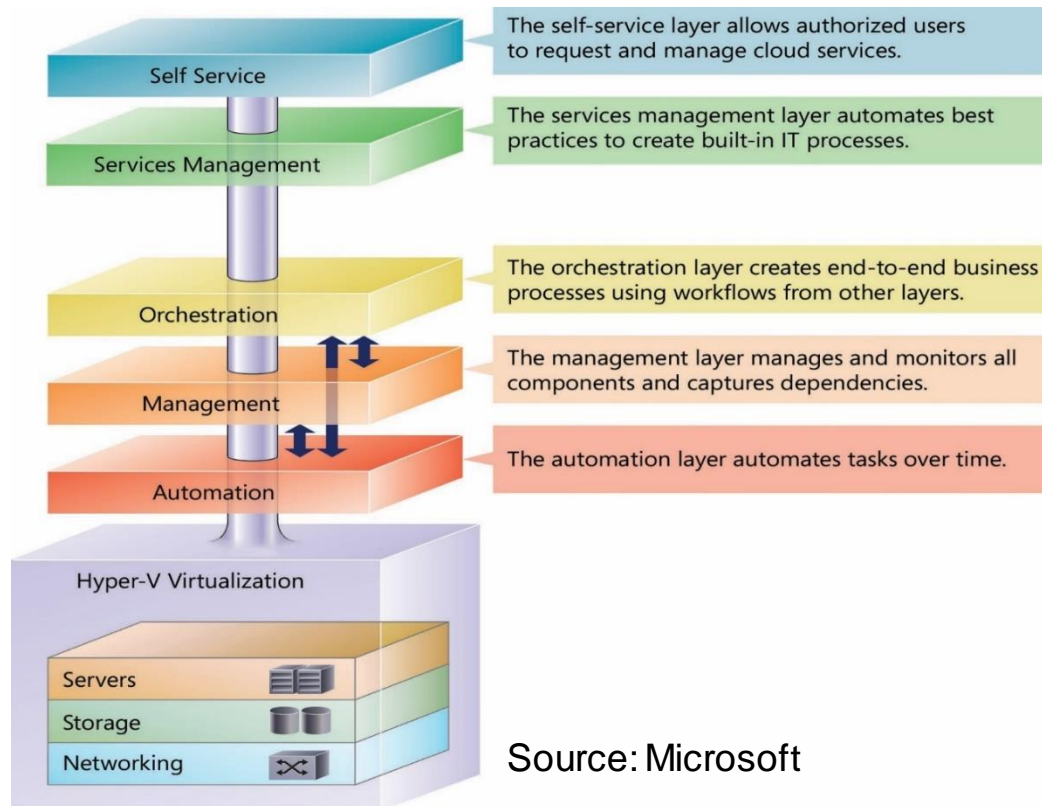
Public/Hybrid Cloud

- Pay-as-you go
- High agility & scalability
- Low cost
- Better Security
- Low control & privacy concerns
- Hybrid clouds
 - Simultaneous scalability, cost, performance, & privacy
 - Private & public cloud should be interoperable



Private Cloud

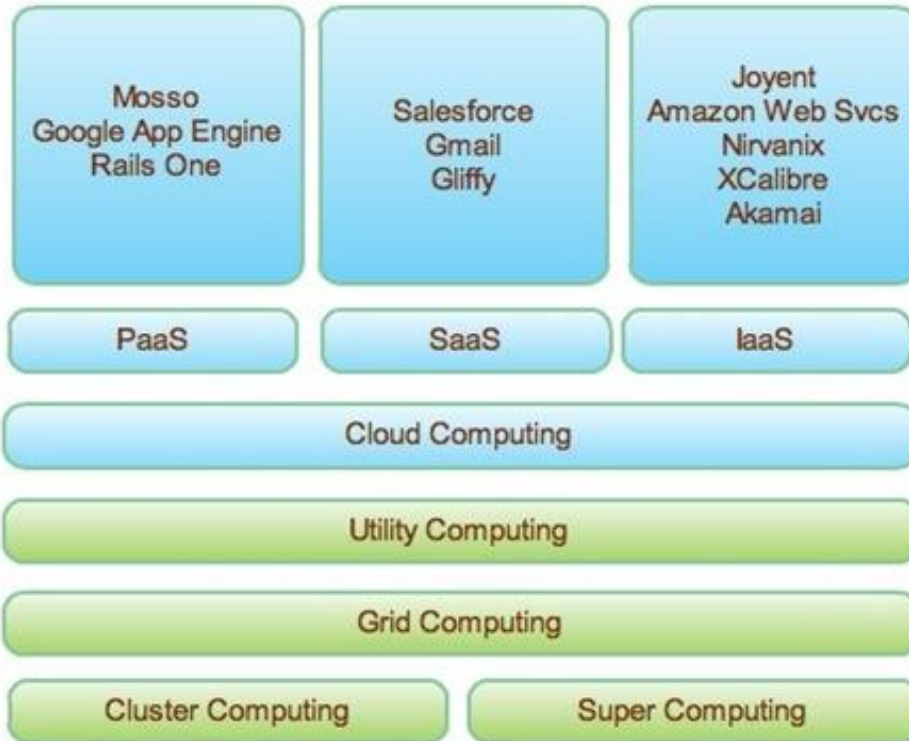
- ❑ Same as a public cloud, but within organization
- ❑ Better agility, performance, control, & security
- ❑ Still limited by available resource pool



Source: Microsoft

Virtualization in Cloud Computing

Cloud Computing



Cloud Computing =
Software as a Service
+ Platform as a Service
+ Infrastructure as a Service
+ Data as a Service

1.0 In blue you have what is lately called Cloud Computing. In green, some of the underlying work done that led to Cloud Computing. At the top are examples of each XaaS type.

Choosing among IaaS, PaaS, vs. SaaS

□ IaaS

- Flexibility, finer control, & performance
- Still need some level of infrastructure maintenance

□ PaaS

- Speedy development, better integration, automated scaling, no maintenance needs
- Relatively low-customization, Vendor lock-in

□ SaaS

- Fastest for common applications
- Little customization

SaaS First, PaaS Second, & IaaS Last

Selection of a Cloud Service

- Know what you want first
- What services are available?
- What is your pricing model?
- What are your scaling options?
- What are your security measures?
- Where are your datacenters located?
- What are SLA terms?
- Customer support
- Reputation

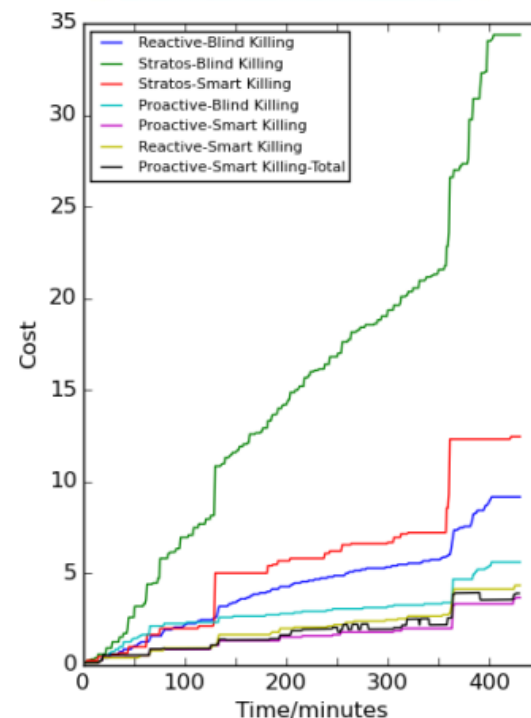
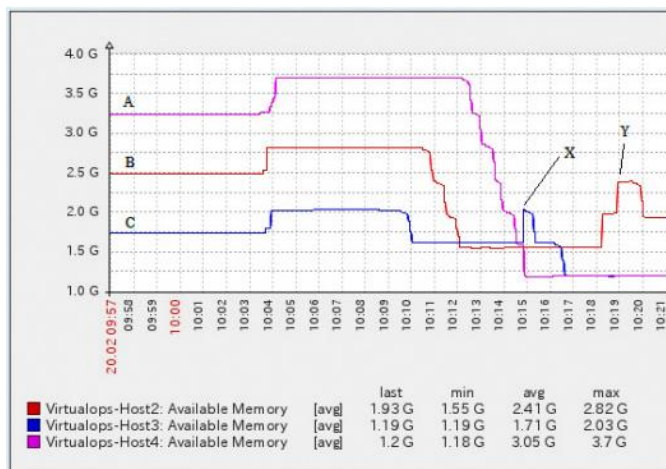
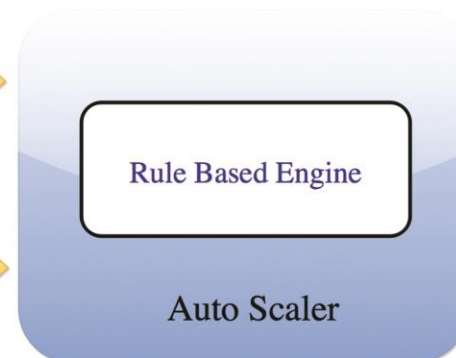
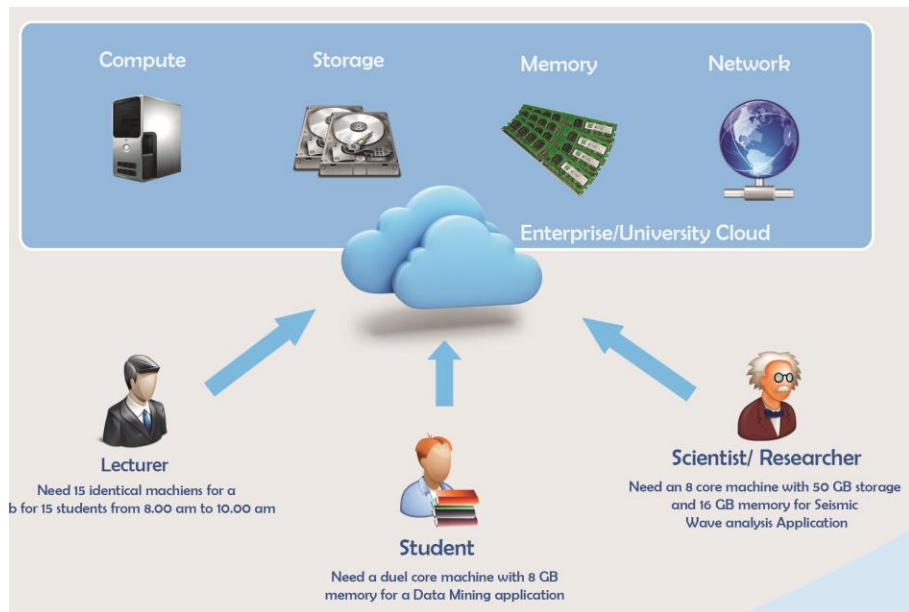
When Not to Use Cloud

- Performance critical applications
 - Unless virtualizing for scale & reliability
- I/O intensive applications
- Colocation of conflicting workloads
- When restricted by licensing terms
 - Applications/OSs with hardware keys
- Not every OS works on latest hypervisors
 - Hypervisors are known to have driver issues
 - Old virtualized OSs may still have driver issues on newer hardware
- When restricted by regulation
 - Be creative
 - Check possibility of changing regulation

Case Studies – Consolidation, Colocation, Public Cloud

- Revenue Administration Management Information System (RAMIS)
- Integrated Treasury Management Information System (ITMIS)
- Online University Admissions
- National Payment Platform (NPP)
- Dept. of Computer Science & Engineering
 - Google Web Apps for Education
 - Office 365
- Touch Pass
 - NFC based bus ticketing
- Microsoft Azure Cloud in Germany
- Mexico IRS

Case Studies – Cloud Research



Data Science & Cloud Computing in CSE Curriculum

Undergraduate

- ❑ Distributed Systems
- ❑ Mobile Computing
- ❑ High Performance Networking
- ❑ Machine Learning
- ❑ Data Mining & Information Retrieval
- ❑ Bioinformatics

Postgraduate

- ❑ MSc in Data Science
- ❑ MBA in IT in Data Analytics
- ❑ MPhil & PhD
- ❑ Distributed Computing
- ❑ Cloud Technologies and Systems
- ❑ Software Development on Cloud Platforms
- ❑ Data Science
- ❑ Business Intelligence
- ❑ Descriptive and Predictive Analytics
- ❑ Enterprise Information Management
- ❑ Data Mining
- ❑ Pattern Recognition
- ❑ Natural Language Processing