Cloud Computing
View from above

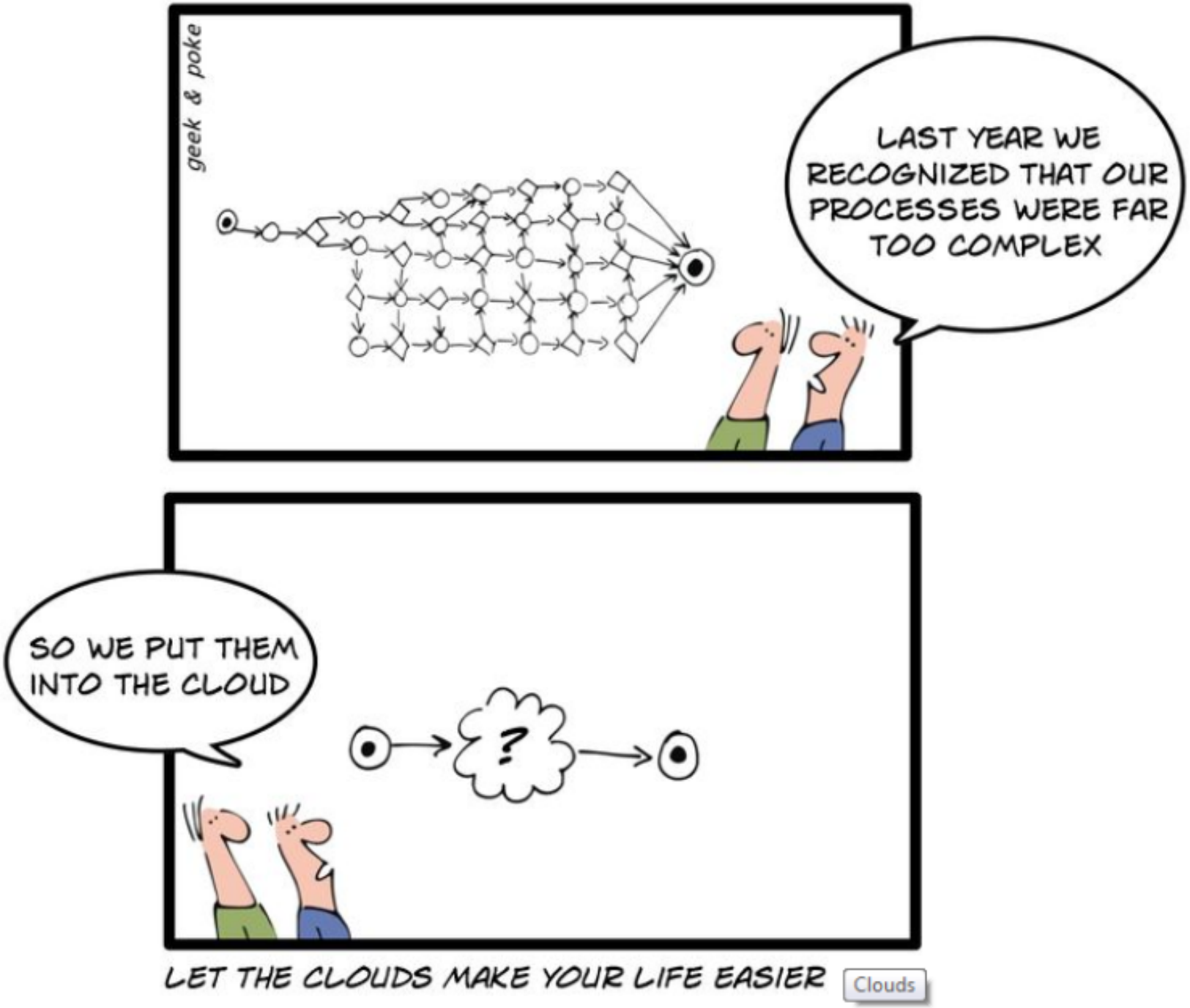
Cloud Boot Camp
New York March 2009

We are going to …

- Try to define what ‘cloud computing’ is
  - Buzzword dissection
  - What makes ‘cloud computing’ cloud computing
- Look at the world of on-demand computing
  - The cloud stack
  - Major players in the space
- Discover if it’s really all that new

What is cloud computing?

- The question everyone is trying to answer
- No real ‘clear’ definition has emerged
  - Its all a bit *cloudy* at the moment!
- Means vastly different things to different people



from http://geekandpoke.typepad.com

Alan Williamson's definition

"*The provisioning of services in a timely (near on instant), on-demand manner, to allow the scaling up and down of resources*"

- For example "Give me as much disk space as I need it, without me having to pre-request it".

Cloud Computing …

- … is the outsourcing of your
  - Resources
  - Services
  - Computing needs?
- … not worrying about the logistics of providing

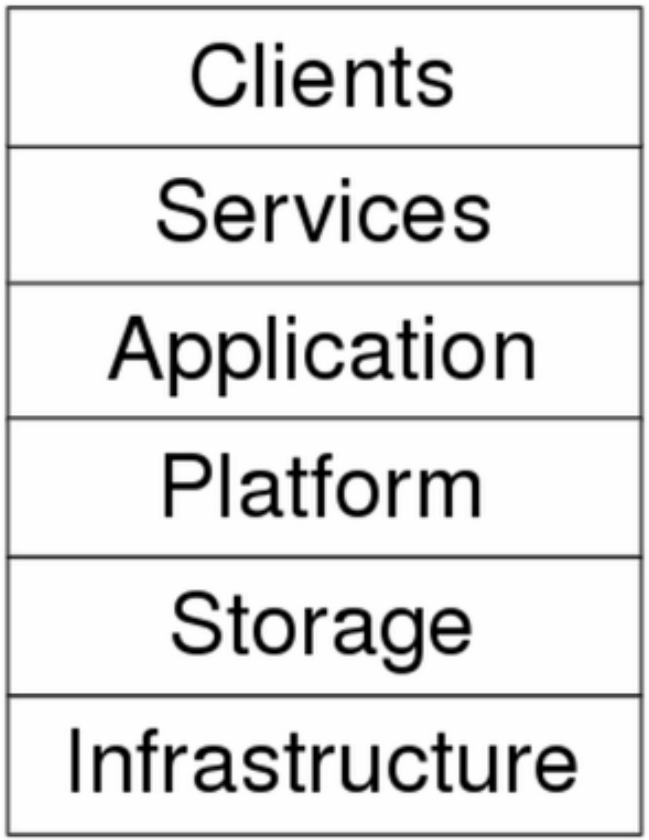
- Just drive the car, and let the mechanic worry about the bit under the hood

Services?

- What do we mean when we talk services?
  - It can seems to cover a lot of ground
    - Disk space?
    - CPU?
    - Memory?
    - Database?
    - Email?

6 layer Cloud Computing Stack

- Sam Johnston formalises the 6 layer stack
- Forms the basis of where everyone fits in the eco system
- Gives us a language

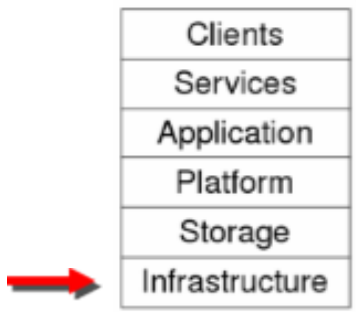


http://samj.net/2008/09/taxonomy-6-layer-cloud-computing-stack.html

Layer#1: Infrastructure

- Provisioning of computing resources
  - CPU
  - Memory
  - Processing
- Basically an “Operating System” on demand
- Usually billed on a per-hour usage model

- Players in this space
  - Amazon EC2
  - Flexiscale
  - GoGrid
  - Joyent
  - AppNexeus
- Management providers
  - RightScale
  - ElasticServer

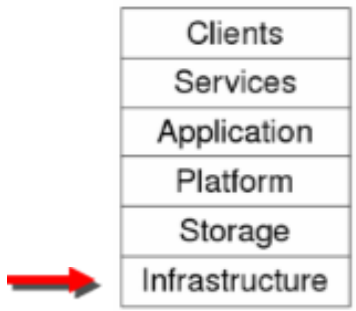


Layer#1: Wiggle Room

- Definition Mayhem
  - Instance
  - Image
  - Accelerator
  - Server

"*Does no one just call it a computer these days??*"

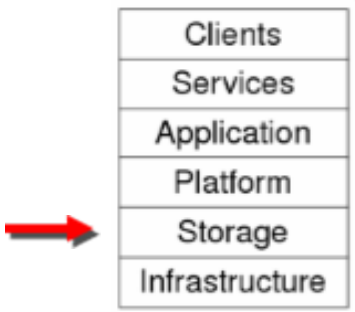
- Operational Differences
  - Wildly different CPU/Memory specs
  - Operating System differences
  - Limitations
- Difficult/Impossible to move whole images between providers



Layer#2: Storage

- Provisioning of data storage
  - Either file/object based
  - Database like functionality
- Billed on bandwidth and storage consumed

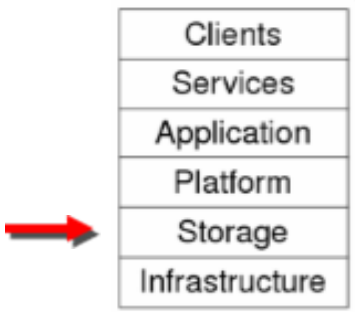
- Players in the space
  - Amazon S3
  - Nirvanix
  - Mosso
  - Amazon's SimpleDB
  - Google's BigTable
  - Azure Storage
- Management Providers
  - Jungle Disk
  - Elephant Disk
  - PutPlace.com



Layer#2: Wiggle Room

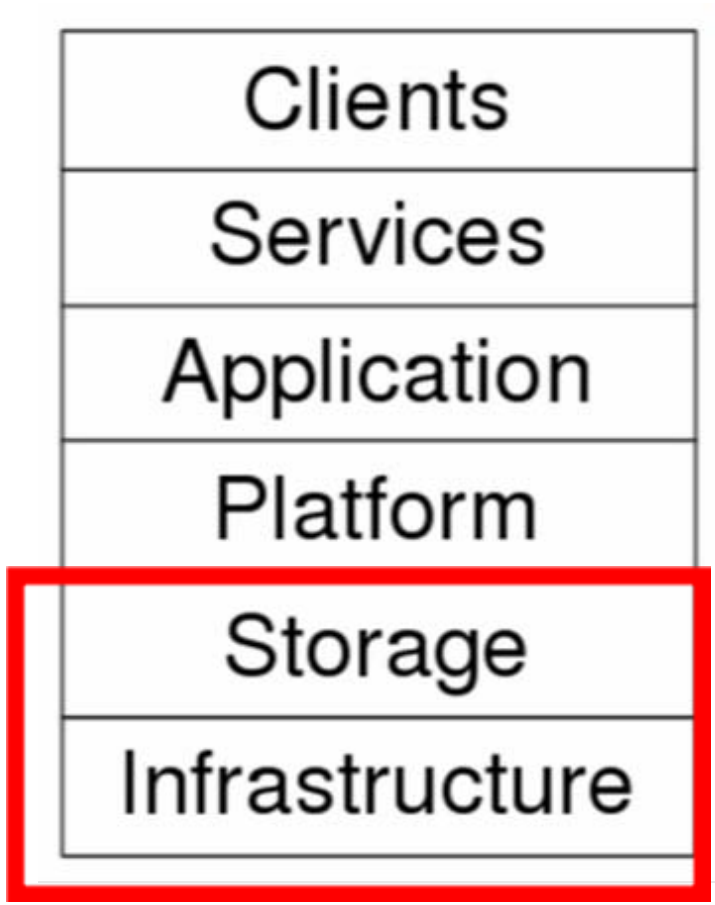
- Different types of data storage models
- Limitations on the size of individual data units
- Different billing models makes it hard to do a straight comparison

- Access to the data generally uses non-standard query syntax
- No common API
- Performance issues



With careful consideration …

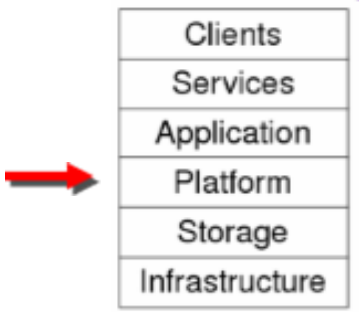
- Manage a level of vendor neutrality
- Move data around; backup-of-backup
- Looking in depth later sessions today at both
  - Storage
  - Infrastructure



Layer#3: Platform

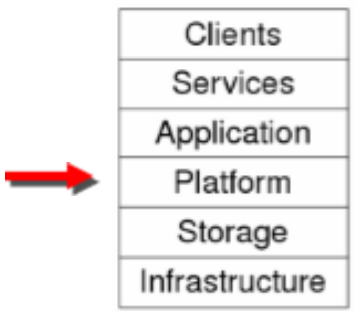
- Provide a complete software stack
  - An IDE for the cloud
- Takes care of
  - Runtimes
  - Load balancing
  - Resource provisioning
- Widely different billing models

- Players in the space
  - Google App Engine Python (initially)
  - Force.com (SalesForce)
  - Microsoft's Azure .NET
  - Heroku.com (RubyOnRails)



Layer#3: Wiggle room

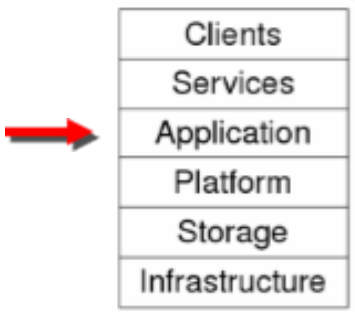
- Different languages
  - Most platforms are unary
- Different operational philosophies
  - Google App Engine for example doesn't permit files
- Lots of limitations in terms of deployment
- Completely reliant on the provider for complete uptime and operation



Layer#4: Application

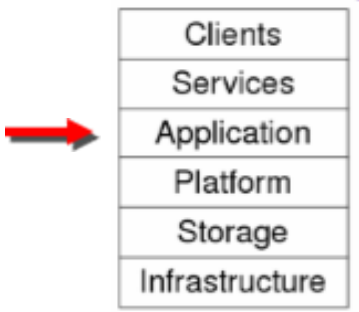
- Applications that are completely ‘online’
  - Operate on data that is stored in the ‘cloud’ or ‘ether’
- No client software generally required
- Billing
  - Ad. Revenue
  - Premium Services

- Players in this space
  - Google Apps
    - Gmail / Google Docs
  - Apple’s MobileMe
  - Microsoft’s Live
    - Hotmail, Live Spaces
  - SalesForce.com



Layer#4: No Wiggling!

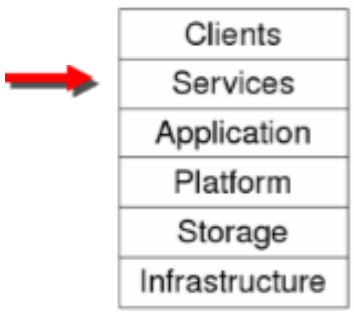
- Near on impossible to move between providers
  - GMail to Hotmail requires major disruption
- End user focused
  - Consumer side of cloud computing
- Completely reliant on the provider for complete uptime and operation



Layer#5: Services

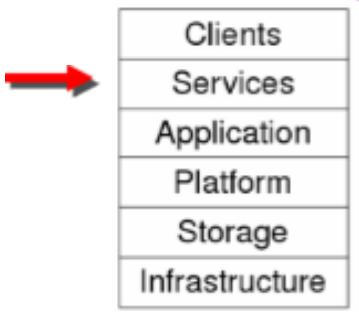
- Provides services to which other applications can utilise
- Specific to vertical markets
- Where most “Web2.0” standards live
- Usually free for non-commercial use

- Players in the space
  - Google/Yahoo Maps
  - PayPal / Google Checkout
  - Google / Yahoo WebServices
  - Amazon Merchant Services
  - Amazon Simple Queue Service



Layer#5: Wiggle free!

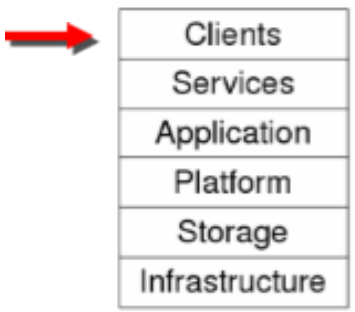
- Some “Web2.0” services have attempted a standardization path
- Most however are complete vendor lock-in
- Mashup applications utilise Cloud Service



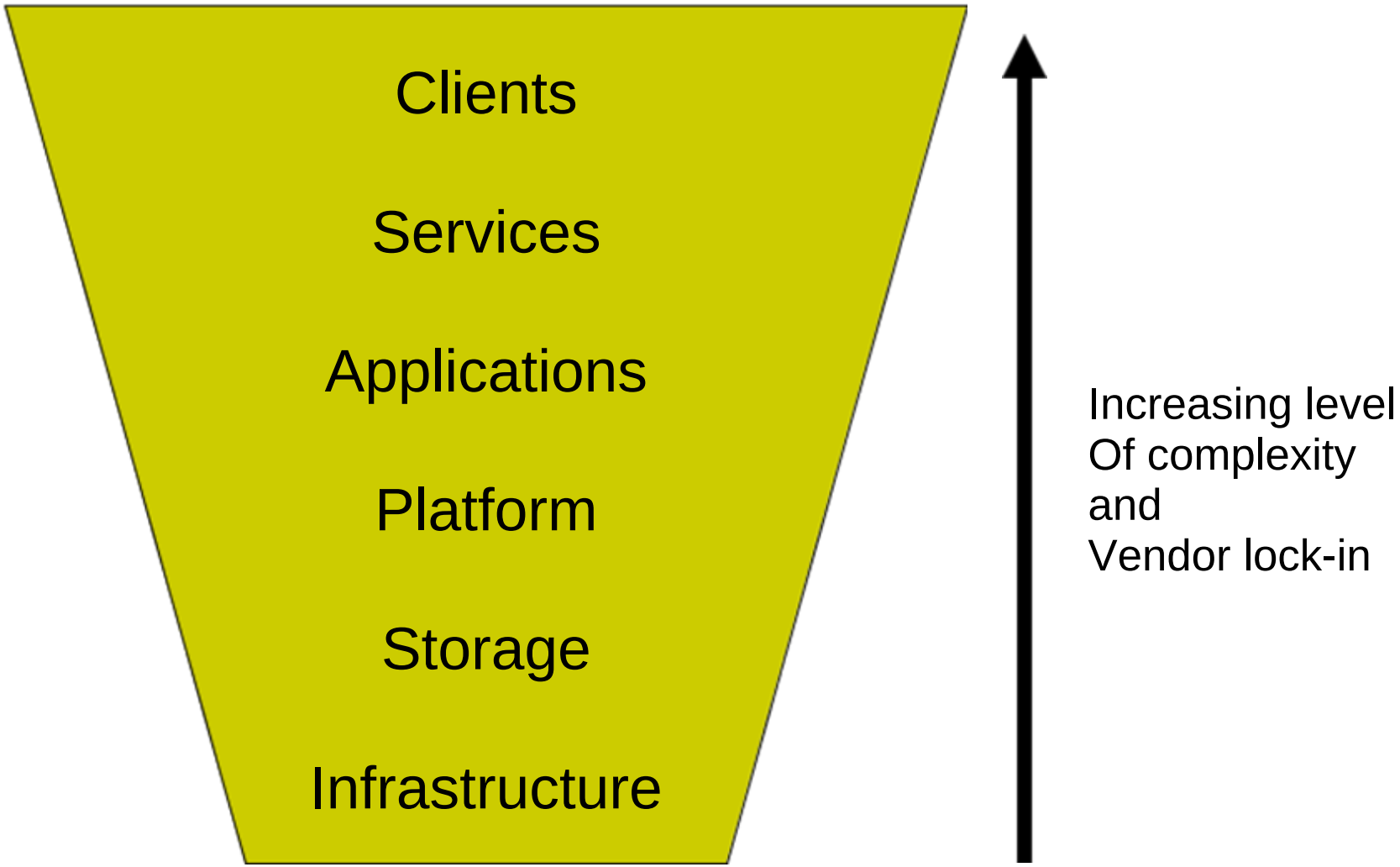
Layer#6: Clients

- Accessing the cloud
- Clients utilise standard access protocols
  - XML
  - JSON
  - REST / SOAP

- Browsers
  - FireFox / IE / Chrome
- Mobile clients
  - Google Android / Symbian / iPhone / J2ME
- Desktop Apps
  - Google Gears / Adobe AIR / Microsoft Azure



The 6 Layer Cloud Stack



But is that the full story?

- Like any good model; it is only valid for a broad range of services
- Many services span different layers at once
  - For example
    - Amazon / Google / Microsoft
    - Facebook / MySpace
    - YouTube / Flickr
    - EBay
  - Making standardization even harder

Cloud Computing's Secret Sauce

- Virtualization makes it all possible
- Free up the relationship between software and hardware and a whole new industry is born
- Virtualization is now built-in to microprocessors
  - Intel's Virtualization (Intel VT)
  - Hardware based, very fast
- Think "Java vs. C" in the old days
  - Java is now as fast, if not faster than C apps

    (source James Gosling, JVMWorld Summer 2008)

Cloud Computing isn't new

- We are merely re-classifying many of the existing technologies and services
- We've lived with service-orientated applications since the main frame days
- Good news
  - All our historical knowledge is transportable
  - You're already a cloud expert!

But the devil is in the detail

- How do you do certain things in the cloud?
  - Seemed easier to do in the good old days of real machines
- People have problems with visualising virtualization
  - We like things we can touch

Myths of the cloud

- Cloud Computing is not only for the public
  - Run cloud stacks internally on your own hardware
    - 3Tera
    - Virtual Iron
    - VMWare
  - Network Storage
    - SUN / HP storage solutions
    - Low cost SAN solutions

Steps for cloud success

- Take deep breaths
  - Appreciate the whole spectrum and then dismiss much of it (majority won't apply to you)
- Can be a little like being locked in a candy store
  - You just don't know which one to pick first – too much choice
- Get behind the marketing buzzwords
  - Everyone is trying to put their spin on it
- Baby Steps … wade into the water slowly
  - Diving in will result in drowning!

now for the next thing…

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