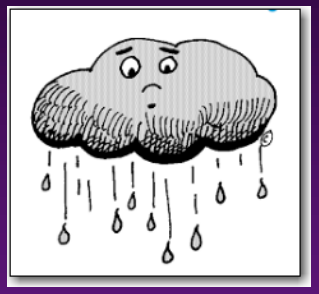
Don't Let Your Cloud Rain on Your Parade



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June 13, 2017

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Who Am I? – "Dr.Paul"

- Been Around FOREVER (used to be President of this group)
  - Spoke at almost every big Oracle conference since '93
  - First inductee to SELECT Hall of Fame
- Wrote lots of books
  - Designer, Developer, JDeveloper, PL/SQL
- Won lots of awards
  - One of initial 6 ACE Directors [+First one fired!]
- Built lots of big systems
  - Air Force Recruiting
  - Ethiopian Ministry of Finance and Economic Development Budget System
- Known for:
  - Thick Database approach
  - Business Rules

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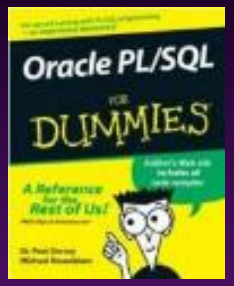
Who Am I? – "Misha"

- Oracle ACE
- Co-author of 3 books
  - *PL/SQL for Dummies*
  - *Expert PL/SQL Practices*
  - *Oracle PL/SQL Performance Tuning Tips & Techniques*



- Known for:
  - SQL and PL/SQL tuning
  - Complex functionality
    - Code generators
    - Repository-based development

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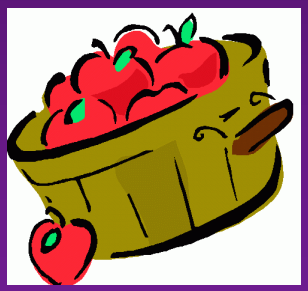
Rule #1

Let's not mix apples and oranges…

… because there are different kinds of clouds!



Infrastructure as a Service (IaaS):

- Core idea:
  - Do whatever you want with provided hardware.
- Functionality:
  - Provider = hardware, virtual machines, storage, networking, load balancers
  - Customer = any software you want (including OS)
    - … usually plus some control over networking (for example, firewall rules)
  - Could have different levels of implementation

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IaaS Implementation

- Local virtualization, a.k.a. private clouds
- Small/medium boutique providers of virtualized hardware
- Big players (Amazon, Azure)
  - … plus Oracle Cloud (~ kind-of IaaS)

Software as a Service (SaaS)

- Core idea:
  - Fixed and formally defined scope
  - Published by provider

- Functionality:
  - Provider = the whole application with documented interfaces
  - Customer = use provided functionality
    - Minimal customization (if any)

Platform as a Service (PaaS)

- Hybrid
  - Provide “Development platform” (not entire solution)
- Functionality:
  - Provider = development platform (OS+DB/App Server+ development tools), including maintenance
  - Customer = use provided platform to develop and deploy any application you want

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PaaS Flavors

- Back end as a Service
- Unified Communication as a Service
- Database as a Service
- Schema as a Service
- … lots of others…

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Rule #2

Your mileage may vary …

… so we will talk about OUR experience!

Our Stories

- Internal development environment
  - Private cloud
  - IaaS
  - All Dulcian databases and application servers are virtual.
- Large DoD system
  - Large cloud provider
  - Mixture of IaaS and PaaS
  - 5000 users
- Provider of medical software used in doctors' offices
  - Boutique cloud provider
  - Very developer-friendly PaaS
  - 1000 users (and growing)

Why bother?

- For DoD system -
  - We were told we had to be in the cloud.
- For medical system -
  - We needed to be HIPAA compliant.
- Internally
  - We were tired of underutilization of our most powerful servers and overutilization of our least powerful servers.

General Impressions

- Not totally loving this cloud thing…
  - One-sided service agreement, no real teeth
  - No visibility for what is going on
  - Much more expensive than buying your own stuff
  - … but private clouds are GREAT! ☺

Case Studies

Case Study #1: Internal Development Environment

- Private Cloud
  - VMWare-based solution
    - VSphere Center (integration of all virtual hosts/guests into one centralized view)
  - All databases and application servers are now virtual.

Case Study #1: Pure IaaS

- Pros:
  - Simplified maintenance:
    - Quick snapshots (my favorite feature – testing new patches is safe!)
    - Backups
    - Clones
    - Migration between hosts
  - Resource provisioning
- Cons:
  - Too easy to over-allocate available resources

Case Study #1: Conclusions

- Impact:
  - Significant decrease in overall hardware cost
  - Major testing process improvements (snapshots!)
  - Simplification of all management tasks
- Experience so far:
  - LOVE IT!

Case Study #2: Large DoD System

- 5000 heavy users worldwide (constantly on the system)
- 20 external interfaces (mostly Web Services)
- Originally had dedicated servers, but since 2014 hosted by a DoD-specific cloud provider
- Mixed architecture:
  - IaaS: Database servers (Oracle 11.2 on Linux)
  - PaaS: Application servers (load balanced) + dedicated reports server

Case Study #2: IaaS Side

- Pros:
  - Reasonably efficient hardware provisioning
    - … needed resources were available and quickly added
- Cons:
  - Very vague SLA agreement ➔ poor customer response
    - Just can't get them on the phone!!!
  - Very expensive for what we got

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Case Study #2: PaaS Side

- Complete disaster!
  - Unexpected and unapproved changes of security certificates on application servers
  - Overall bad coordination and communication with the project administration team
  - Very limited control (~ very restricted platform)

Case Study #2: Conclusions

- History:
  - Downtime
    - Own hardware: 15 years < 0.1%
    - Cloud: 2 years ~1.5% downtime

- Impact:
  - Approval obtained to get rid of current system and start over

Case Study #2: Future

- Action:
  - Moving to Amazon AWS as VM (ETA – end of this year)
  - Will not be cheap
  - Will have to absorb some workload (previously done by government-specific hosting)
- Experience so far:
  - Amazon placed staff onsite to ease transition.
  - Very professional group
  - Cautiously optimistic, but will keep you posted!

Case Study #3: Medical Software in Doctors' Offices

- Developer-friendly PaaS
  - Operating system is maintained by providers.
  - Database is a joint area of responsibility.
- Extension to existing COTS software
- Thousands of users
- Light application, but very complex, heavy interfaces
  - Load and parse entire medical chart (JSON)
- Implemented on a boutique cloud (small provider)

Case Study #3: PaaS (for us) + SaaS (for doctors)

- Pros:
  - Not expensive
  - Nice customer service
  - Provides HIPAA compliance for a low cost

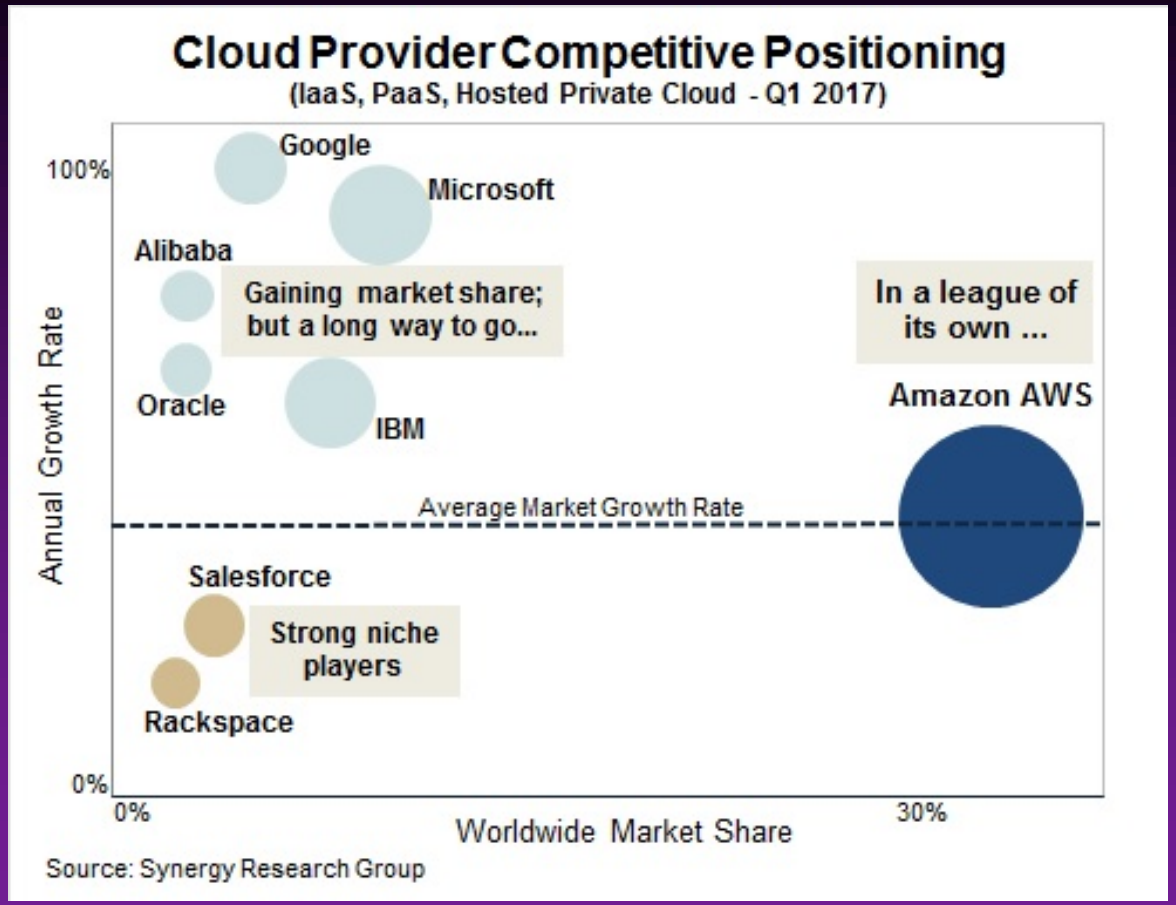
- Cons:
  - Probably not bullet-proof availability (compared to Amazon)

Case Study #3: Conclusions

- Impact
  - Near 0 downtime!
- Experience so far
  - Does exactly what we need

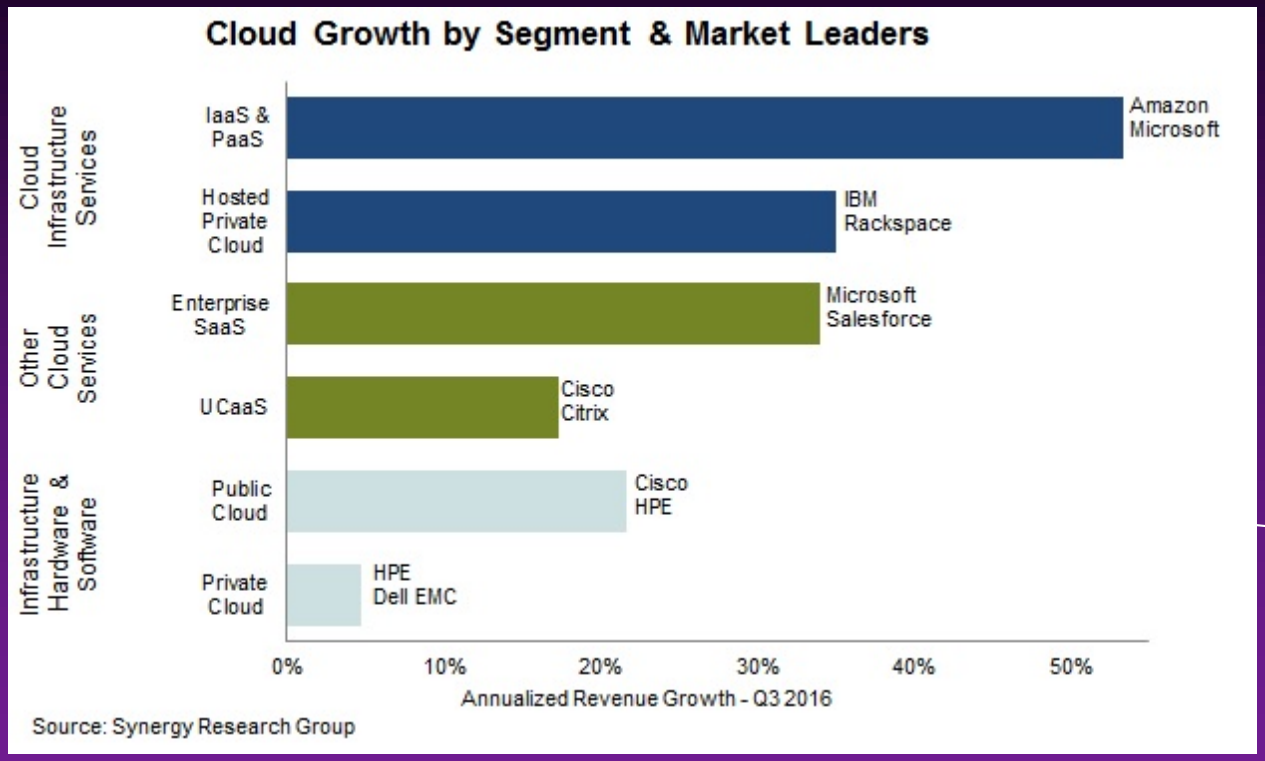
Lies, Damned Lies, and Statistics (Mark Twain)

Overall Market



Any comments needed? ☺

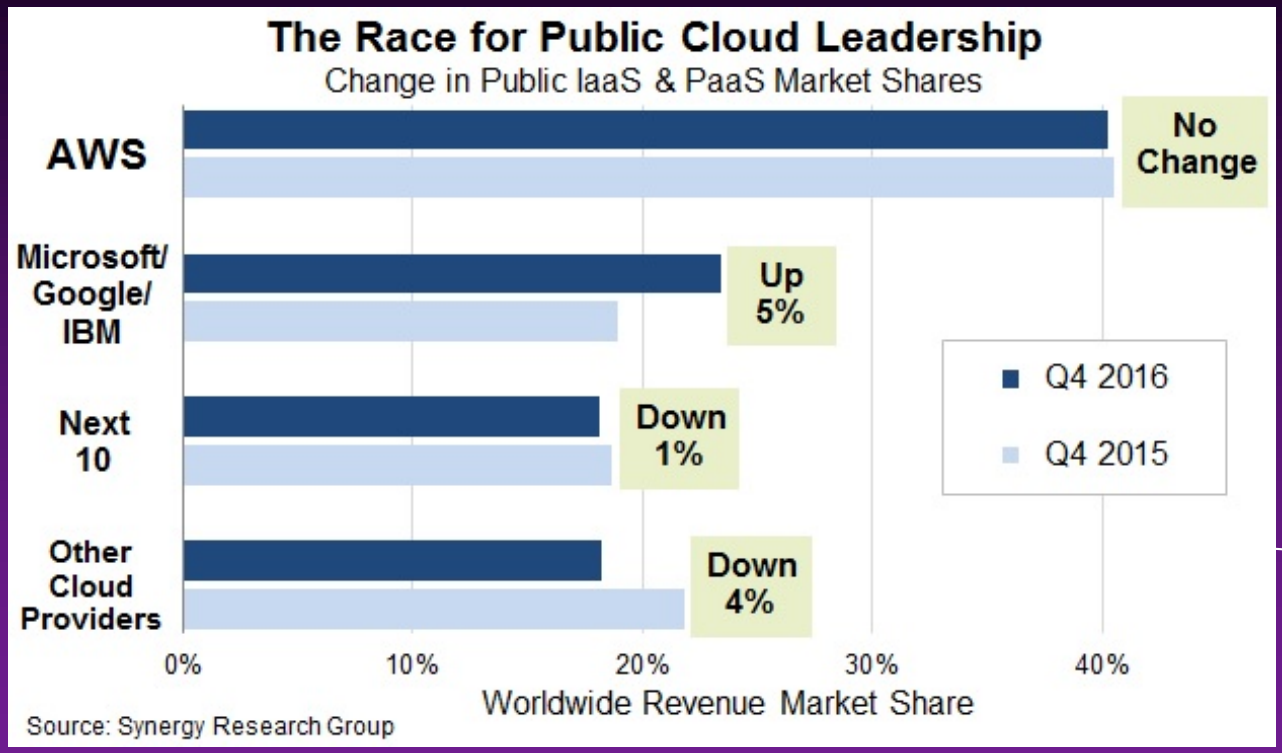
Market Growth By Segments



Oracle is not in the same league (yet): $178 million in revenue vs. Amazon's $3.5 billion

People don't want to manage their hardware anymore?

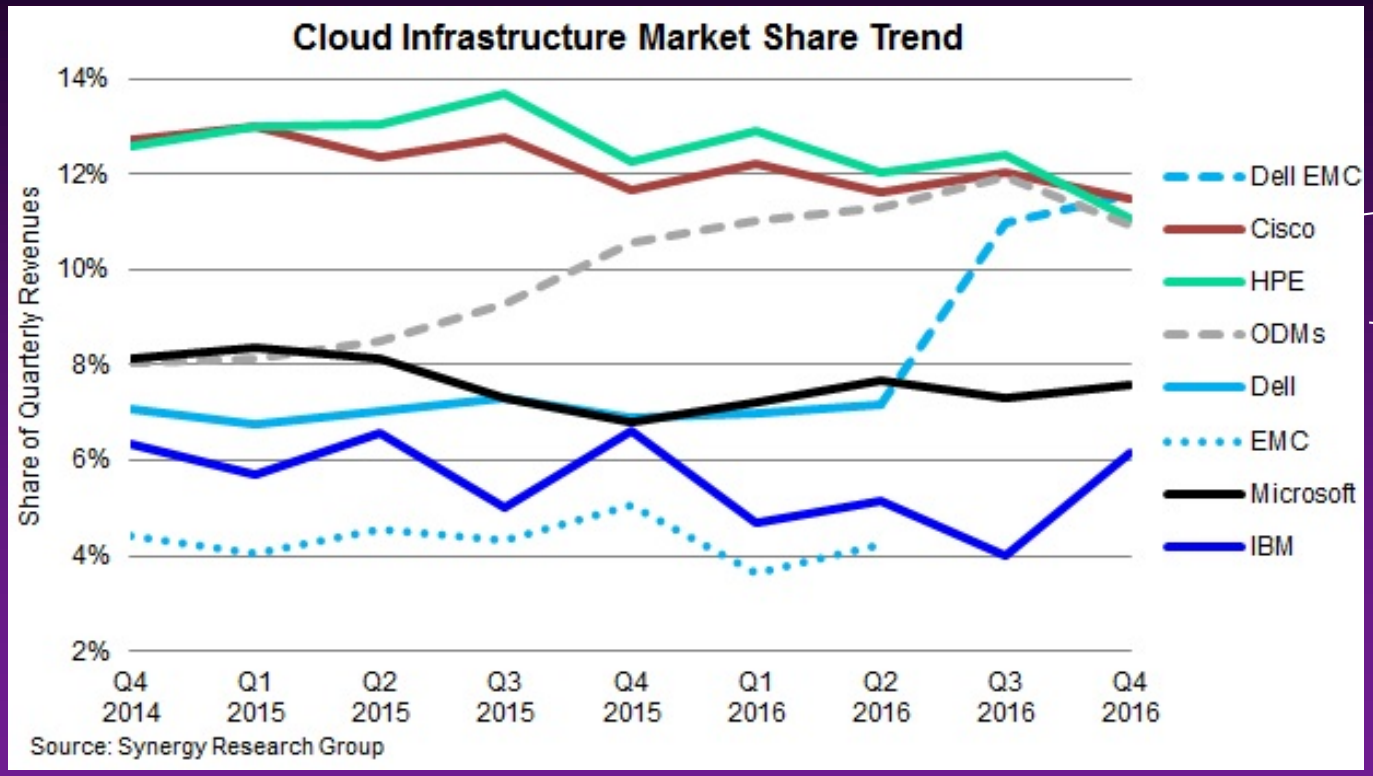
Cloud Provider Dynamics



Big players are up

Small players are down

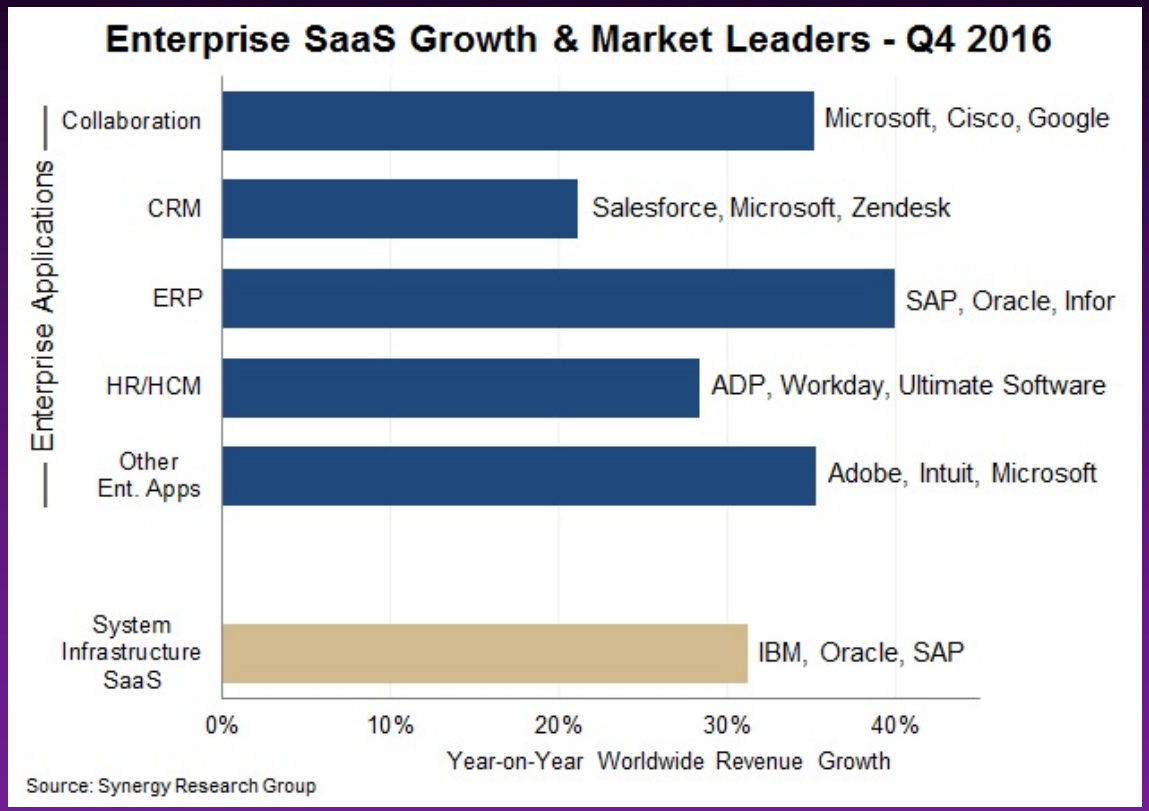
Cloud Infrastructure Dynamics



3-way tie

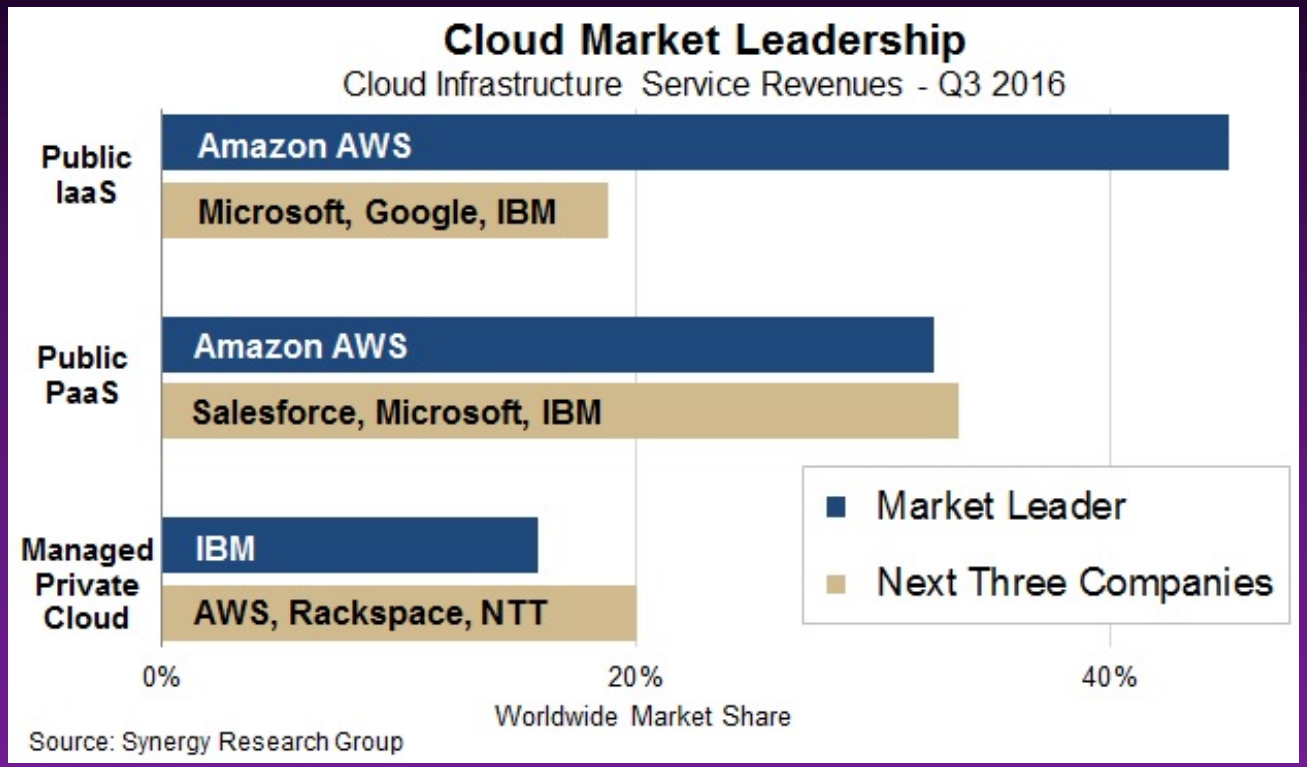
ODM (original design manufactures): combined data

SaaS



Oracle is picking up some speed:
SaaS and PaaS speed of growth – 85%

King of the Hill



Sorry,
no 2017 data yet…

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Conclusions (1)

- Highly detailed Service Level Agreement (SLA) is the key to success because:
  - 1. Hardware is only as good as the people maintaining it
    - Platform maintenance mistakes are VERY costly.
  - 2. From time to time, you DO need human intervention.
    - You need to know how to reach these people immediately.

Conclusions (2)

- Oracle still doesn't recognize VMWare [Doc ID 249212.1]
  - To log a bug, you may be forced to reproduce the issue in a non-virtual environment, unless it is already known.
- BYOL systems should be on constant alert because:
  - Oracle may suddenly change its policies.
  - If you are not on Oracle Cloud, you will be paying more
    - Latest example: changes from Jan 23, 2017

"When counting Oracle Processor license requirements in Authorized Cloud Environments, the Oracle Processor Core Factor Table is not applicable."

http://www.oracle.com/us/corporate/pricing/cloud-licensing-070579.pdf

Conclusions (3)

- Oracle Cloud is still a work in progress (especially the DBaaS part)
  - There are various levels of complaints about manageability and performance.
    - but that is normal in the early stages of a product.
  - Oracle Database 12c Release 2 is very promising
    - … but it remains to be seen how it will work "on the premises."

Conclusions (4)

- You MUST have an "exit cloud" strategy.
  - Something bad could suddenly be discovered about your provider
    - … like a data breach
  - Providers may suddenly go out of business.
  - Providers may suddenly change various conditions (not just prices).
- You are strongly recommended to have "Data Escrow" either on-premises or at the alternative provider.

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Summary

- We have come a LONG way in IaaS land:
  - Big players seem to have a bright future.
    - Amazon and Microsoft – for sure, Oracle – TBD
  - Private clouds are doing OK (particularly for development).
  - Boutique clouds are in survival mode.
    - Hard to compete with big players except by low pricing
- Success of PaaS and SaaS in PROD ⇔ depends upon how much you trust the provider

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- Latest books:
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  - *Oracle PL/SQL for Dummies*