Everything as a Service (XaaS)

COSC349—Cloud Computing Architecture David Eyers



Learning objectives

- For at least three different types of XaaS offerings: describe the purpose of that type of XaaS; indicate its key positive and negative tradeoffs; and
- Sketch the pricing approach of some XaaS offerings

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 Understand that X as a Service is often a cloud model laaS, SaaS and PaaS remain a core group of three though

Everything as a Service (XaaS, EaaS, *aaS)

- Collection is described as 'everything as a service'
- All share pricing as a service; cloud-based hosting

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 Success of laaS, PaaS, and SaaS led to other services XaaS not a single type of service: also may overlap I/P/SaaS

 e.g., specialising a particular PaaS allows for targeted pricing ... cloud provider can decide what overheads to absorb Providers benefit from fine-grained knowledge about cloud use

• Downsides: complexity; external reliance; data offsite



Database as a Service (DBaaS)

- Or 'cloud database', e.g., AWS RDS, Amazon Aurora, etc.
- Benefit: cloud-scale; needn't manage DB software • **Downside**: less control; potential lock-in
- Clouds often offer NoSQL and NewSQL database systems NoSQL / NewSQL DBs are designed to scale-out over clusters NoSQL typically tuned for non-relational data-types • Key-value store; JSON; time-series data; graph databases; ... **NewSQL** instead scales out a typical relational database





Storage as a Service

- Enterprise storage systems are typically multi-tier:
 - RAM; SSD; spinning disk; tape
- to access and may lead to data security concerns
- - Backup client on-site, synchronise with cloud—slow is OK

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Storage as a Service integrates hybrid cloud offerings into tiers

Cloud provides large amounts of storage, but may be slow

Also covers personal storage: Dropbox, Box, OneDrive, etc.

Cloud backup systems: an alternative to tiered storage





Network as a Service

- Can be external organisation running client network **Bandwidth on Demand** (BoD)—avoids provisioning for peaks Virtual Private Network (VPN)—provides secure network VPNs let external devices appear as if inside organisation network
- Content Delivery Networks (CDN)
 - CDNs use global deployment to disseminate data, e.g., video
- Mobile Virtual Network Operator (MVNO)
 - MVNO rents radio spectrum from infrastructure owner
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Security as a Service (SECaaS)

- Also Network Defence as a Service (NDaaS) Operational services provided by SECaaS Identity and Access Management (IAM) Email security—phishing detection; privilege testing Web security—detection of anomalous behaviour

- - Virus / malware scanning
- Risk mitigation services provided by SECaaS Intrusion detection and management
- - Business Continuity / Disaster Recovery
 - Data Loss Prevention (DLP)—detect exfiltration



Unified communications as a Service (UCaaS)

- Organisations used to rely on wired phone extensions
 - Internal 'exchange' to manage n-m connectivity: PABX
- Multiple pressures have emerged:
 - Mobile devices render phone extensions less relevant
 - Demand for video conferencing on end-user devices
 - Integration between comms. and other systems (CRM, etc.)
 - May be inefficient to offer these services in-house
 - Can still do digital transformation in-house with VoIP...
- e.g., UoOtago online meetings can use <u>Zoom</u> (really?!)





Logging as a Service (LaaS)

- Security sensitivity means LaaS is often private cloud Splunk is a log management firm supporting public & private Log files emerge from all over enterprise IT • Server software; network components; hardware devices Raw log information often just a puzzle piece: Need to centralise & aggregate information to see big picture Potentially independent: collection; retention; analytics

- Want alerting to be managed in a unified way
 - Don't independently set up SMS recipients for each service





Desktop as a Service / Desktop Virt.

University of Otago Student / Staff Desktop

DaaS is VDI in the cloud

- ... even if an organisation's sites become disabled / destroyed
- - Must price software licensing, and time-based VM cost

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Otago ITS run the back-end Virtual Desktop Infrastructure (VDI)

Facilitates access to 'work desktop' from any device & place

 Client doesn't need to provision / manage hardware DaaS allows security to be monitored by the provider (scale)



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Windows 365

- Windows 365: web-based access to desktop GUI
- VDI: primarily care about app use through GUI
 - Infrastructure opaque to users: can share backend servers
- Windows 365: PC with known specs behind GUI
 - User chooses PC RAM size. Cross between EC2 and VDI?
- Typical pricing is a monthly rental charge COSC349 Lecture 12, 2024

Sounds like VDI, but Microsoft are continuing to offer VDI too

Windows 365 free trial oversubscribed almost immediately...

Mobile backend as a Service (MBaaS)

- MBaaS provides services useful to mobile applications • **Push notifications**; integration with other platforms (e.g., social)
- - Pricing often based on number of API requests
- Popular offerings from many large cloud providers, e.g. Apple's CloudKit—the platform powering iCloud
- - Provides: file storage, databases, authentication, messaging, ...
 - Google's Firebase (started 2011, acquired by Google in 2014)
 - Has above CloudKit offerings, plus testing, profiling, debugging
- We come back to MBaaS in a later lecture





Search as a Service

- Large organisations need search services
 - Difficult when spanning multiple resources, such as web + DBs
- Publicly web accessible material? 'Google' (WLOG) it!
 - Can easily focus search engines, e.g., using 'site:' directive
 - Can go further to more tightly 'brand' the search pages
- If internal, non-public resources need searching
 - Pre-cloud: put rack-mounted search appliances on your LAN
 - Post-pre-cloud: can have software agents scan resources
 - Services' indexes can help such search tools, e.g., email headers

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