

PA200 - Cloud Providers

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- ▶ More detailed in Cloud Service Deliver Models
- ▶ Datacenter Virtualization – oVirt
- ▶ IaaS – Infrastructure as a Service – OpenStack
- ▶ PaaS – Platform as a Service - OpenShift
- ▶ SaaS – Software as a Service – Microsoft Dynamics CRM – mostly abandoned
- ▶ xPaaS – extended PaaS – integrates aPaaS (Application), iPaaS (Integration), dvPaaS (Data Virtualization), bpmPaaS (Business Process Management), mPaaS (Mobile)

- ▶ Amazon Web Services
- ▶ Web service backend providing libraries for majority of modern web programming languages
- ▶ Provides also database access and storage
- ▶ Features mobile platform as well
- ▶ REST-style HTTP, SOAP

- ▶ Simple Storage Service

- ▶ Provides API-driven Object storage
- ▶ Stored files are abstracted all the way to objects and are easy to represent in high-level programming languages
- ▶ REST-style HTTP, SOAP, BitTorrent

- ▶ Elastic Compute Cloud (IaaS)
- ▶ KVM-based
- ▶ Provides backend to earlier mentioned services as well as ability to sell „Virtual private cloud“ to customers
- ▶ OSs (Linux, OpenSolaris, Windows, NetBSD, ...)

- ▶ Elastic Beanstalk (PaaS)
- ▶ AWS Lambda (event-driven, serverless computing - FaaS)
- ▶ Glacier (storage for archives or backups)
- ▶ Elastic Block Store (block-level storage)
- ▶ SimpleDB, DynamoDB, Elastic MapReduce, ...

- ▶ Rich platform exposing functionality over REST

- ▶ Primarily developed to support Google's core services (search, youtube, gmail)
- ▶ Later extended with the business needs driven by Android, its integration with services
- ▶ Nowadays featuring rich set of programming frameworks, hosting services and database engines

- ▶ Web apps on Google's infrastructure (PaaS)
- ▶ Python, Java (JVM), Go, PHP, Node.js
- ▶ Easy deploy, monitoring, scaling
- ▶ Limited languages and tools (SQL vs. GQL)

- ▶ IaaS
- ▶ Compute Engine Unit (GCEU) - abstraction of computation power
- ▶ at the backend kvm based

- ▶ IaaS for storage
- ▶ REST-like HTTP access

- ▶ compatible with Amazon S3
- ▶ web service (with REST-like interface)
- ▶ work with Storage
- ▶ SQL dialect, returns JSON
- ▶ can be integrated via HTTP (Spreadsheets)

- ▶ Provider of solutions that can serve either as a private or public cloud
- ▶ Also provider of PaaS/xPaaS solution (OpenShift)
- ▶ Involved in development of cloud-oriented apps ranging from Level 1 (kernel, KVM), through management software (OpenStack, oVirt) and PaaS up to application level (JBoss Enterprise Application Platform, Data Virtualization, etc.)

- ▶ open source upstream for Red Hat Virtualization
- ▶ can manage networks, CPUs, storages
- ▶ with VM it can do live migration, live snapshots

- ▶ integrate with many open source projects (OpenStack, Foreman, ManageIQ, ...)
- ▶ Java (GWT, WildFly)
- ▶ REST-style HTTP API
- ▶ can integrate with LDAP or AD

- ▶ RHEL, CentOS, Fedora or Debian with KVM
- ▶ VDSM (Python daemon) manages resources and VMs
- ▶ gets commands from Engine and reports back to it

- ▶ open source platform for cloud computing (mainly IaaS)
- ▶ written in Python
- ▶ each Project aims to solve one part of cloud computing needs
- ▶ pluggable w/r/t backends and between Projects

- ▶ central user management and authentication service
- ▶ can use directory service backend (LDAP)

- ▶ layer on top of hypervisor(s)
- ▶ manages compute resources - VMs and containers
- ▶ manages networks and IP addresses for VMs
- ▶ can use SDN technologies (OpenFlow)
- ▶ load balancing, floating IPs, firewall, VPN, ...

- ▶ Block Storage (Cinder) - many storage providers
- ▶ Image Storage (Glance) - images to boot from and to store snapshots of VMs to
- ▶ Orchestration (Heat) - used to manage deployments of applications on OS
- ▶ Database as a Service (Trove)
- ▶ Bare Metal (Ironic) - management of physical machines (PXE and IPMI as default)

- ▶ PaaS
- ▶ container based deployment and management
- ▶ Kubernetes with Docker images

- ▶ written in Go
- ▶ IaaS
 - ▶ Servers (Bare Metal, Virtual)
 - ▶ Storage (Block, File, Object, Backup)
 - ▶ Networking (VPN, DirectLink, CDN)
 - ▶ Management (Monitoring & Reporting, Managed Hosting)
- ▶ PaaS
 - ▶ based on Cloud Foundry
 - ▶ runs on SoftLayer
 - ▶ supports Java, Node.js, Go, PHP, Swift, Python
 - ▶ include OpenWhisk (similar to Amazon Lambda or Google Cloud Functions)
- ▶ PaaS
 - ▶ Ruby, Java, Node.js, Scala, Clojure, Python, PHP, and Go
 - ▶ PostgreSQL, Redis, MongoDB

- ▶ Connect for Salesforce
- ▶ PaaS
- ▶ Ruby, Go, Java, Node.js, Python, PHP, .NET
- ▶ IBM, Pivotal, HPE, GE, Huawei - certified providers
- ▶ not a full enumeration of subjects on market
- ▶ offerings are different in technologies, services and prices
- ▶ offerings often overlaps in a lot of parts
- ▶ offerings often provides some added value for allied services / products