

On-premise data centers do not need to be legacy

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A little bit of history

Lessons learned

Technologies bets

About me

- GNU/Linux user since 2001
- Working with GNU/Linux since 2004
- Currently working for Red Hat

A little bit of history

Very brief “cloud” history

- 1998 - Rackspace is founded
- 2005 - SoftLayer is founded
- 2006 - AWS launches Simple Storage Service (S3)
- 2006 - AWS launches Elastic Compute Cloud (EC2)
- 2008 - Google launches Google App Engine
- 2013 - IBM buys SoftLayer
- 2021 - AWS has over 200 services

Very brief non-“cloud” history

- 1964 - IBM introduces the CP-40, the first mainframe with time-sharing technology
- late 1960s - IBM releases SIMMON, the first hypervisor
- 1974 - Gerald Popek and Robert Goldberg classify the hypervisors into two types:
 - Type 1: bare-metal virtualization
 - Type 2: hosted [on top of the host Operating System] virtualization
- 1998 - VMware founded
- 2001 - VMware releases ESX 1.0 Server (Type 1)
- 2003 - Xen first release (Type 1)
- 2003 - VMware releases Virtual Center 1.0 with vMotion
- 2008 - Microsoft releases Hyper-V

What is cloud?

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A business model where one party rents to a second party computer system resources, especially data storage (cloud storage) and computing power, with the smallest granularity possible.

- Time: month -> hour -> minute -> second -> millisecond
- CPU: CPU -> vCPU -> fractional vCPU

Lessons learned

Separation of concerns

- Standardize the interface between infrastructure and workload
- Scalability at workload level
- Workload have an abstract concept of the physical architecture

Functional business model

- Standardize the interface between infrastructure and workload
- Bill back infrastructure costs to the workloads owners
- Keep the costs down

Maintain control

- Do not use third-party proprietary software
- Evaluate buy vs build decisions preferring the latter
- Be aware of lock-ins

Product between the **probability** that a component will require substitution during the solution life and the **total costs** in case of substitution.

Technologies bets

- Reduce the complexity of your system to a minimum
- Prefer build-time complexity over run-time complexity
- Minimize the amount of services available

- Use a Kubernetes distribution
 - DIY/Community
 - Commercial
 - Fully open source
 - Trustworthy company
 - Long track record
 - Heavily involved in upstream development

Automation

- Use an immutable approach to infrastructure
- Version the infrastructure (eg: gitops)
- Automate the whole process

Putting it all together

- Create multiple DataCenters (and multiple clusters) but hide them from the workload developer
- Use a tool to manage the clusters (eg: Open Cluster Management)
- Standardize the Kubernetes APIs as the only interfaces between infrastructure and workload
- Bare-metal container platform
- Automate all the infrastructure pieces and configuration
- Start providing only: OCI registry, Object Storage, selected Kubernetes objects (eg: Pods, Deployments, Stateful Sets, Services, PV, PVC, ConfigMaps, Secrets)
- Provide more services once you have a good strategy to support them and many of your users are already using the technology
- Create a simple UX to submit the creation/update/deletion of workload objects
- Store workload objects in a versioned storage (eg: git) and automate deployment

Thanks

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