



A Complete Open Cloud Storage, Virt, IaaS, PaaS

Dave Neary
Open Source and Standards,
Red Hat

Agenda

1. Traditional virtualization
2. The move to IaaS
3. Storage
4. PaaS, application encapsulation and orchestration
5. Cloud monitoring, service brokerage

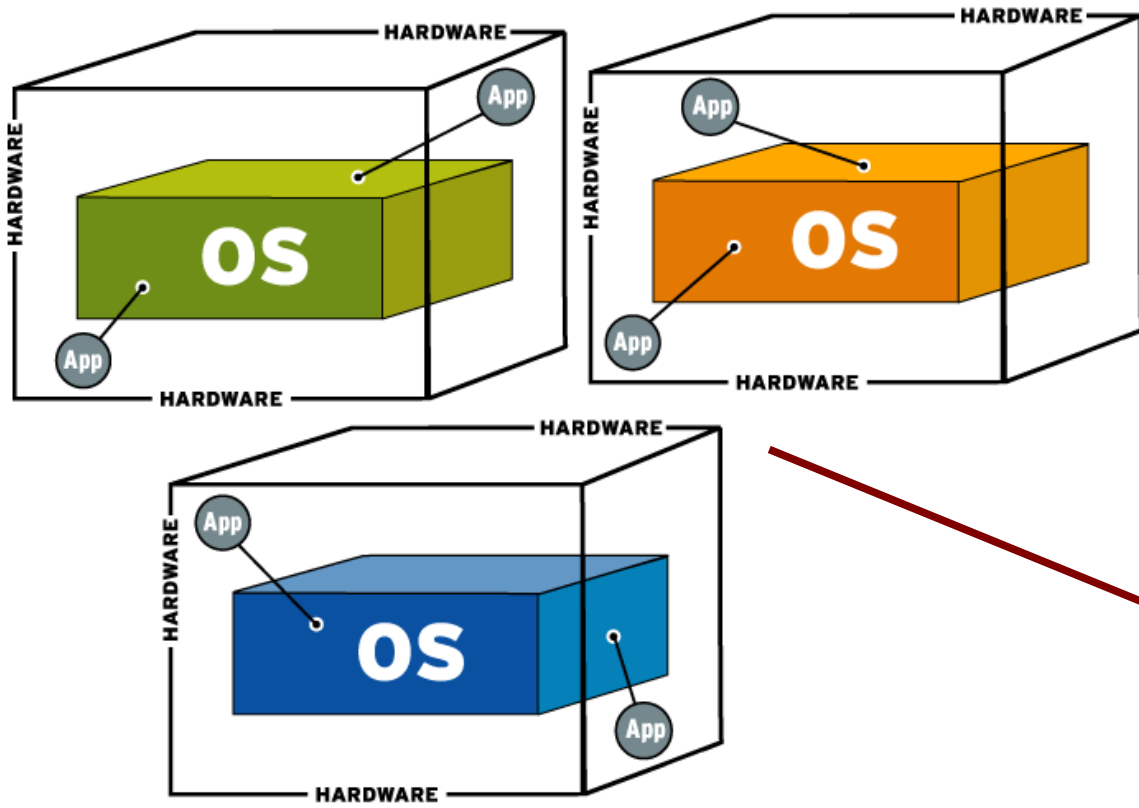


Agenda

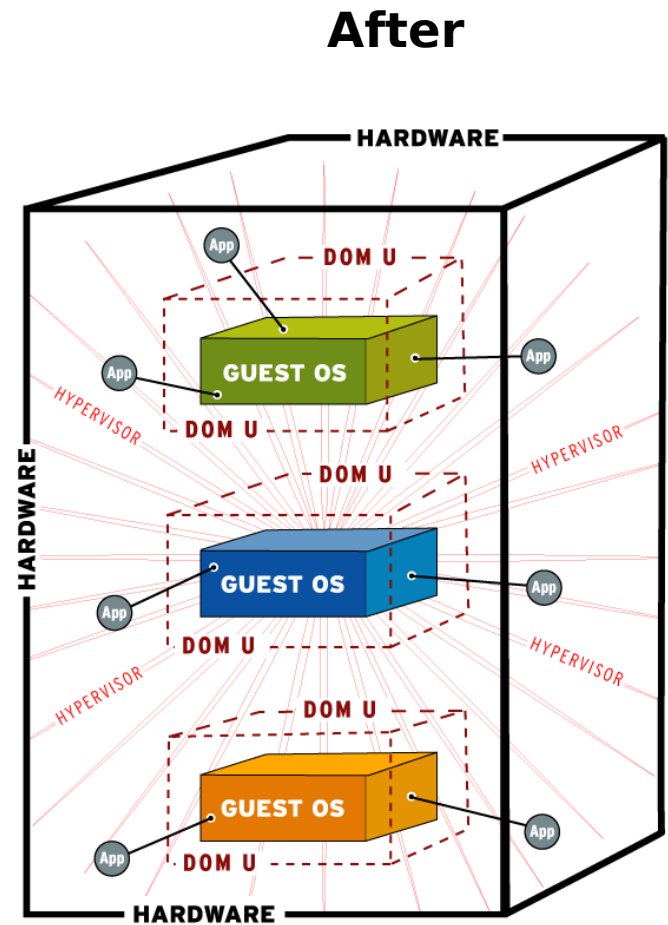
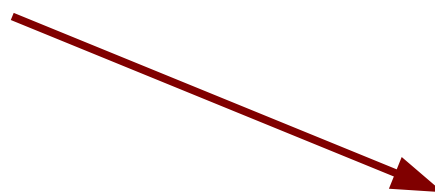
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Virtualization



Before



After



Virtualization

- **Consolidation of hardware** – fewer, bigger servers
- **Workload management** – over-subscribed services get more hardware
- **Protect your apps** – fault tolerance, high availability, live migration, Network, disk, compute, memory Quality of Service
- **Ability to scale up** – add more hardware and modify resources allocated to VM on the fly
- **No change to legacy apps**



Open Source virtualization



KVM management application
Open Source alternative to vSphere



Widely deployed Hypervisor
Hosted by Linux Foundation since April 2013



Developed by Google to manage clusters
Manages KVM and Xen nodes



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Infrastructure as a Service

- Self-service provision
- Many identical servers
- Stateless services
- Scale-out easily – load balancing, public IPs, database as service
- Move to object storage



Pets vs Cattle (yes, again)



Scale Up

- Servers are like pets.

Pets are given names, are unique, lovingly hand raised and cared for. When they get ill, you nurse them back to health



Scale Out

- Servers are like cattle.

Cattle are given numbers and are almost identical to each other. When they get ill, you get another one.

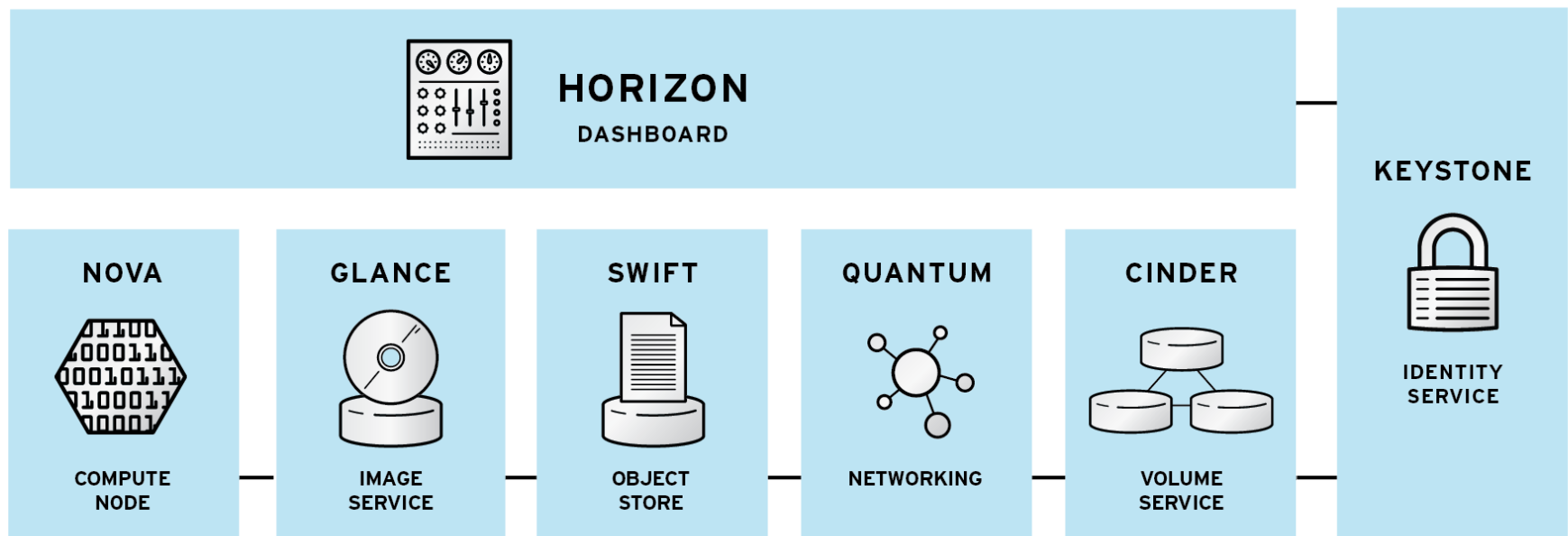
“

“Future application architectures should use Cattle but Pets with strong configuration management are viable and still needed”

- Tim Bell, CERN



OpenStack architecture

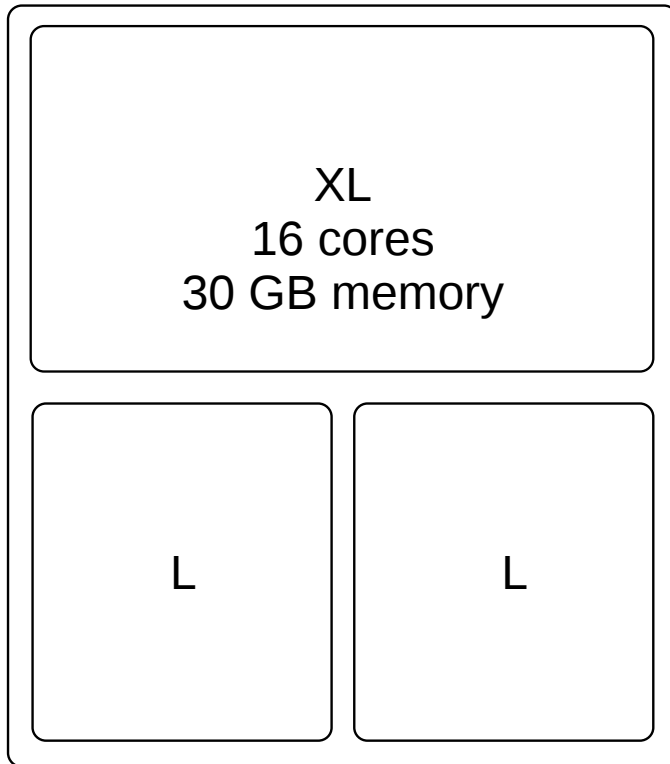


OST 0001

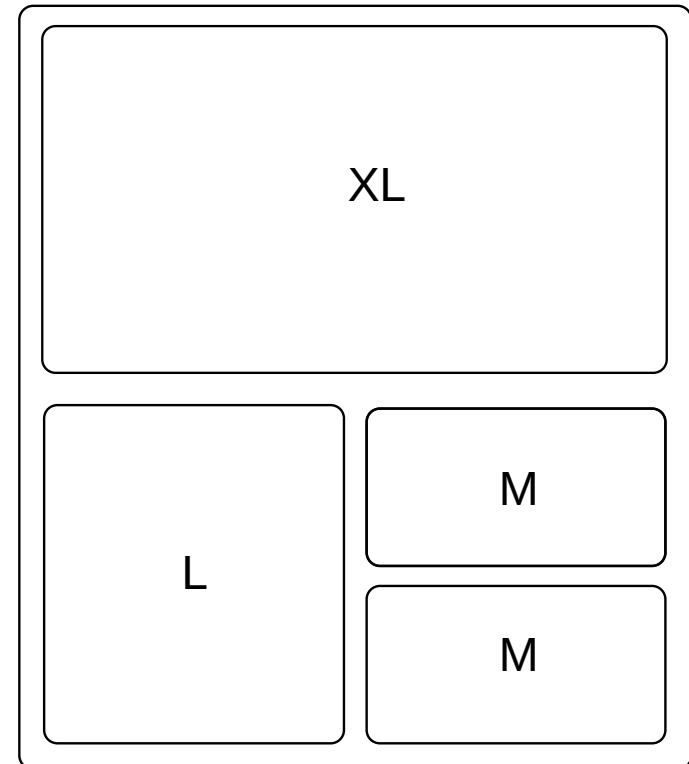
- Modular architecture
- Designed to easily scale out
- Based on (growing) set of core services



Instance types



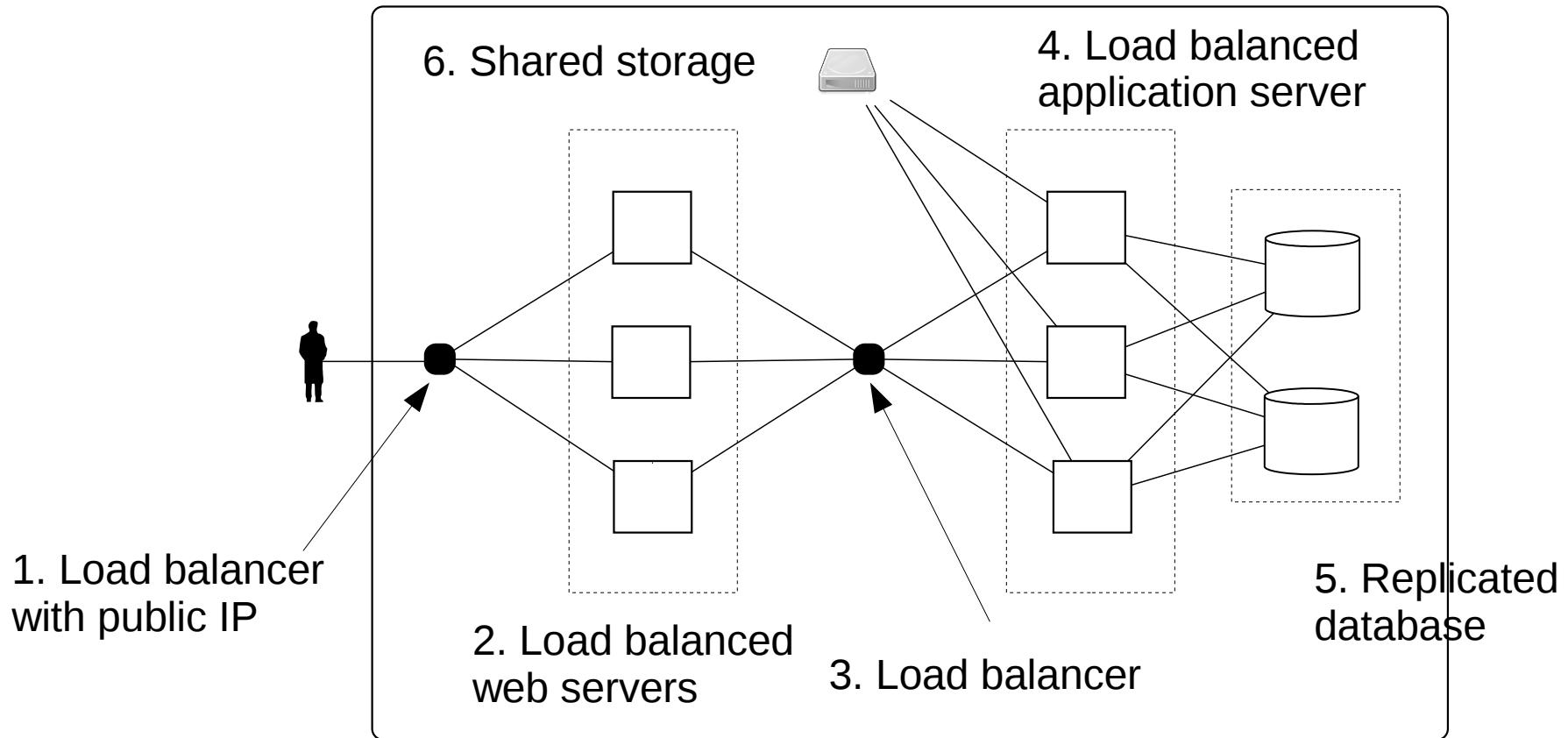
Server 19234
32 cores
60GB memory



Server 19235
32 cores
60GB memory



Sample cloud application



Web service



Sample cloud application

- Stateless – no side-effects in instance, memory only
- Persistent storage requires block storage or object storage service, or shared filesystem
- Requires rearchitecture of legacy applications



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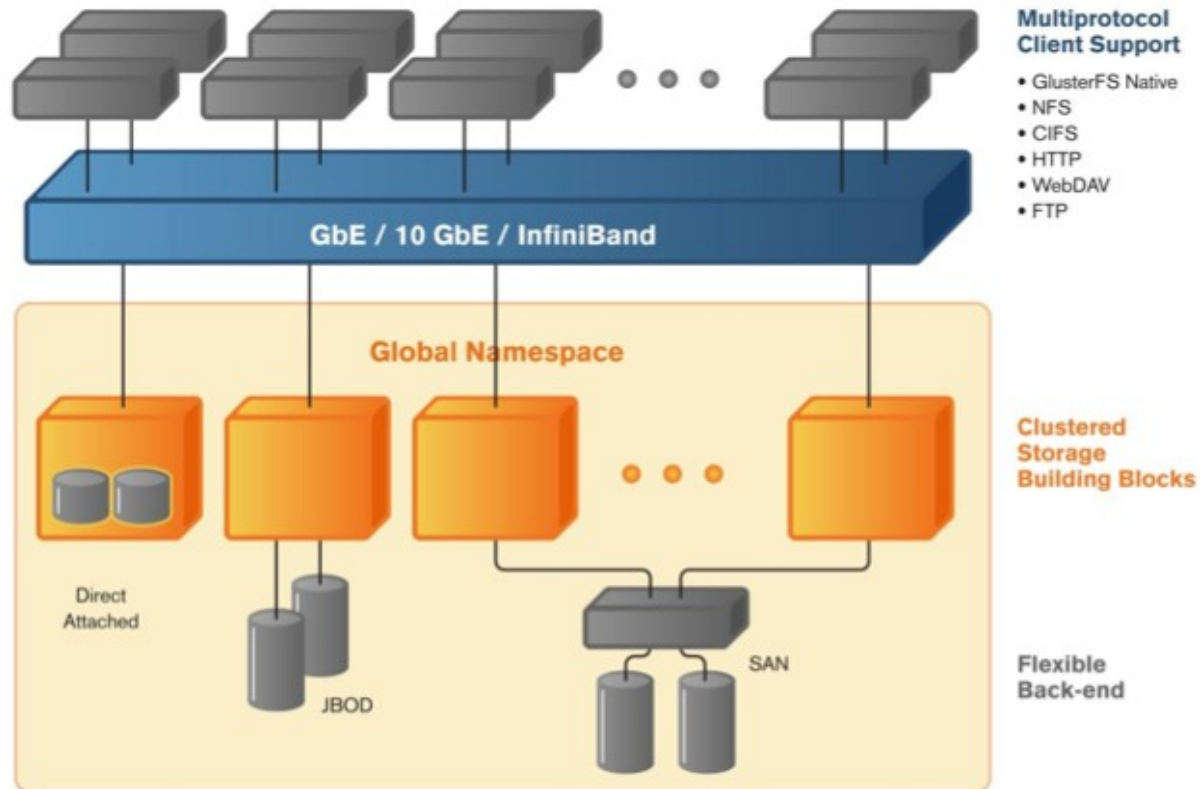


Storage

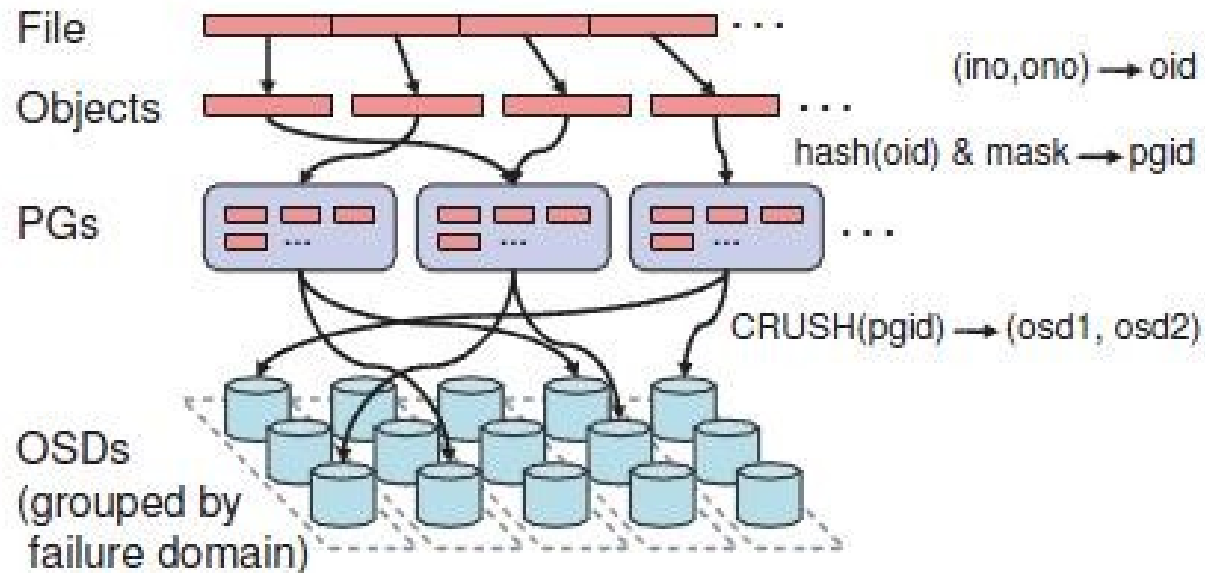
- Clouds needs scale-out storage
- Disk drives fail. All the time
- Image, block, and object storage, and/or shared filesystem
- Scale-out storage on commodity hardware - GlusterFS, Ceph, RiakCS, Swift
- Virtualization aware, tight integration with virtualization and Infrastructure as a Service desirable



Scale-out storage



Scale-out storage



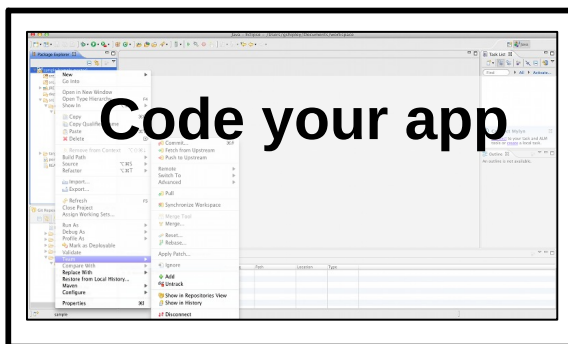
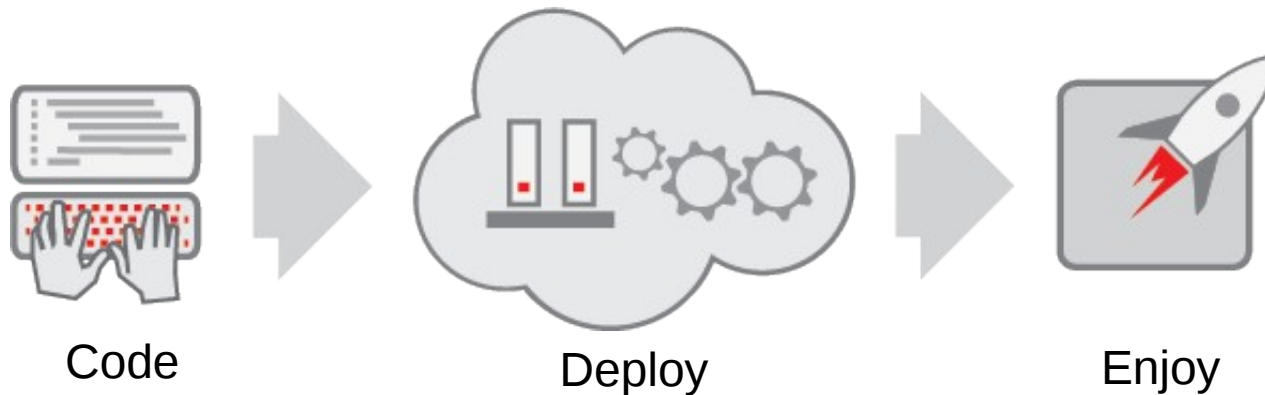
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PaaS = Platform as a Service

A Cloud Application Platform





Consolidated B-24 Liberator

Incredibly sophisticated. ~500k parts, assembled by unskilled labor.

No manufacturing process. Parts were cast in rubber molds, so every part was slightly different.

Assembled in the heat of San Diego, which warped the metal and required whole assemblies to be adjusted.

Ford Motor Co. brought a manufacturing process ...
•unit production went from 250 planes a year to 650 planes a month.

THIS IS OUR CHALLENGE TODAY



Craftwork

Physical

How to Build an App:

1. Have Idea
2. Get Budget
3. Submit hardware acquisition request
4. Wait
5. Get Hardware
6. Rack and Stack Hardware
7. Install Operating System
8. Install Operating System Patches/Fix-Packs
9. Create user Accounts
10. Deploy framework/appserver
11. Deploy testing tools
12. Test testing tools
13. Code
14. Configure Prod servers (and buy them if needed)
15. Push to Prod
16. Launch
17. Order more servers to meet demand
18. Wait...
19. Deploy new servers
20. Etc.

Virtualized

How to Build an App:

1. Have Idea
2. Get Budget
3. Submit VM Request request
4. Wait
5. Deploy framework/appserver
6. Deploy testing tools
7. Test testing tools
8. Code
9. Configure Prod VMs
10. Push to Prod
11. Launch
12. Request More Prod VMs to meet demand
13. Wait
14. Deploy app to new VMs
15. Etc.

Assembly Line

With PaaS

How to Build an App:

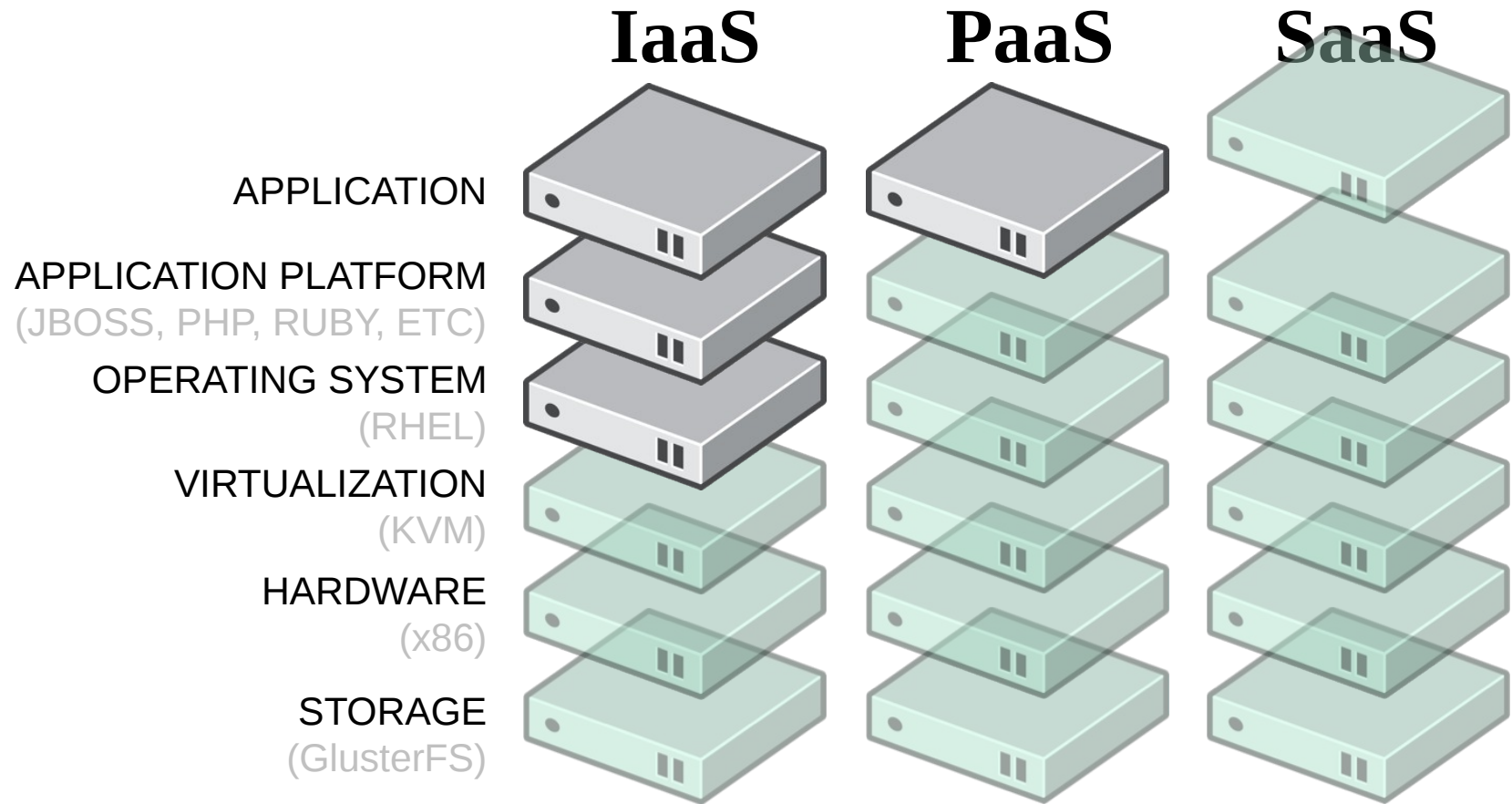
1. **Have Idea**
2. **Get Budget**
3. **Code**
4. **Test**
5. **Launch**
6. **Automatically Scale**





*“The use of Platform-as-a-Service technologies will enable IT organizations to become more agile and more responsive to the business needs.” –Gartner**



Control vs automation



 Managed and Controlled by Customer (IT, Dev, or User)

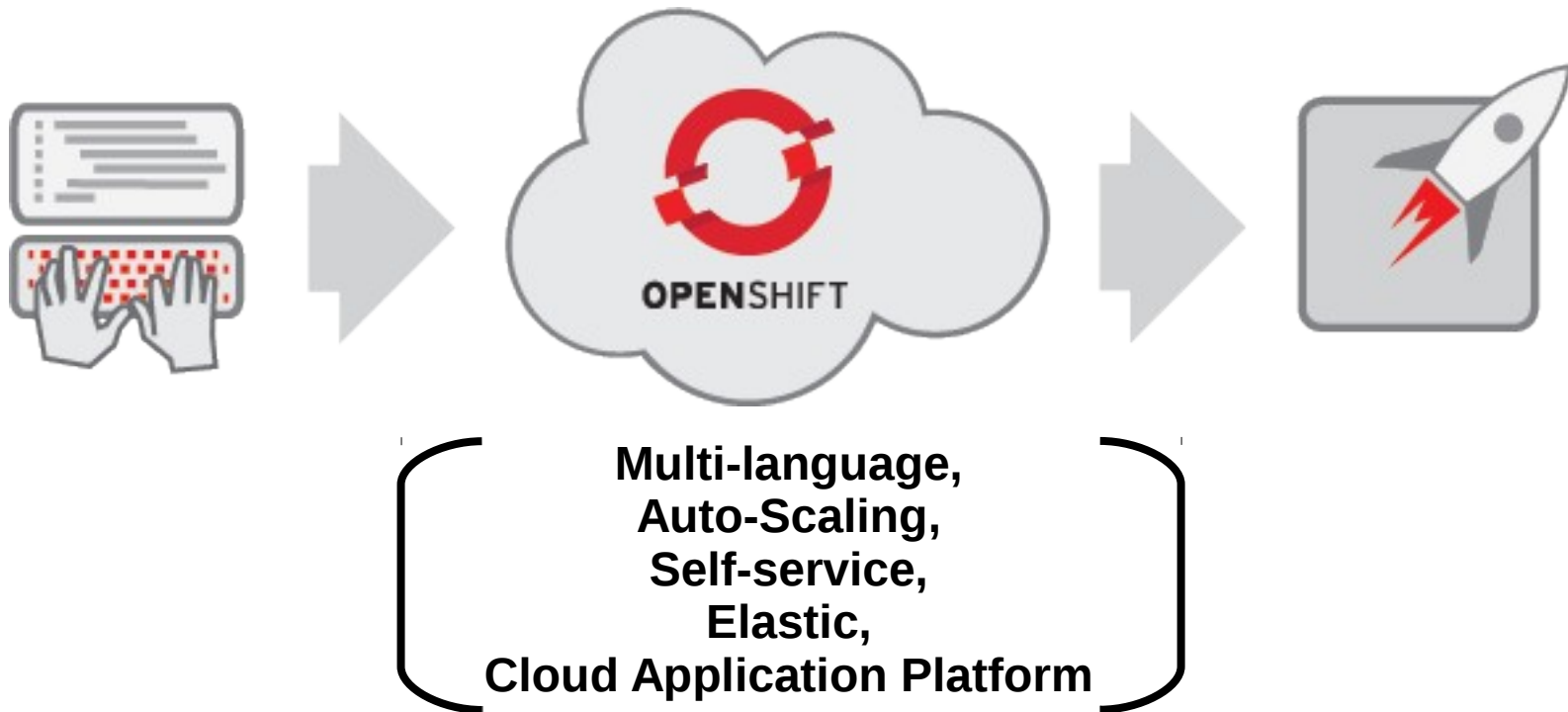
 Automated and Managed by the Public or Private Cloud Offering

Increased Control

Increased Automation



OpenShift Origin



CloudFoundry



Docker



docker



Orchestration and deployment

- Containerization – Docker, OpenShift cartridges
- Orchestration templates – Heat, CloudFormations
- Configuration management – Foreman, Puppet, Chef, Ansible, CFEngine...



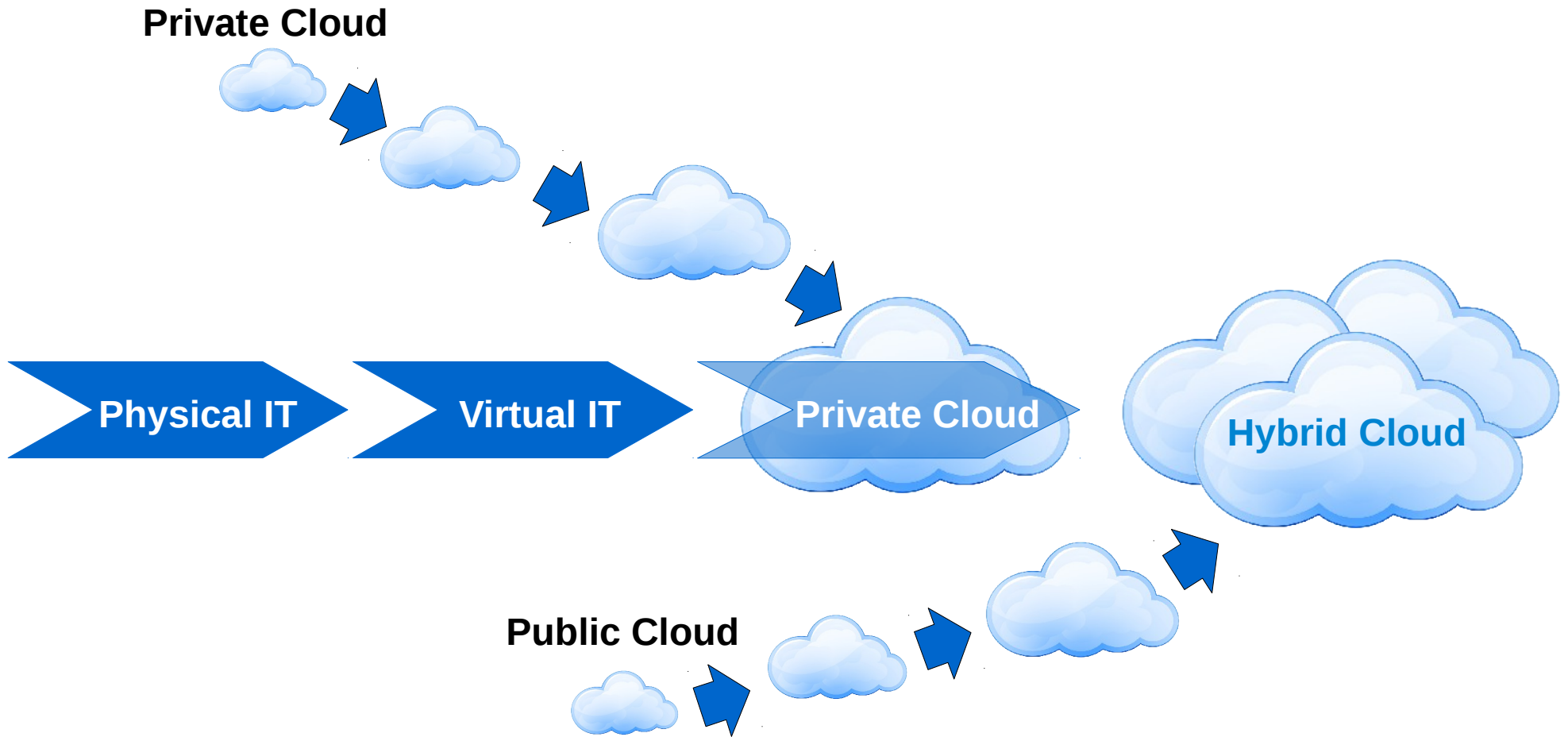
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Industry Trend – Hybrid Cloud

Existing IT + Private Cloud + Public Cloud = “Hybrid Cloud”



It's all coming together!!!



One Ring to Rule them All

- Cloud management software
- “Single pane of glass” to allow management of traditional Virt and private and public IaaS
 - Enables policy enforcement
 - Facilitates service migration
 - Frees you from vendor lock-in
- CloudForms Management Engine



Open Hybrid Cloud

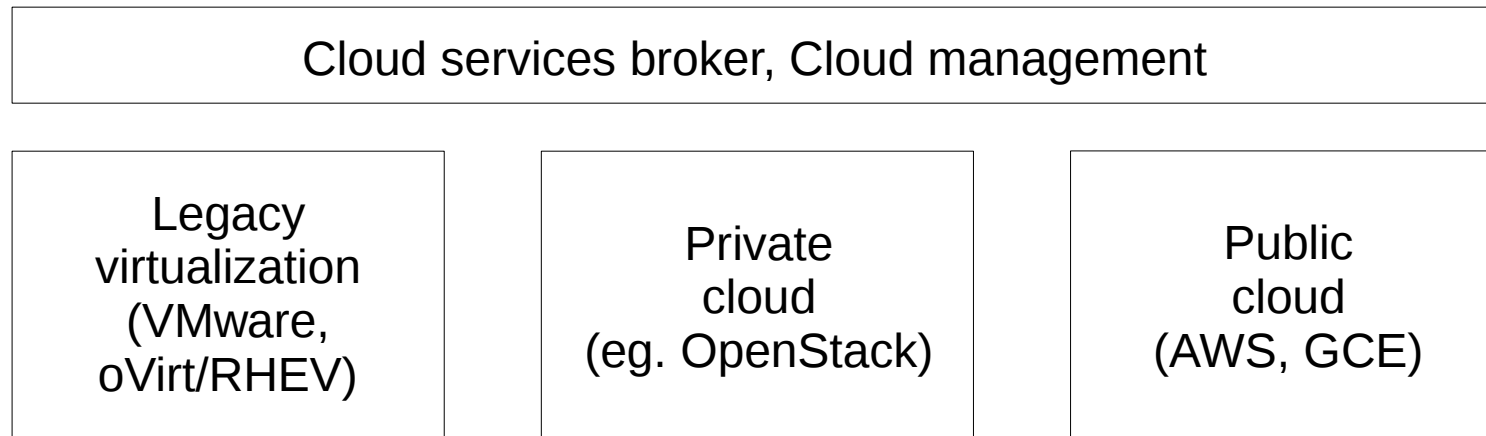
Legacy
virtualization
(VMware,
oVirt/RHEV)

Private
cloud
(eg. OpenStack)

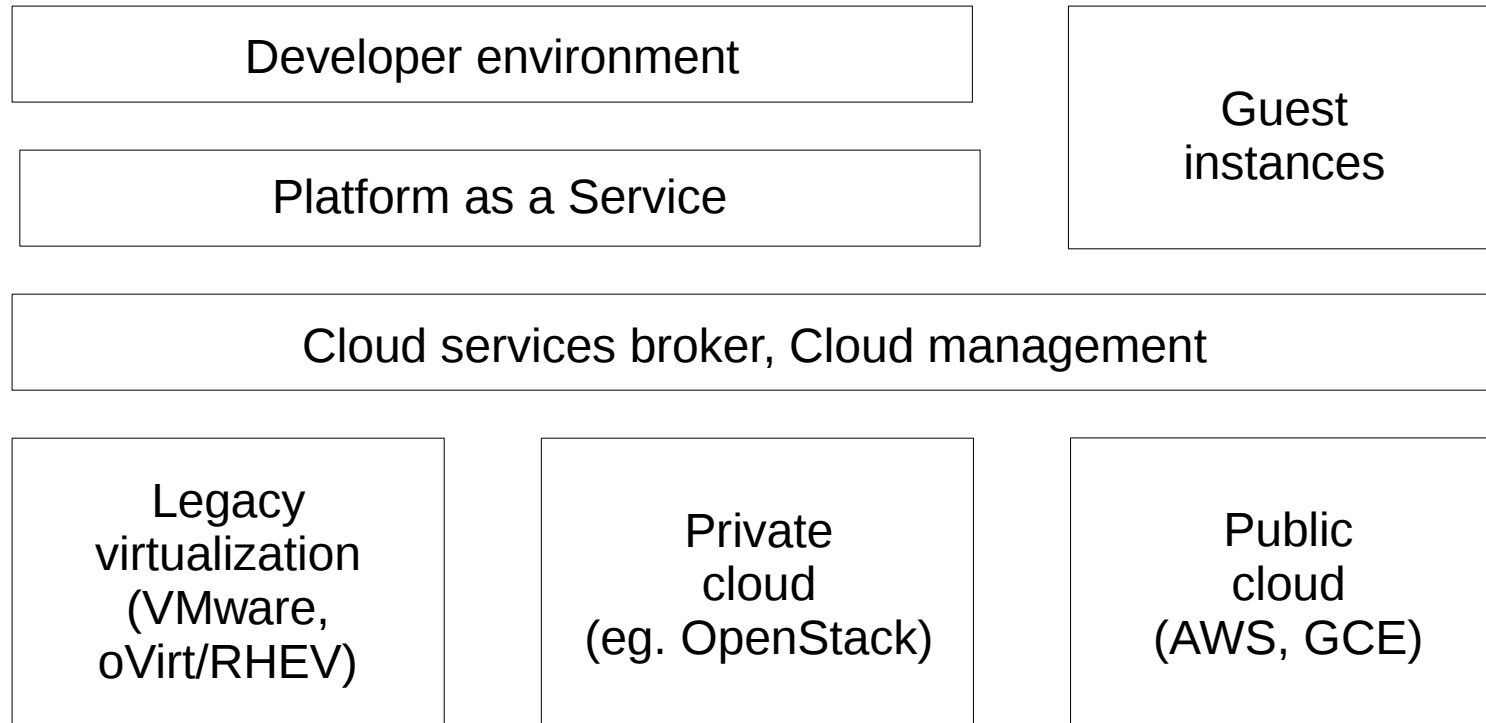
Public
cloud
(AWS, GCE)



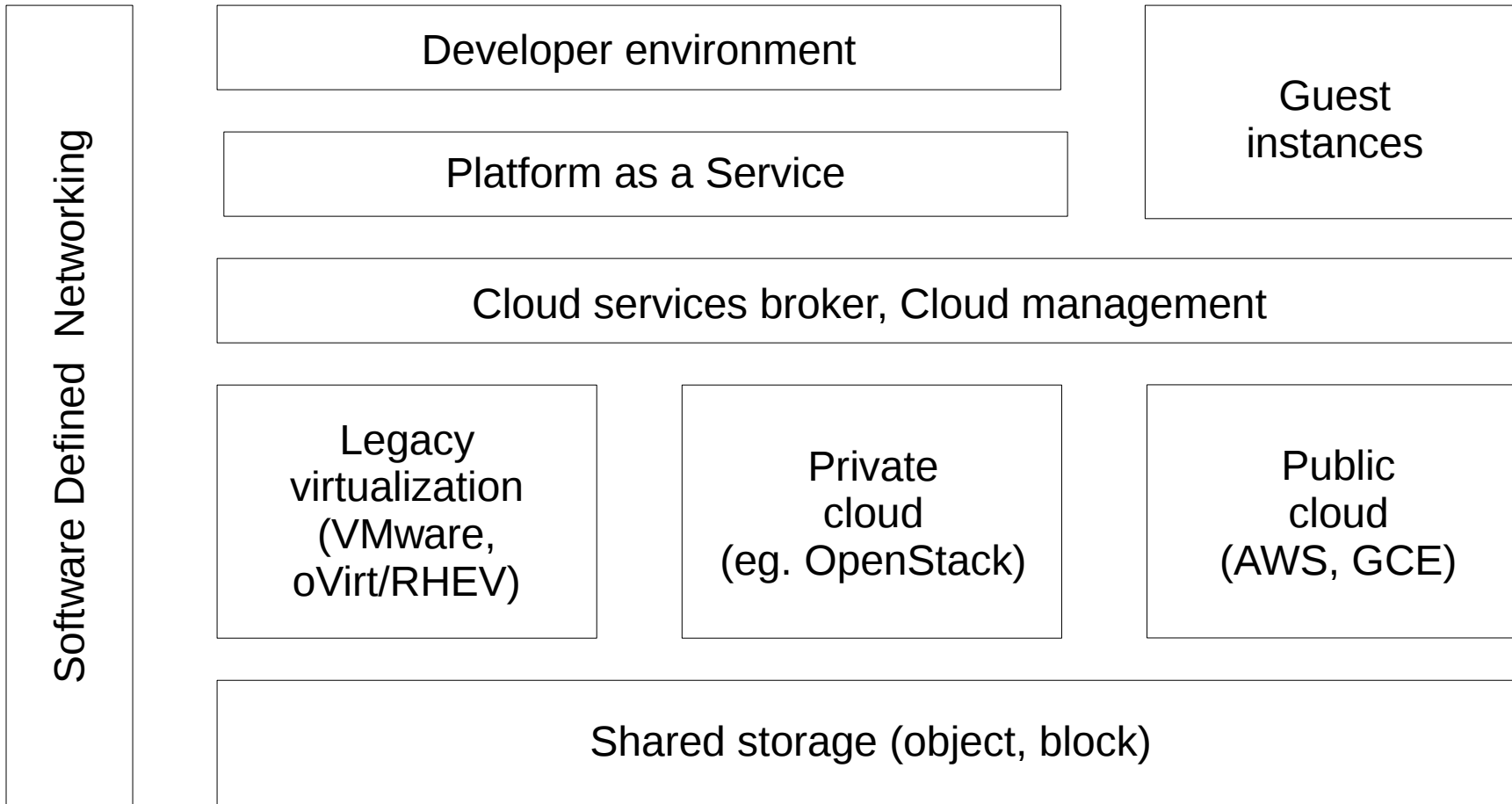
Open Hybrid Cloud



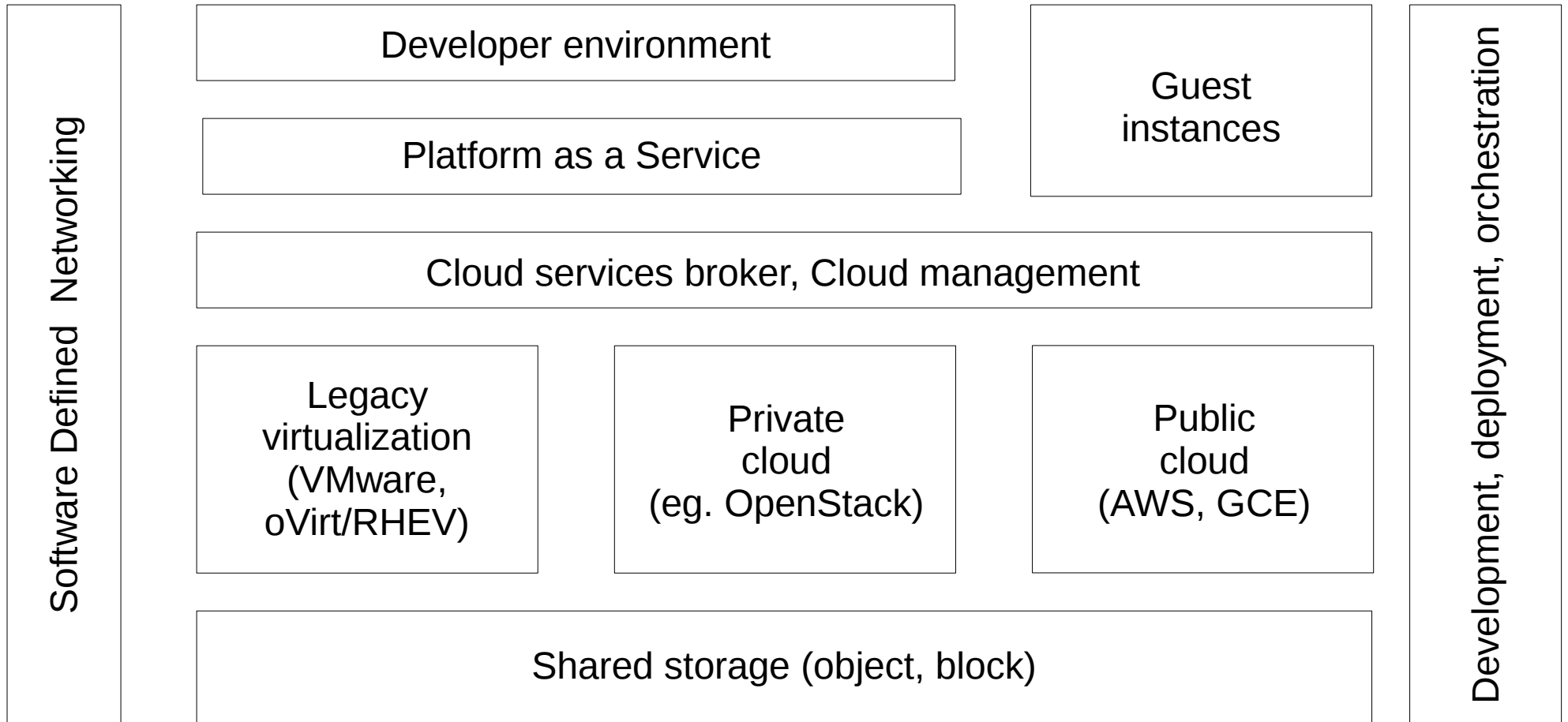
Open Hybrid Cloud



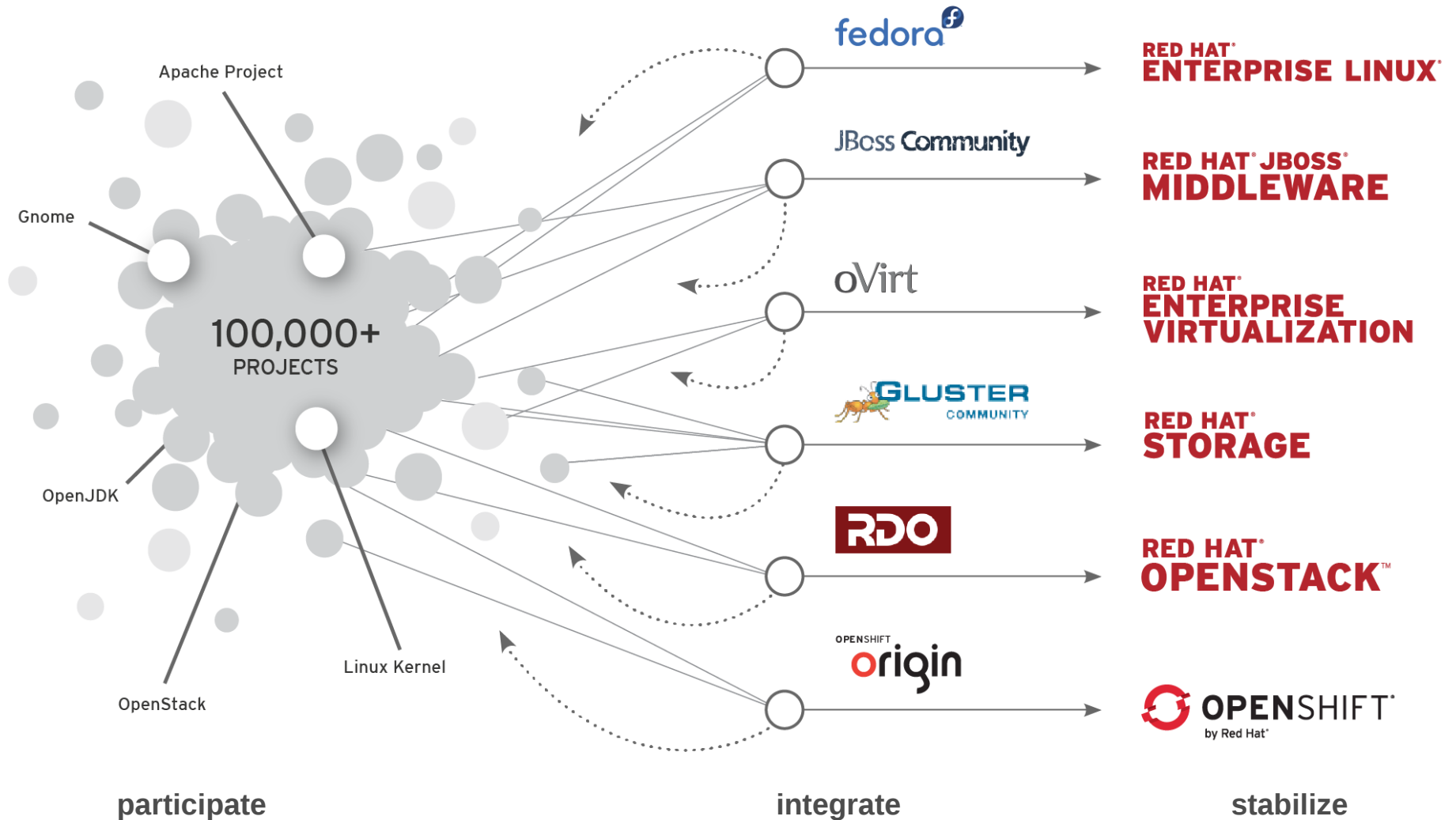
Open Hybrid Cloud



Open Hybrid Cloud



Open Hybrid Cloud needs Open Source



**THANK YOU!
QUESTIONS?**

Dave Neary
dneary@redhat.com
[@nearyd](#)

