It’s all about the IT execution!

IT modern delivery

Pini Cohen

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What is IT delivery?

Delivery challenges: Tsunami of new technologies

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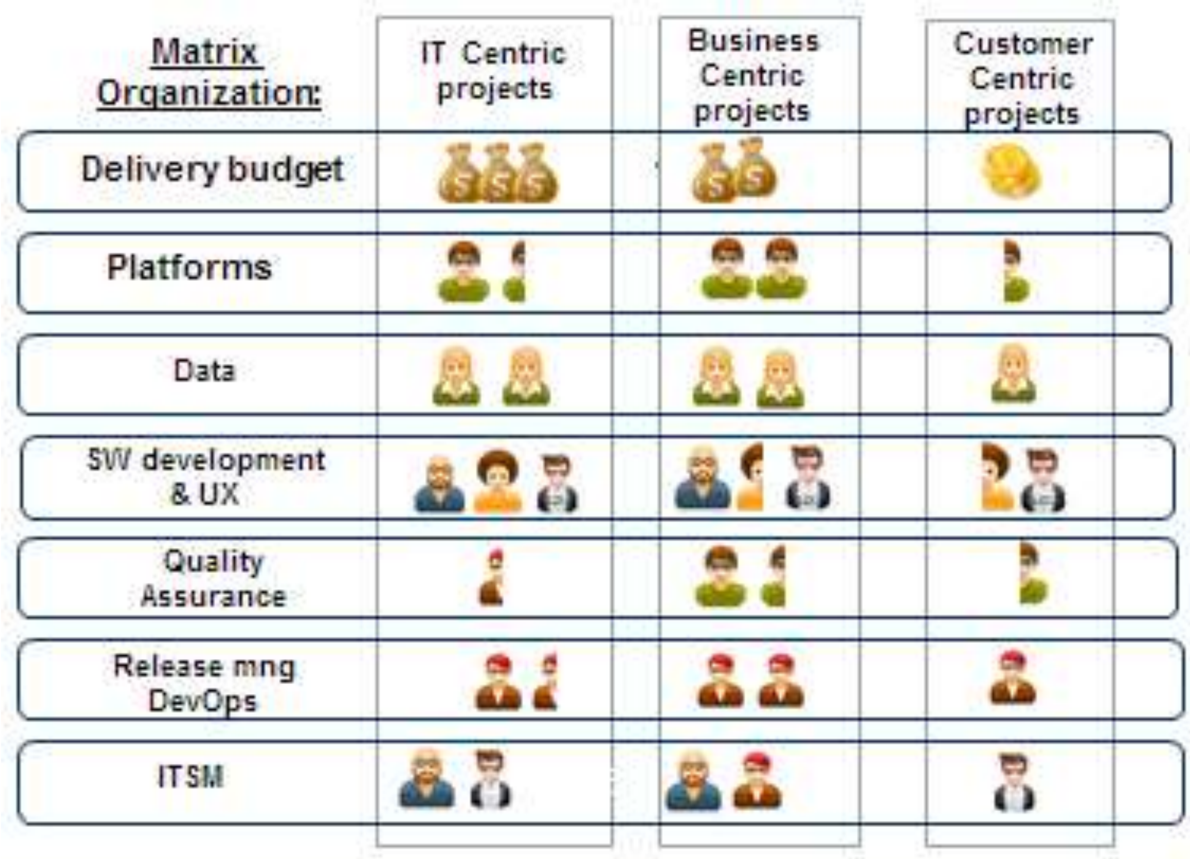
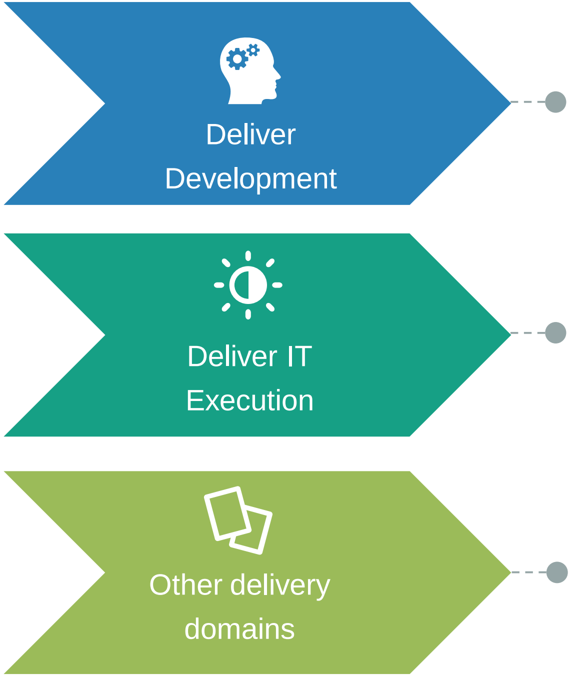
Delivery challenges: the different IT types require different delivery characteristics and level of effort



Matrix Organization:	IT Centric projects	Business Centric projects	Customer Centric projects
Delivery budget	💰💰💰	💰💰	🪙
Platforms	👤👤	👤👤	👤
Data	👤👤	👤👤	👤
SW development & UX	👤👤👤	👤👤👤	👤👤
Quality Assurance	👤	👤👤	👤
Release mng DevOps	👤👤	👤👤	👤
ITSM	👤👤	👤👤	👤

The STKeye - three pillars of Delivery:



Deliver Development

Deliver IT Execution

Other delivery domains

Development and related SW tools

PaaS, IPaaS, CaaS, microservices , Docker, agile , DBMS, Devops, Dev Tools

Core Infrastructure (compute, storage, network)

Storage, network, server that delivers IaaS and are the foundation of PaaS and CaaS in the private or public cloud enable Devops

Other delivery domains

Public cloud Integration for SaaS, external API, System monitoring (ESM), ITSM , End user computing , IT procurement, Testing tools

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Development : the vision is clear

Fast and efficient

Based on Open Source components

Portable, managed (traceable, etc.)

Great DX (developer experience)

Good SW Quality (QA)

Production is updated constantly

Cloud ready (enabling scaling, utilizing modern cloud functionality etc.)

Secured software architecture and development

Keep up with new technologies

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Modern development principals

1 Rest
Use rest as standard API

2 Web Development
Do not use client server unless a must

3 Automatic Tests
In all layers to enable Devops also unit tests and TDD test driven development

4 No technology debt
Try to have supported technologies

5 Agile software development
Use Agile as default development methodology

6 Enhance and not replace
?Enahance transactions" means "co-existence"). Nosql might help here.

7 Devops
Devops (both code and infrastructure)

8 Microservices
Microservices (but use ESB) , fault tolerance service (smart proxy) and enable polyglot development

9 Application logs
Application logs preferably "event sourcing"- writing each change in application status to log

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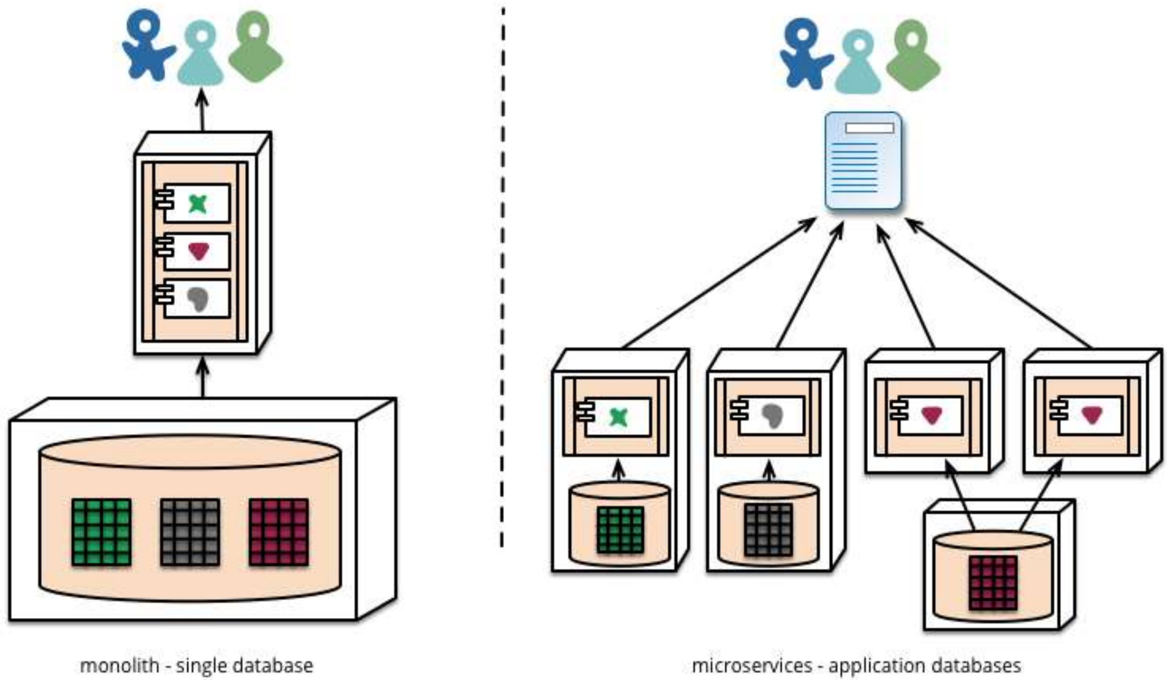
Microservices


monolith - single database
microservices - application databases

Source: http://martinfowler.com/

Microservices

How big is your team?

APaaS – application platform as a service

Developer’s heaven

On public cloud

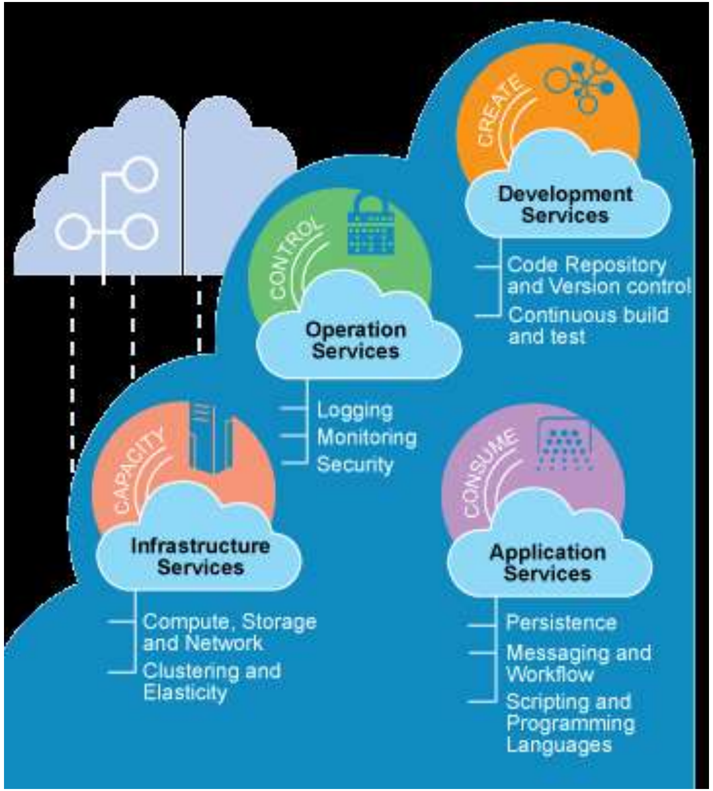
Google Cloud Platform

heroku

Joyent

Microsoft Azure

amazon web services



CREATE

Development Services

- Code Repository and Version control
- Continuous build and test

CONTROL

Operation Services

- Logging
- Monitoring
- Security

CAPACITY

Infrastructure Services

- Compute, Storage and Network
- Clustering and Elasticity

CONSUME

Application Services

- Persistence
- Messaging and Workflow
- Scripting and Programming Languages

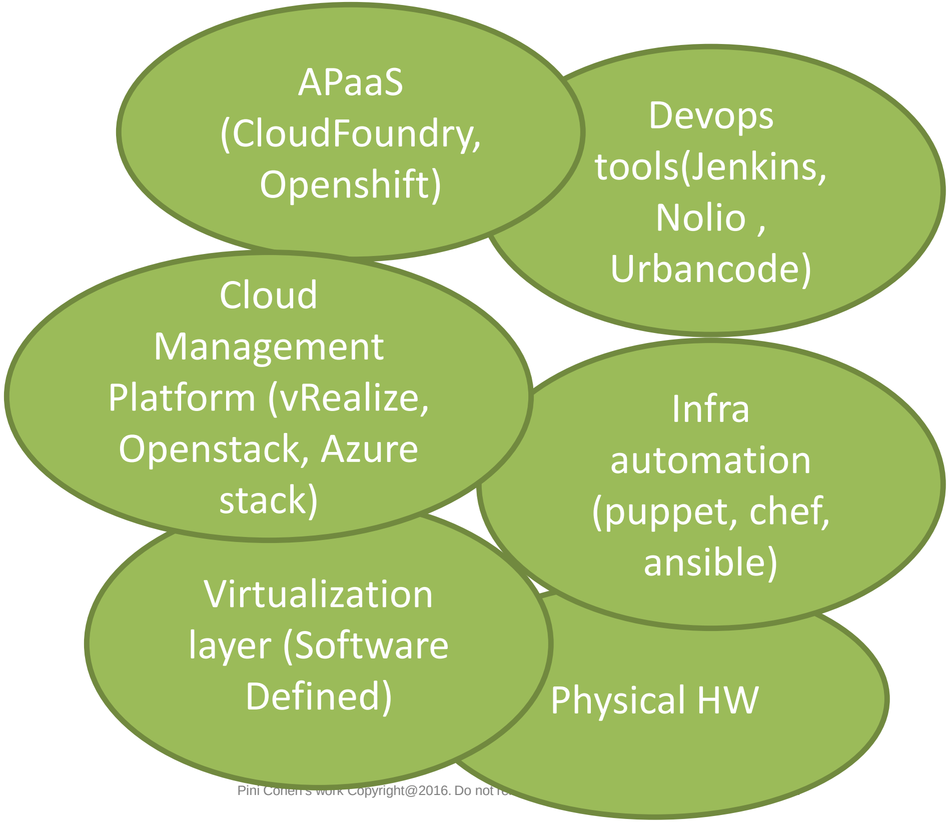
Private and public cloud

OPENSHIFT

CLOUD FOUNDRY™

IBM Bluemix™

Development and Deploy stack – before containers



APaaS (CloudFoundry, Openshift)

Devops tools(Jenkins, Nolio , Urbancode)

Cloud Management Platform (vRealize, Openstack, Azure stack)

Infra automation (puppet, chef, ansible)

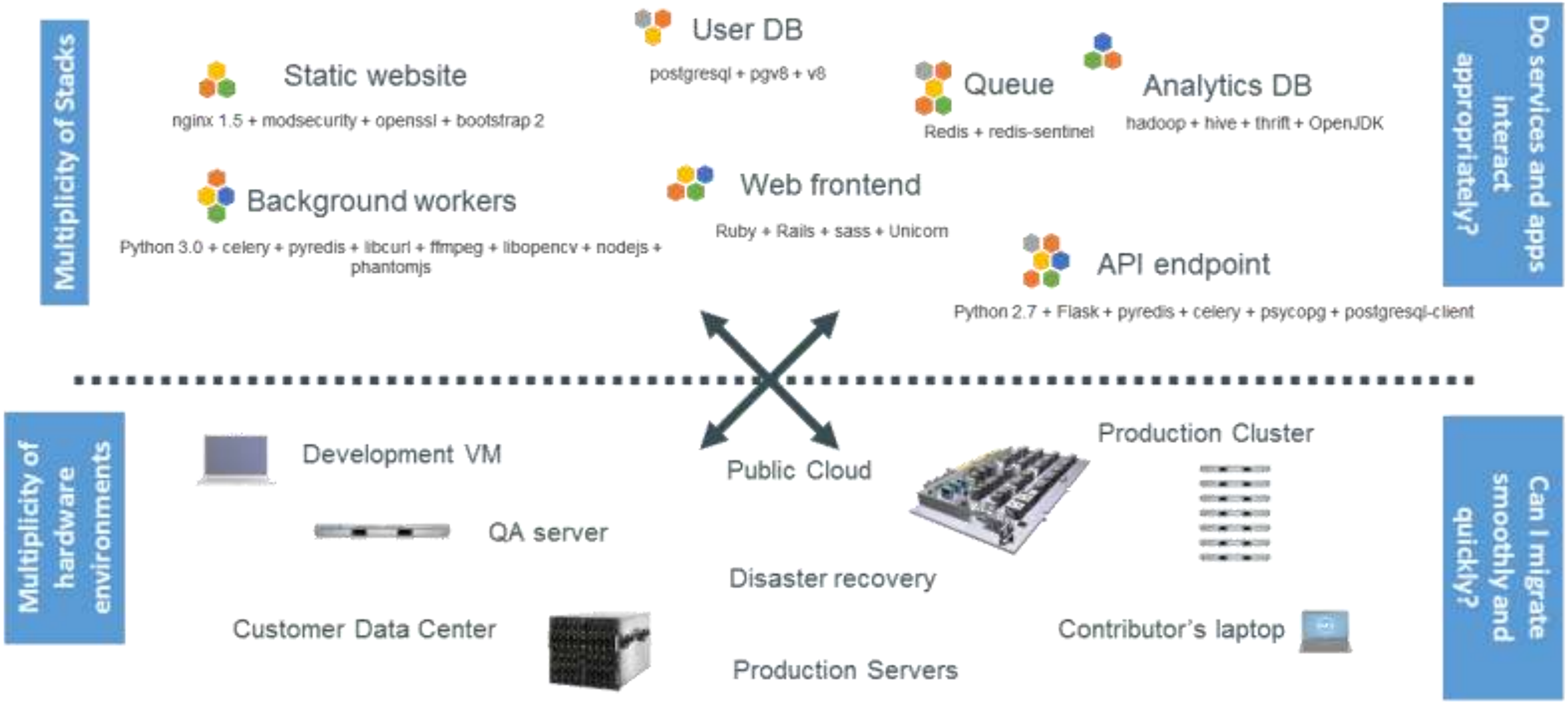
Virtualization layer (Software Defined)

Physical HW

This might change with containers

The basic challenge

“binaries \ libraries” complexity



Multiplicity of Stacks

Static website

nginx 1.5 + modsecurity + openssl + bootstrap 2

User DB

postgresql + pgv8 + v8

Queue

Redis + redis-sentinel

Analytics DB

hadoop + hive + thrift + OpenJDK

Background workers

Python 3.0 + celery + pyredis + libcurl + ffmpeg + libopencv + nodejs + phantomjs

Web frontend

Ruby + Rails + sass + Unicorn

API endpoint

Python 2.7 + Flask + pyredis + celery + psycopg + postgresql-client

Do services and apps interact appropriately?

Multiplicity of hardware environments

Development VM

QA server

Customer Data Center

Public Cloud

Disaster recovery

Production Servers

Production Cluster

Contributor’s laptop

Can I migrate smoothly and quickly?

Source: files.meetup.com/11185112/**Docker**-Meetup-jan-2015-Final.ppt

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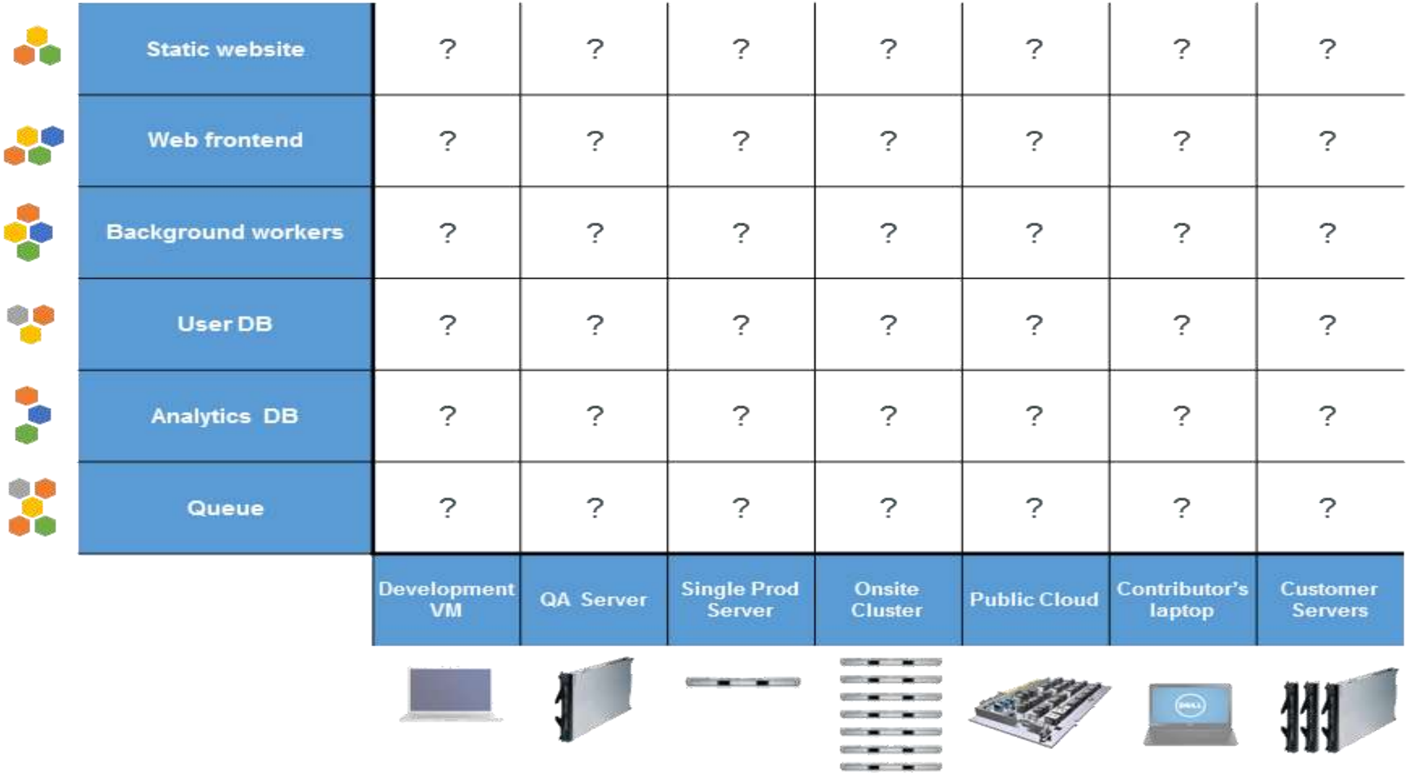
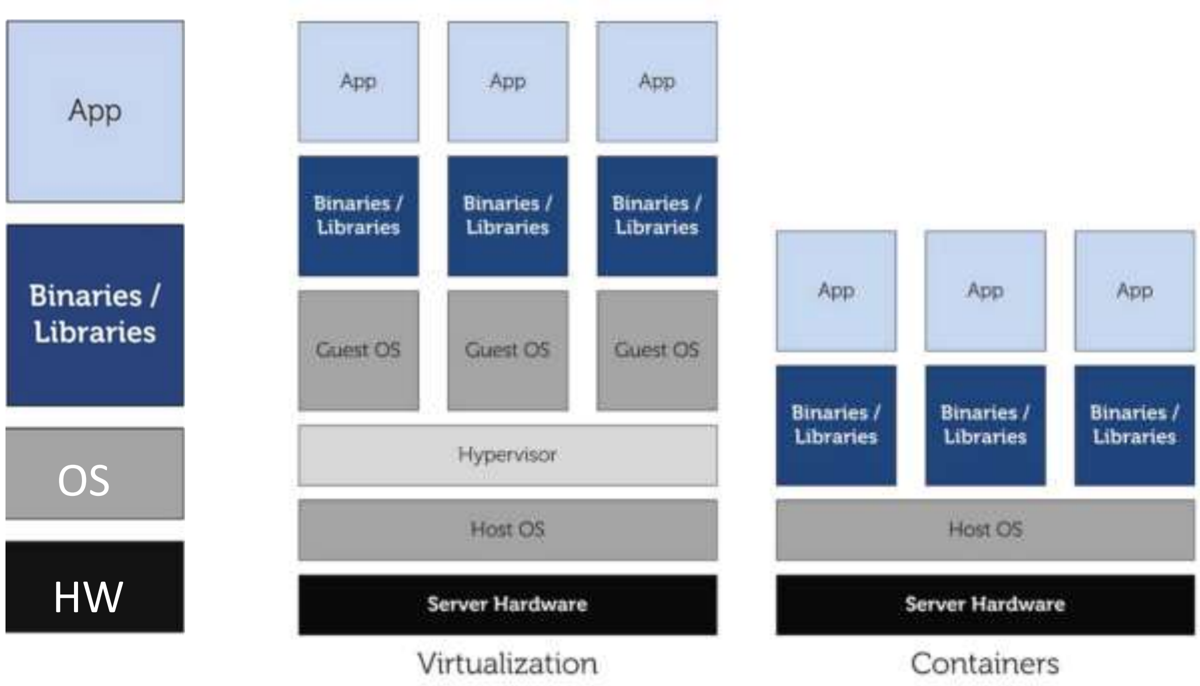
The Matrix from hell….



	Development VM	QA Server	Single Prod Server	Onsite Cluster	Public Cloud	Contributor's laptop	Customer Servers
Static website	?	?	?	?	?	?	?
Web frontend	?	?	?	?	?	?	?
Background workers	?	?	?	?	?	?	?
User DB	?	?	?	?	?	?	?
Analytics DB	?	?	?	?	?	?	?
Queue	?	?	?	?	?	?	?

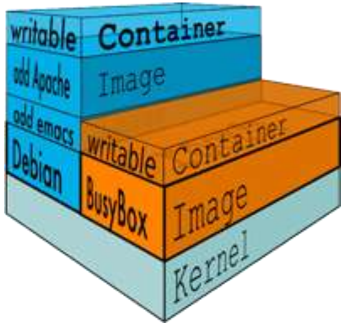
Source: files.meetup.com/11185112/**Docker**-Meetup-jan-2015-Final.ppt

Virtual Machine Vs. Containers

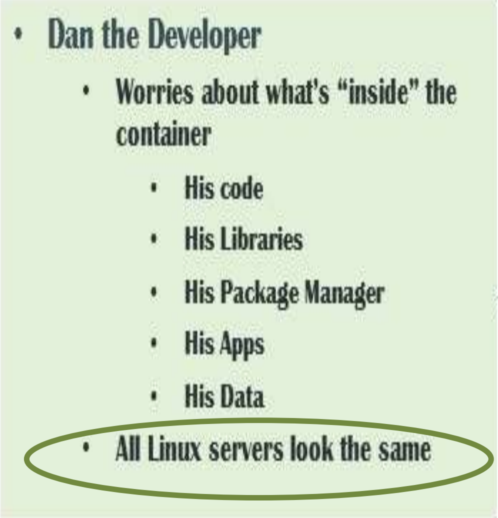


What are Containers and Docker ?

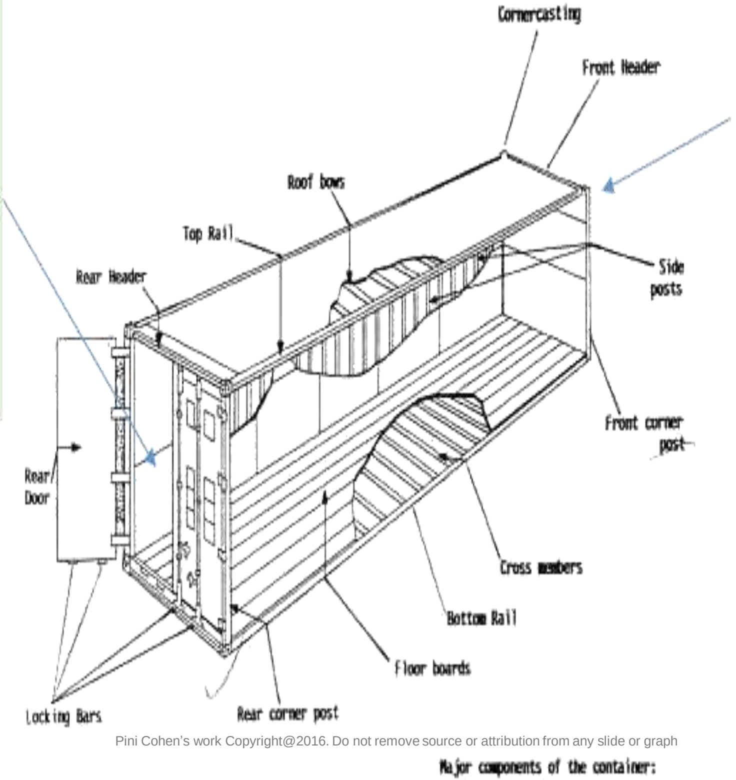
- **Linux Containers** (LXC) is an operating-system-level virtualization method for running multiple **isolated Linux systems** (**containers**) on a single control host (LXC host)**.**
- **Docker** is an open-source project that automates the deployment of applications inside software **containers**, by providing an additional layer of abstraction and automation of operating-system-level virtualization on **Linux**. (Wikipedia)

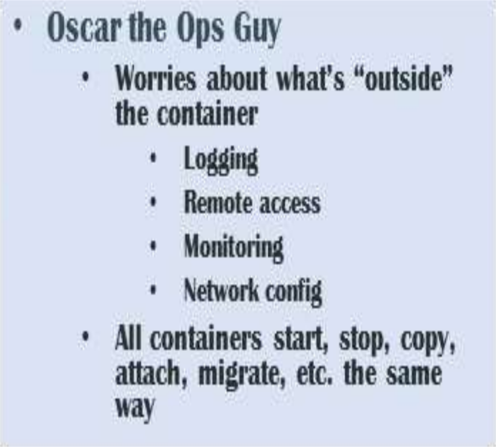


Why it Works: Separation of Concerns……



- Dan the Developer
  - Worries about what's "inside" the container
    - His code
    - His Libraries
    - His Package Manager
    - His Apps
    - His Data
  - All Linux servers look the same

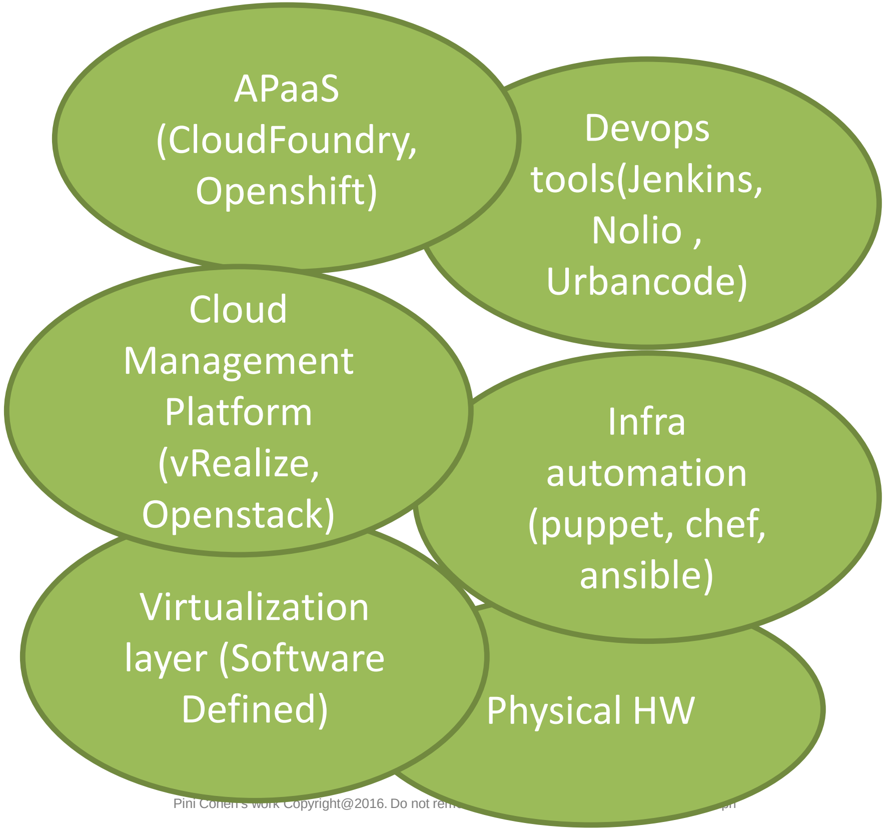




- Oscar the Ops Guy
  - Worries about what's "outside" the container
    - Logging
    - Remote access
    - Monitoring
    - Network config
  - All containers start, stop, copy, attach, migrate, etc. the same way

Source: files.meetup.com/11185112/**Docker**-Meetup-jan-2015-Final.ppt

All layers will support containers



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Cloud Management Platform (vRealize, Openstack)

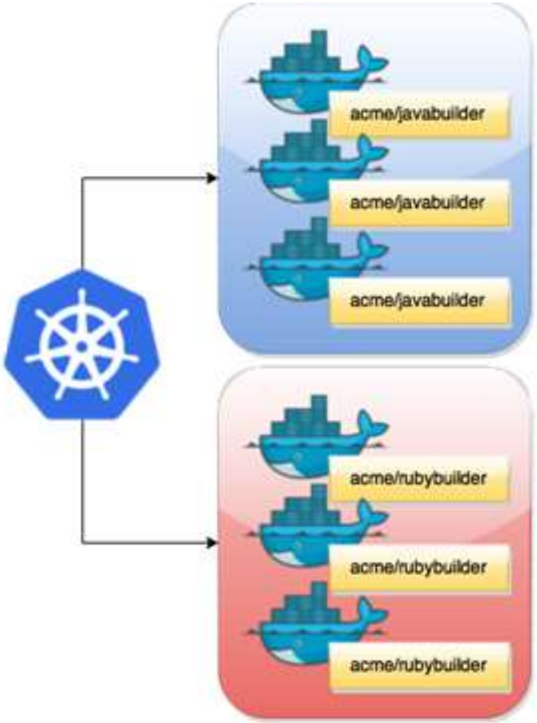
Infra automation (puppet, chef, ansible)

Virtualization layer (Software Defined)

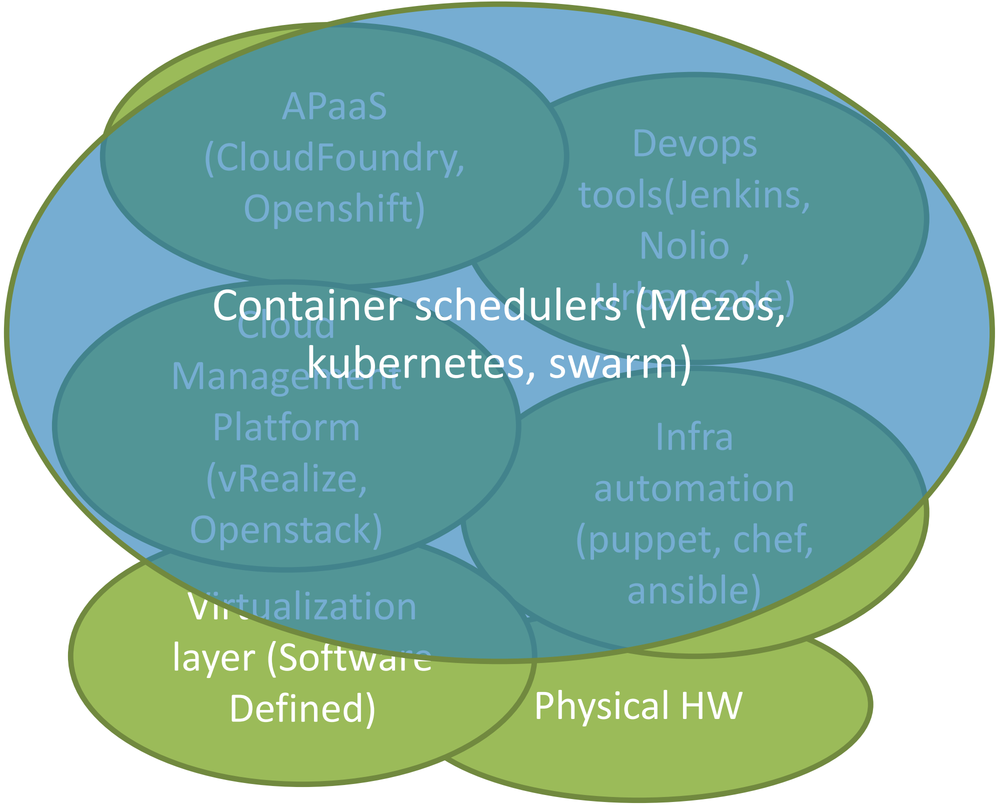
Physical HW

Container schedulers and orchestration

docker
SWARM
MESOS
amazon
web services™
kubernetes



What will be the role of container schedulers?



APaaS (CloudFoundry, Openshift)

Devops tools(Jenkins, Nolio , Urbancode)

Container schedulers (Mezos, kubernetes, swarm)

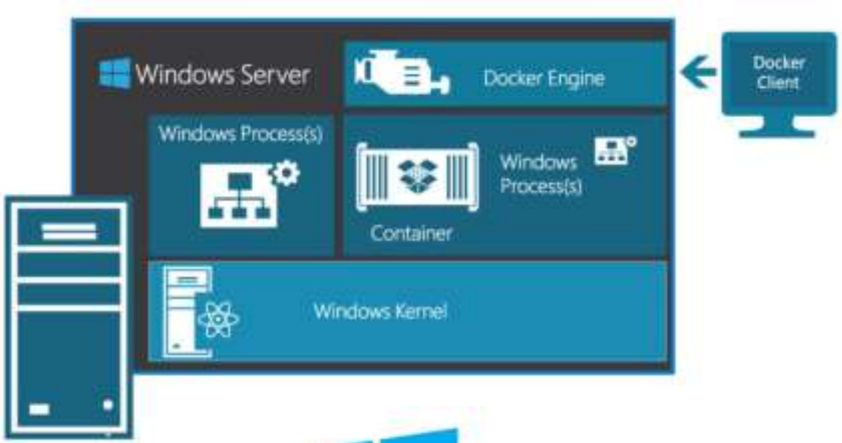
Cloud Management Platform (vRealize, Openstack)

Infra automation (puppet, chef, ansible)

Virtualization layer (Software Defined)

Physical HW

Things are still moving: Microsoft and VMWARE



Windows Server 2016

Windows Azure

Linux ✓

VMWARE: ‘Instant Clone’ also known as VM Fork or Project **Fargo**

PHOTON OS™

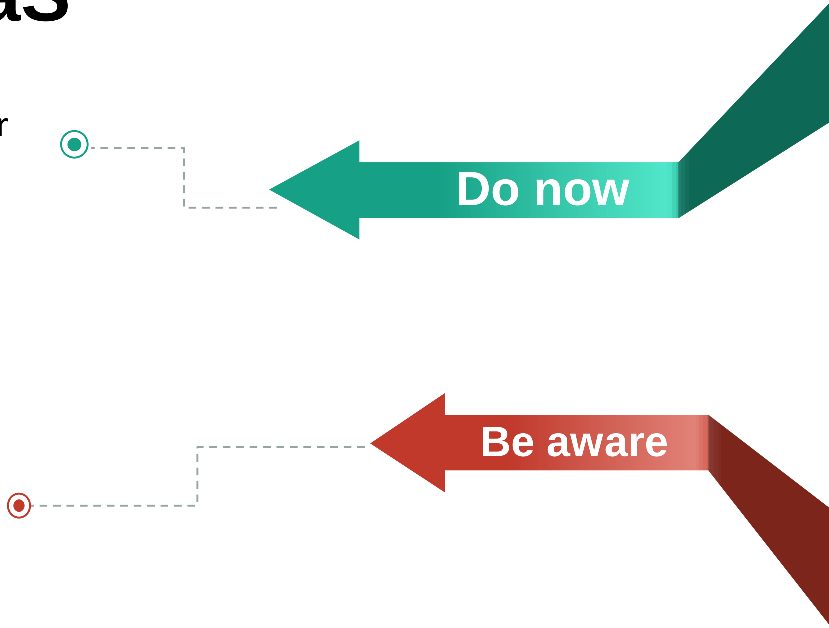
docker vmware

STKI Recommendations: container technologies and APaaS

Start to select and implement new technologies for development and deployment

Looks like APaaS is more mature than container schedulers

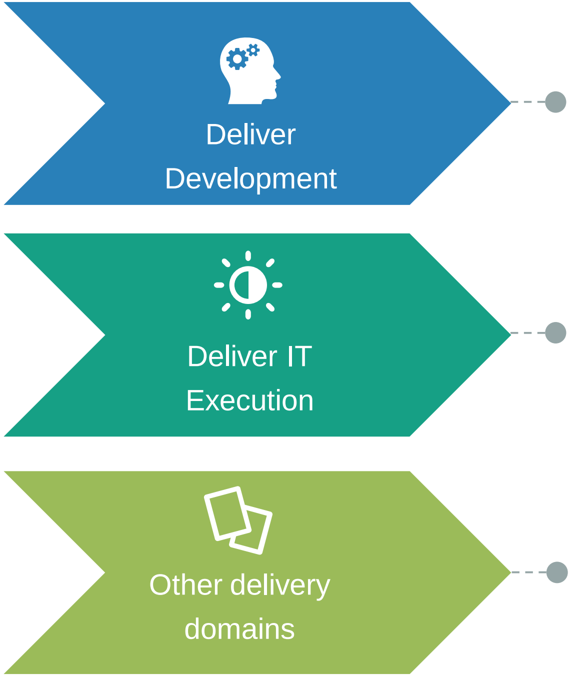
Processes, organizations and management commitment is more important than tools selection



Do now

Be aware

The STKeye - three pillars of Delivery:



Deliver Development

Deliver IT Execution

Other delivery domains

Development and related SW tools

PaaS, IPaaS, CaaS, microservices , Docker, agile , DBMS, Devops, Dev Tools

Core Infrastructure (compute, storage, network)

Storage, network, server that delivers IaaS and are the foundation of PaaS and CaaS in the private or public cloud enable Devops

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Public cloud Integration for SaaS, external API, System monitoring (ESM), ITSM , End user computing , IT procurement, Testing tools

IT Execution – the vision is clear

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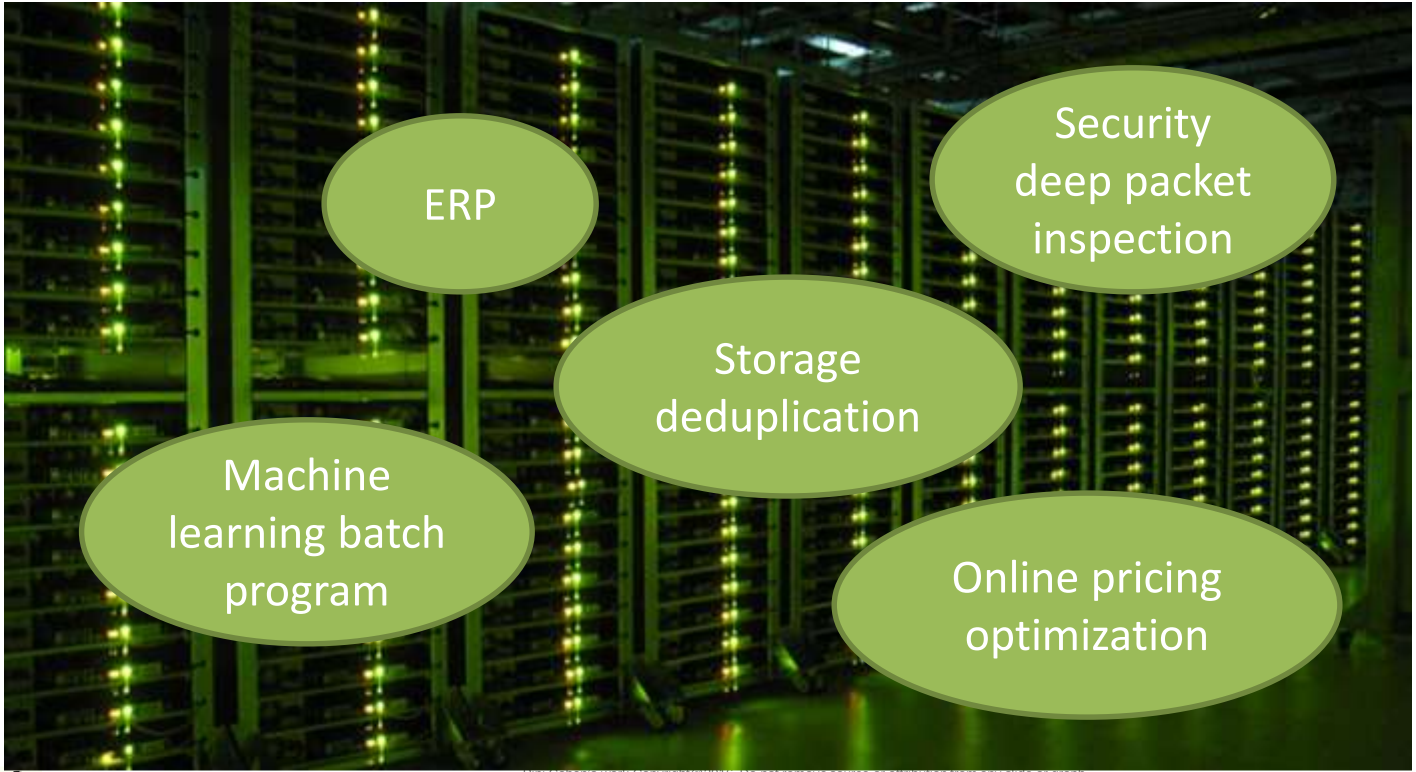


ERP

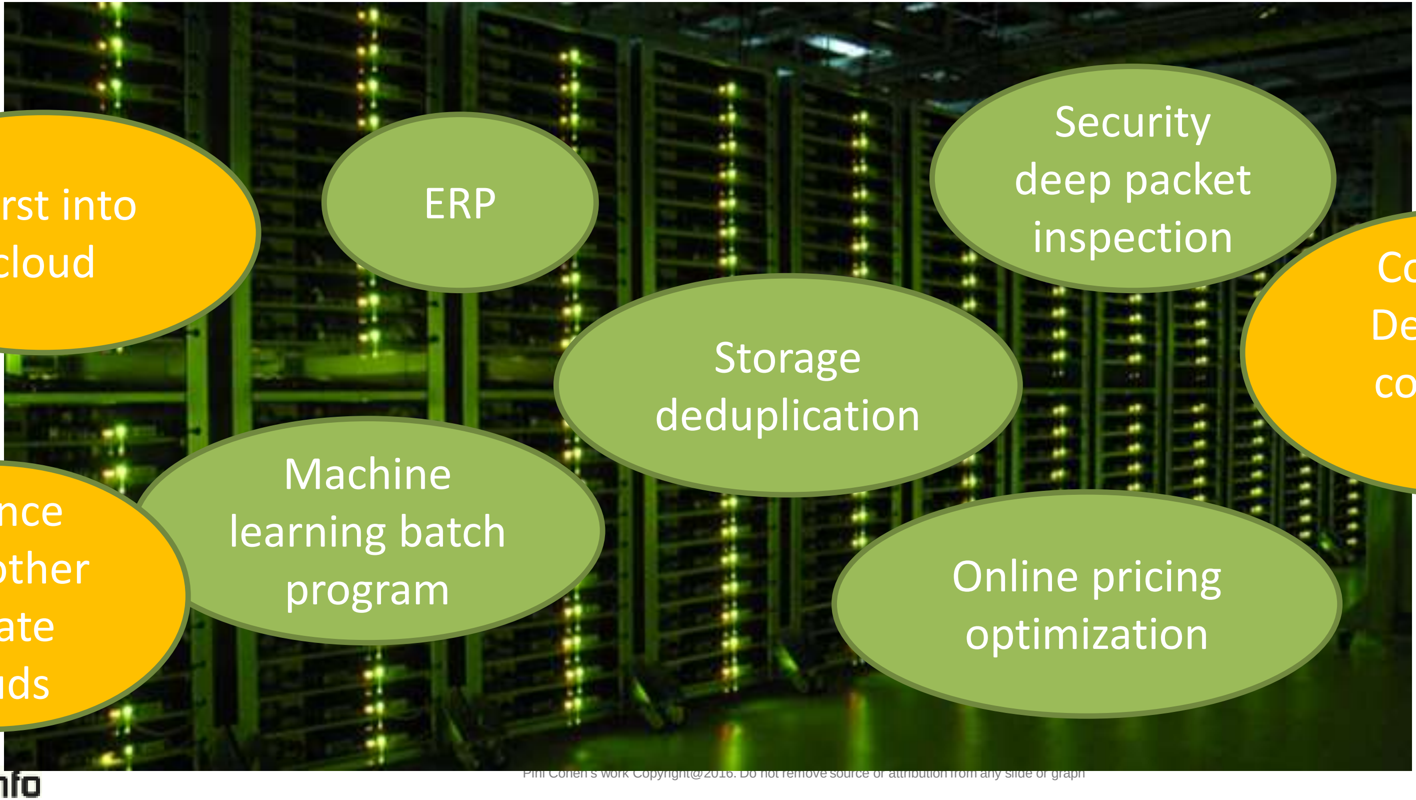
Security deep packet inspection

Storage deduplication

Machine learning batch program

Online pricing optimization

IT Execution – the vision is clear



Burst into cloud

ERP

Security deep packet inspection

Constant Deploy of code and infra

Storage deduplication

Balance with other private clouds

Machine learning batch program

Online pricing optimization

IT execution (running the IT) : the vision is clear

Standard cheap Servers

All "virtualized" and "software defined"

Cloud = elastic & self healing, templates, orchestration workflow, etc.

No centralized storage

Security based on micro segmentation

Delivered constantly to production (Devops)

Network HW fast but stupid

Adequate organization structure

Bursting to public cloud and balanced between private cloud locations

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Compute

no problem

Wistron Server

OPEN
Compute Project

STKI Recommendations: Compute

Currently main stream servers are the safest choice

For new type of workload cheaper servers should be examined

Do now

Software Defined Storage solutions

HEDVIG

nexenta®

Global Leader in Software-Defined Storage.

EMC²

SCALEIO

HPE

VMware® Virtual SAN™

IBM

Software Defined Storage

NetApp

Software-Defined
Storage: Data ONTAP

All Flash Array: “AFA born” vs. “AFA migrants”

- Can put flash logics (“even writes per cell”) at basic OS level and therefore use less expensive flash
- Will use (all the time) inline dedup and compression globally (not per LUN\Raid group)

- Kaminario
- EMC XtremIO
- SolidFire (NetApp)
- HP 3PAR 8450
- IBM All Flash (TMS)
- HDS-A (Nimbus OEM)

- EMC VNX-F; VMAX-All Flash
- NetApp All Flash FAS
- HDS VSP-F
- HP 3PAR
- IBM V7000
- Dell Flash Storage

1000 erases per block (TLC)

Object storage

Distributed

No limits (name spaces, scale)

Metadata

File

Type: GE PACS
Created: 11-14-10
Location: f:\patients\R\Ray_Francis\scapula\front_left
Owner: Dr Christian Anderson
Size: 24.2M
Last Accessed:11-16-10

Object

Type: GE PACS
Created: 11-14-10
Owner: Dr Christian Anderson
Technician: Lola Smith
Size: 24.2M
Last Accessed: 11-16-10
Patient: Francis x. Ray
DOB: 9-17-67
Sex: M
Injury Date: 11-14-10
Injury Type: Fracture
Anatomy: left scapula
View: rear
Object ID: 6deiyrfyewek547f2cgksddgsdd7
Retention:220147200 (7 years)
Archive = yes
Description:front left scapula

STKI Recommendations: Storage

Implement SDS for none production and later for none critical storage

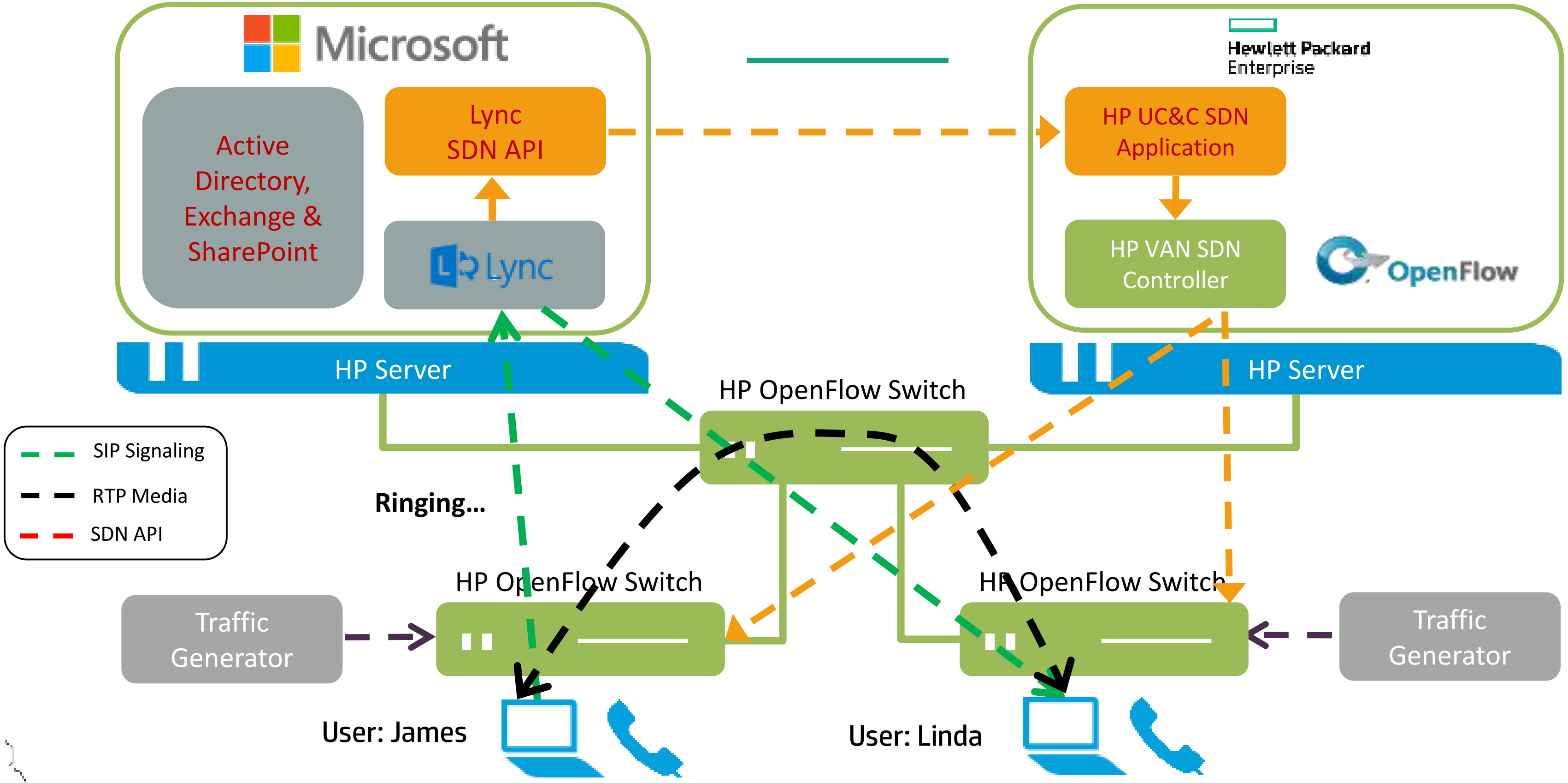
Implement initial object storage especially for large NAS environments

Backup to public or community cloud if regulation allows

Do now

Centralized storage is here to stay for the short-mid term

Networking: SDN business applications



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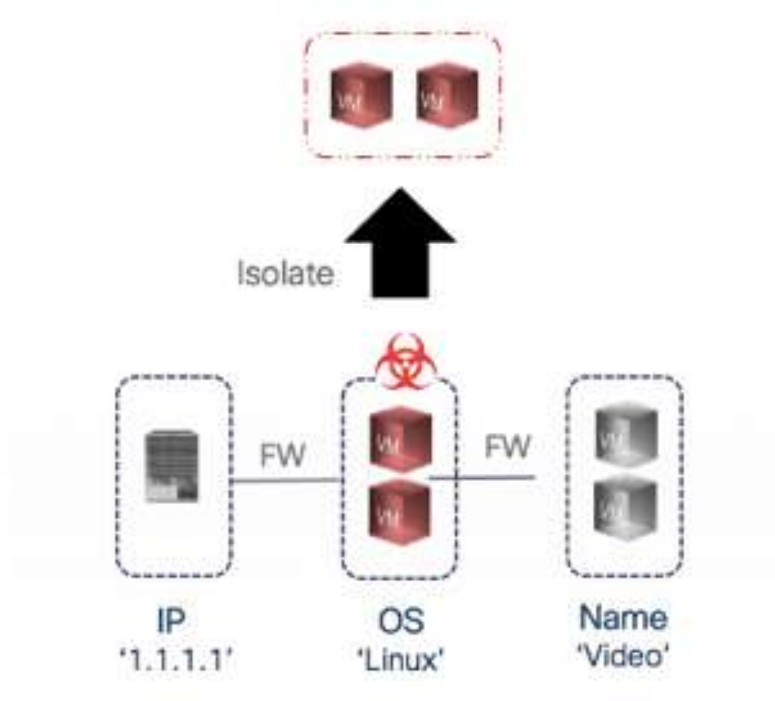
SDN: Network Micro-segmentation for better security



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Network – SDN players

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STKI Recommendations: Network DC

Put explicitly what is the need for SDN and see if SDN (and which) is the answer

Security is domain with high potential for SDN deployment

Large organizations – play with SDN even if there is no immediate reason

Do now

Be aware

Professional decision and not “Network vs. System vs. Storage” political war

Compute, network & storage: together or apart?

co

rk

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Modern platforms (converged infrastructure and cloud platforms) dimensions:

1 HW vs. SW

2 Infrastructure blocks (vBlock) vs. standard servers (hyperconverged)

3 Based on traditional network HW vs. SDN based

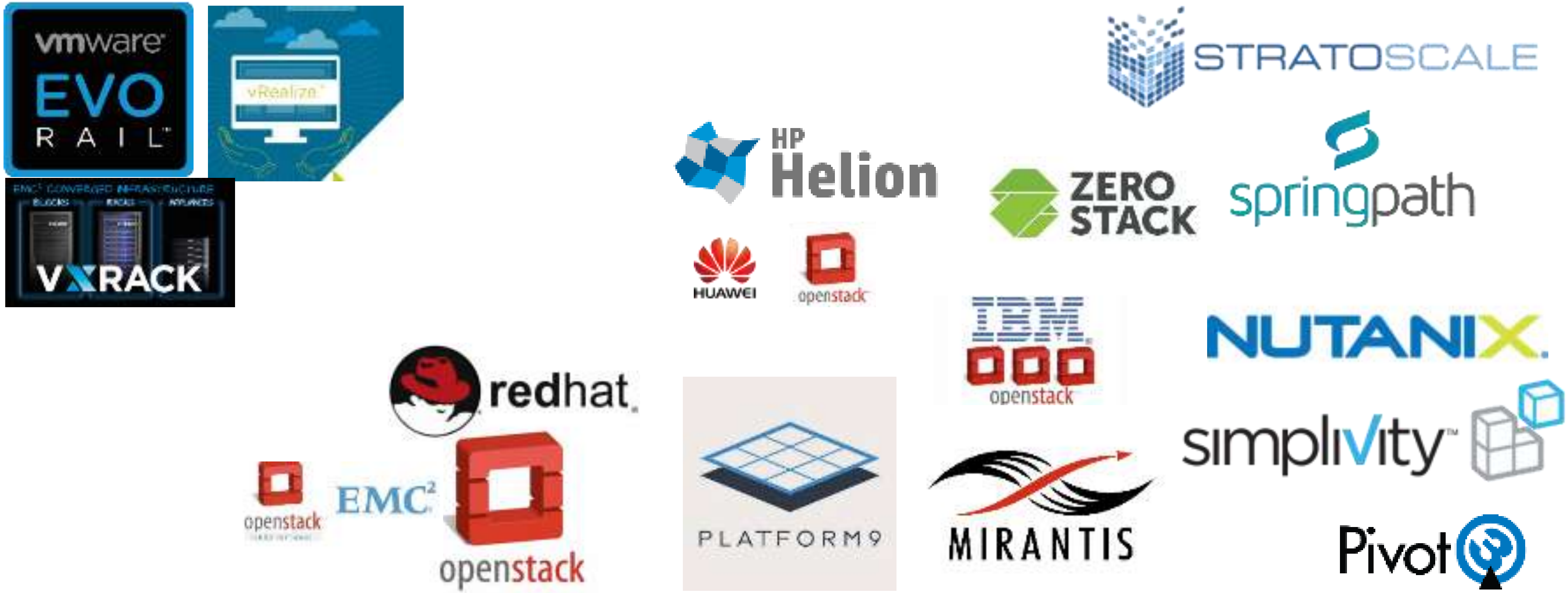
4 Level of openstack support

5 VMware based vs. other hypervisor

6 Basic execution (compute, network, storage) vs. cloud capabilities (templates, workflow, elasticity, ...)

Cloud platform and Converge infrastructure – so many options…

"serving Devops, built easily from "menu" by automation"



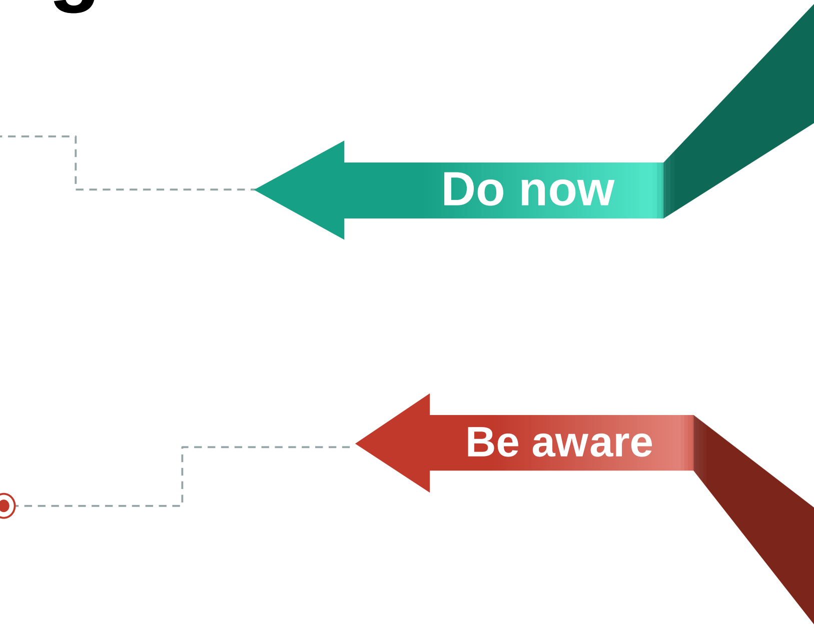
Cloud Platform and Converged Infrastructure

Currently, for short term “cloud ready” project VMWARE is the natural choice

Hyperconverged solutions are becoming ready for prime time

Goodbye “Server-Storage-Network DC teams”. Long live “IT execution” team

Containers might change everything…



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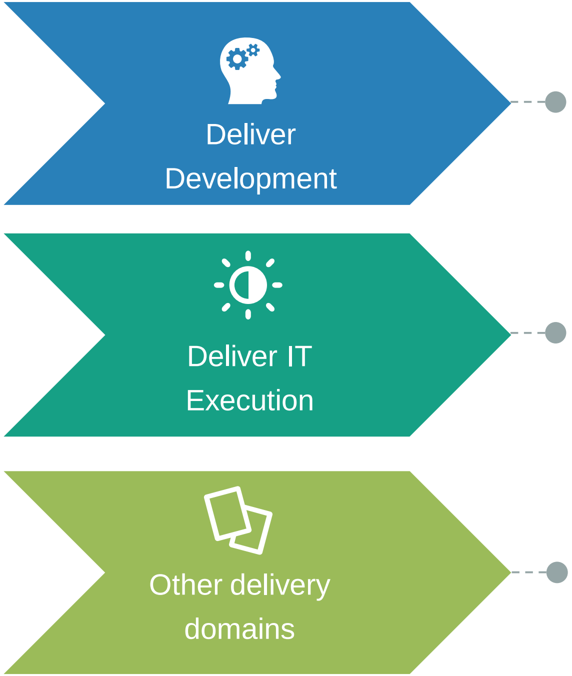

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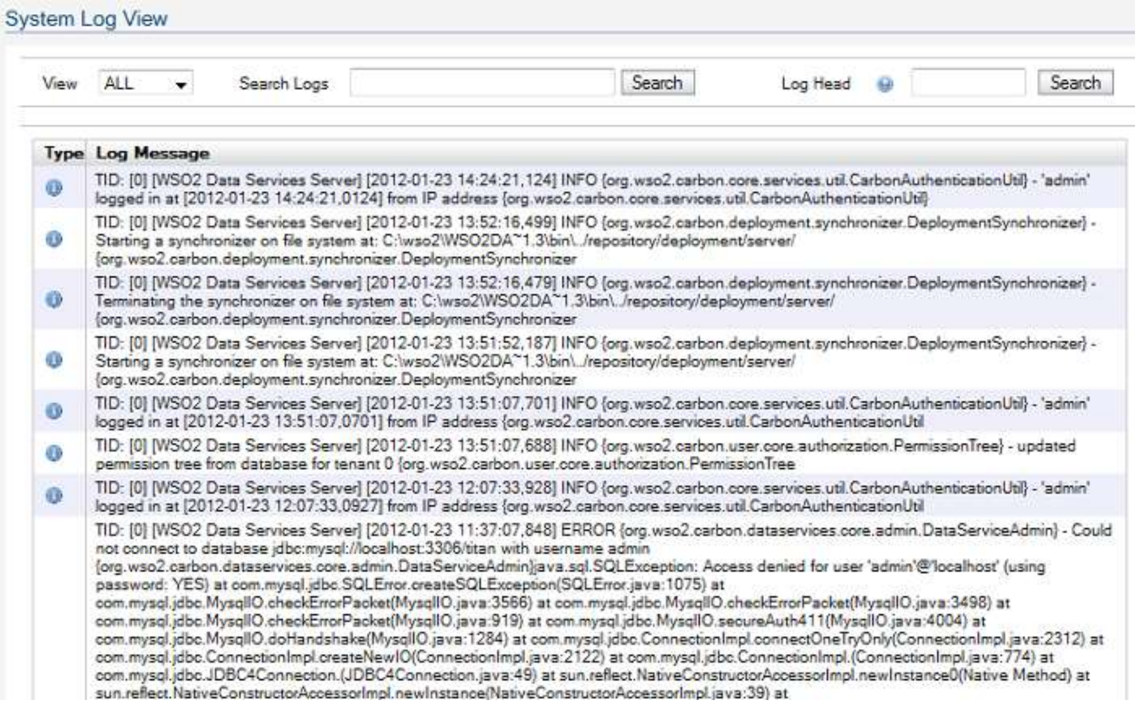
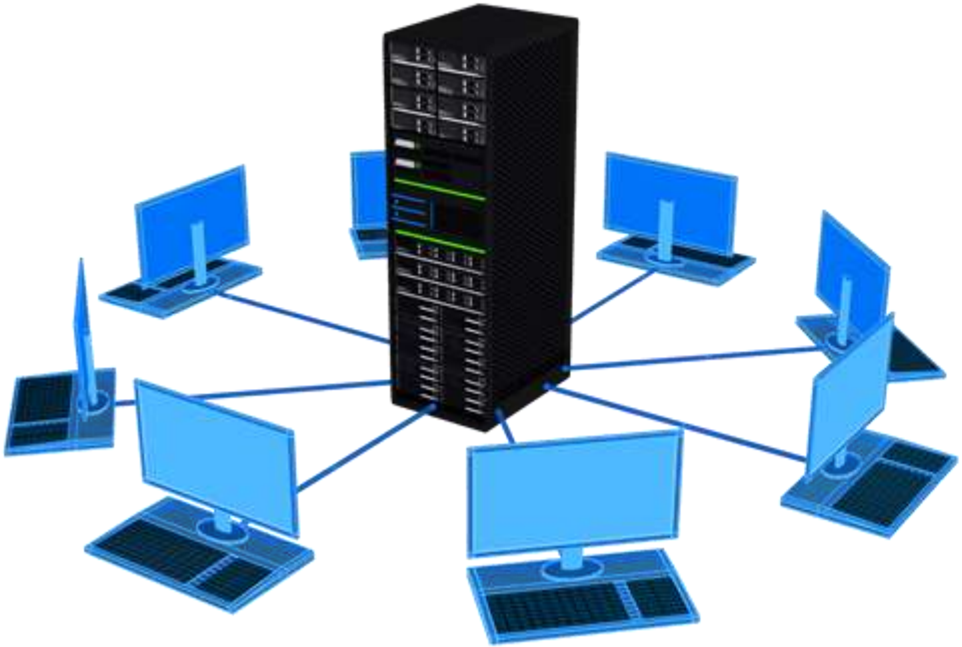
Enterprise System Management: the march towards the logs



```
TID: [0] [WSO2 Data Services Server] [2012-01-23 14:24:21,124] INFO {org.wso2.carbon.core.services.util.CarbonAuthenticationUtil} - 'admin'
logged in at [2012-01-23 14:24:21,0124] from IP address {org.wso2.carbon.core.services.util.CarbonAuthenticationUtil}
TID: [0] [WSO2 Data Services Server] [2012-01-23 13:52:16,499] INFO {org.wso2.carbon.deployment.synchronizer.DeploymentSynchronizer} -
Starting a synchronizer on file system at: C:\wso2\WSO2DA~1.3\bin\../repository/deployment/server/
{org.wso2.carbon.deployment.synchronizer.DeploymentSynchronizer
TID: [0] [WSO2 Data Services Server] [2012-01-23 13:52:16,479] INFO {org.wso2.carbon.deployment.synchronizer.DeploymentSynchronizer} -
Terminating the synchronizer on file system at: C:\wso2\WSO2DA~1.3\bin\../repository/deployment/server/
{org.wso2.carbon.deployment.synchronizer.DeploymentSynchronizer
TID: [0] [WSO2 Data Services Server] [2012-01-23 13:51:52,187] INFO {org.wso2.carbon.deployment.synchronizer.DeploymentSynchronizer} -
Starting a synchronizer on file system at: C:\wso2\WSO2DA~1.3\bin\../repository/deployment/server/
{org.wso2.carbon.deployment.synchronizer.DeploymentSynchronizer
TID: [0] [WSO2 Data Services Server] [2012-01-23 13:51:07,701] INFO {org.wso2.carbon.core.services.util.CarbonAuthenticationUtil} - 'admin'
logged in at [2012-01-23 13:51:07,0701] from IP address {org.wso2.carbon.core.services.util.CarbonAuthenticationUtil
TID: [0] [WSO2 Data Services Server] [2012-01-23 13:51:07,688] INFO {org.wso2.carbon.user.core.authorization.PermissionTree} - updated
permission tree from database for tenant 0 {org.wso2.carbon.user.core.authorization.PermissionTree
TID: [0] [WSO2 Data Services Server] [2012-01-23 12:07:33,928] INFO {org.wso2.carbon.core.services.util.CarbonAuthenticationUtil} - 'admin'
logged in at [2012-01-23 12:07:33,0927] from IP address {org.wso2.carbon.core.services.util.CarbonAuthenticationUtil
TID: [0] [WSO2 Data Services Server] [2012-01-23 11:37:07,848] ERROR {org.wso2.carbon.dataservices.core.admin.DataServiceAdmin} - Could
not connect to database jdbc:mysql://localhost:3306/titan with username admin
{org.wso2.carbon.dataservices.core.admin.DataServiceAdmin}java.sql.SQLException: Access denied for user 'admin'@'localhost' (using
password: YES) at com.mysql.jdbc.SQLError.createSQLException(SQLError.java:1075) at
com.mysql.jdbc.MysqlIO.checkErrorPacket(MysqlIO.java:3566) at com.mysql.jdbc.MysqlIO.checkErrorPacket(MysqlIO.java:3498) at
com.mysql.jdbc.MysqlIO.checkErrorPacket(MysqlIO.java:919) at com.mysql.jdbc.MysqlIO.secureAuth411(MysqlIO.java:4004) at
com.mysql.jdbc.MysqlIO.doHandshake(MysqlIO.java:1284) at com.mysql.jdbc.ConnectionImpl.connectOneTryOnly(ConnectionImpl.java:2312) at
com.mysql.jdbc.ConnectionImpl.createNewIO(ConnectionImpl.java:2122) at com.mysql.jdbc.ConnectionImpl.(ConnectionImpl.java:774) at
com.mysql.jdbc.JDBC4Connection.(JDBC4Connection.java:49) at sun.reflect.NativeConstructorAccessorImpl.newInstance0(Native Method) at
sun.reflect.NativeConstructorAccessorImpl.newInstance(NativeConstructorAccessorImpl.java:39) at
```

SBC and VDI is mature



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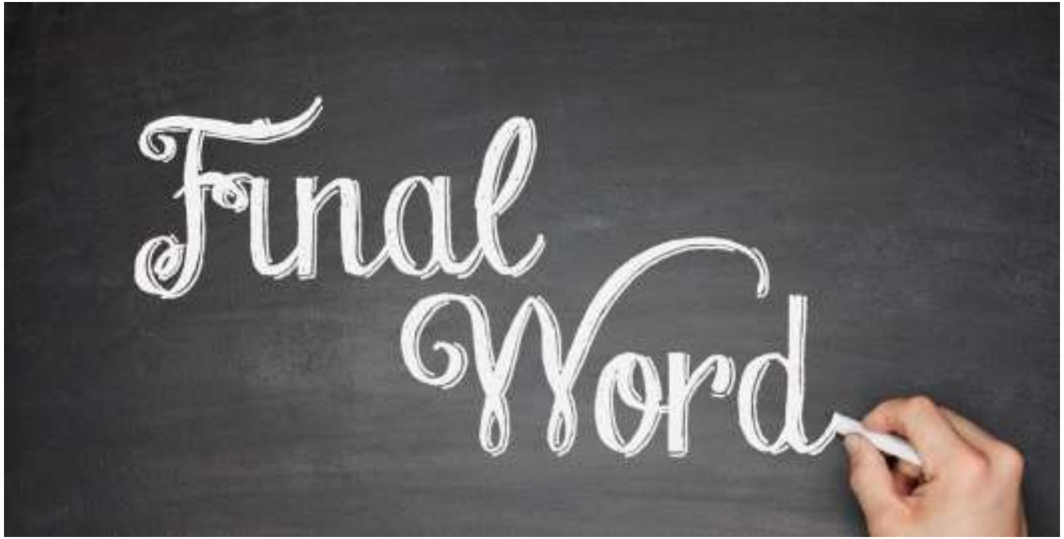
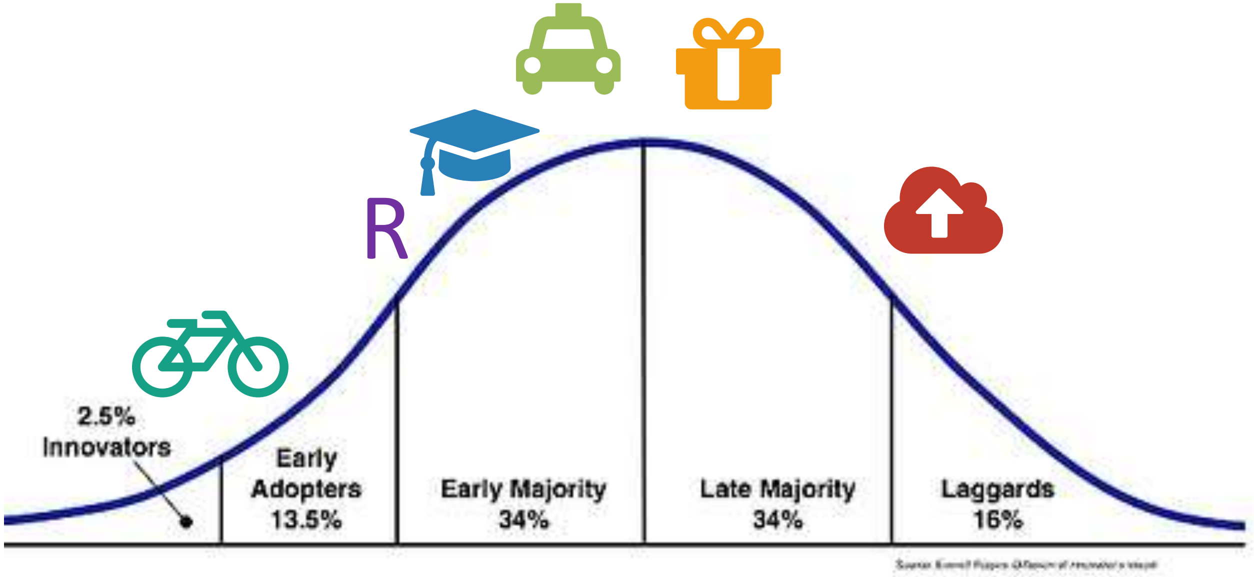
Testing Automation enable Devops

Final word



Where are my projects located on the maturity graph?



Source: Everett Rogers Diffusion of innovations model

STKI Recommendations: Why delivery does projects fail?

Be aware

Lack of management commitment

Deliverables are not 100% clear and constant change in requirements

Unrealistic expectations\budget\time

Team A will is using the deliverables but Team B is managing the project (example for cloud ready project : Infrastructure vs. developers)

Summary- Lets ride the tsunami wave!

But focus on where you want to get!!

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That’s it.

Thank you!

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