DevOps Introduction

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Agenda

- Course outline
- What is DevOps.
- Why DevOps?
- Benefits of DevOps.
- Pre-requisites.
- DevOps scope.
- Introduction to Cloud Computing
- Introduction to Virtualization

DevOps Course Outline

- Introduction to Devops, Cloud Computing and Virtualization.

- Vagrant creates and configures virtual development environments. It can be seen as a wrapper around virtualization software such as VirtualBox and VMWare.

- Git is a distributed revision control system with an emphasis on speed, data integrity, and support for distributed, non-linear workflows.

- Puppet is an open source configuration management utility. It runs on many Unix-like systems as well as on Microsoft Windows.

DevOps Course Outline

- Chef is a configuration management tool used to streamline the task of configuring and maintaining a company's servers, and can integrate with cloud-based platforms.

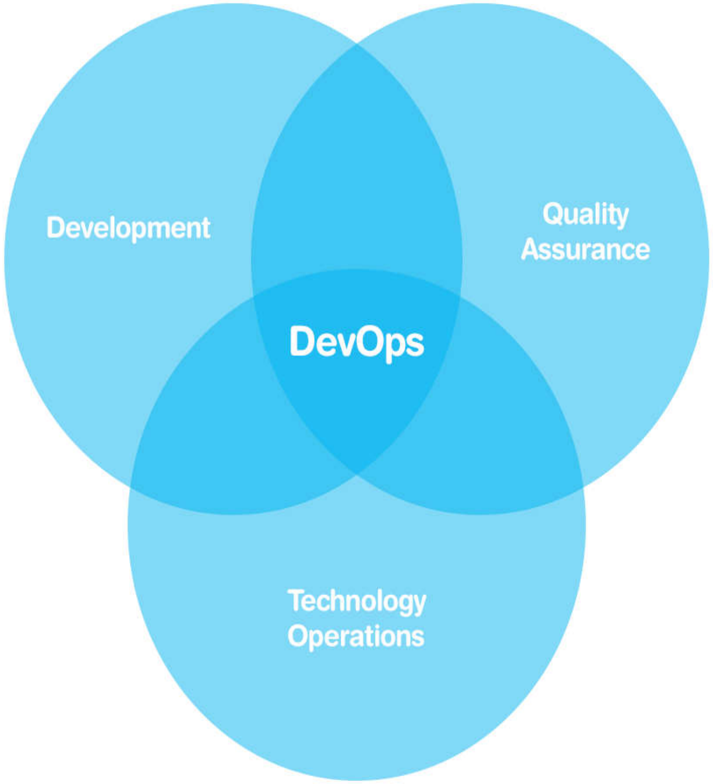
- Nagios, an open-source computer-software application, monitors systems, networks and infrastructure.

- Jenkins is the leading open source automation server. Built with Java, it provides hundreds of plugins to support building, testing, deploying and automation for virtually any project

- 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.

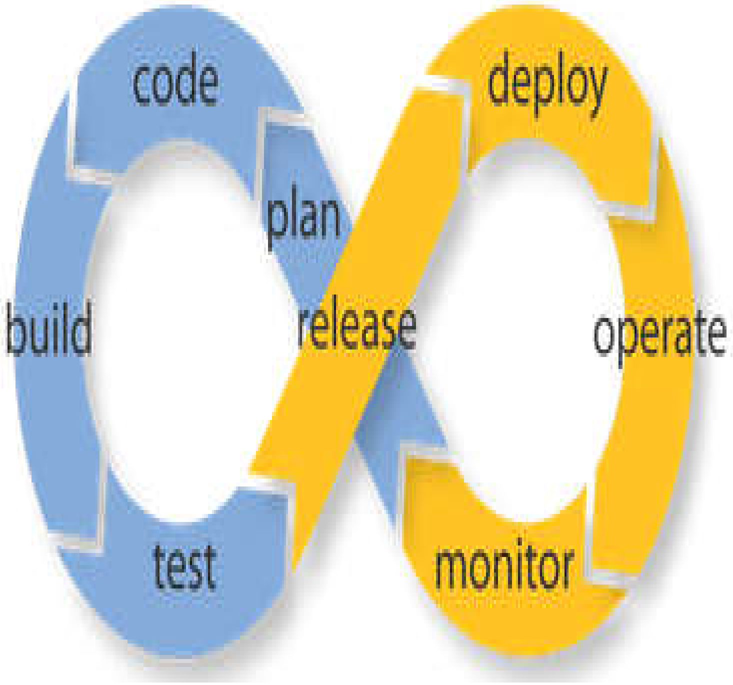
Devops Defined

What is DevOps is a culture, movement or practice that emphasizes the collaboration and communication of both Software Developers and other information technology (IT) professionals while automating the process of software delivery and infrastructure changes .It aims at establishing a culture and environment where building testing, and releasing software, can happen rapidly, frequently, and more reliably. -- Wiki

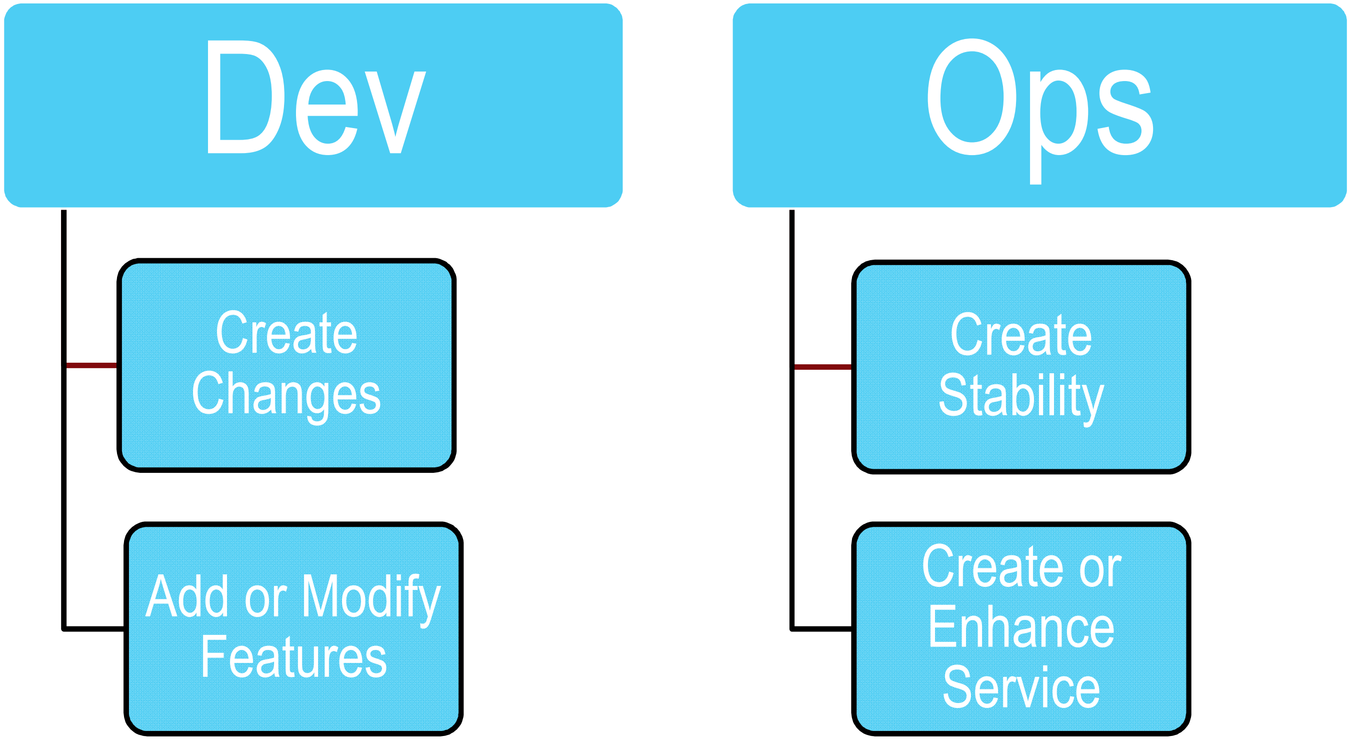


Devops Defined

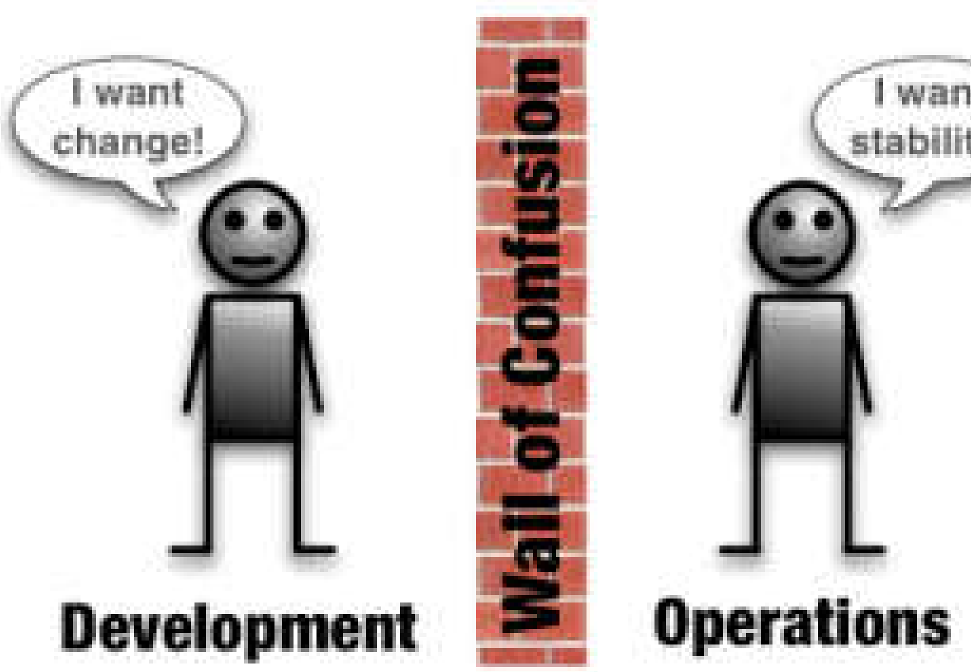
The term “DevOps” typically refers to the emerging professional movement that advocates a collaborative working relationship between Development and IT Operations, resulting in the fast flow of planned work (i.e., high deploy rates), while simultaneously increasing the reliability, stability, resilience and security of the production environment.



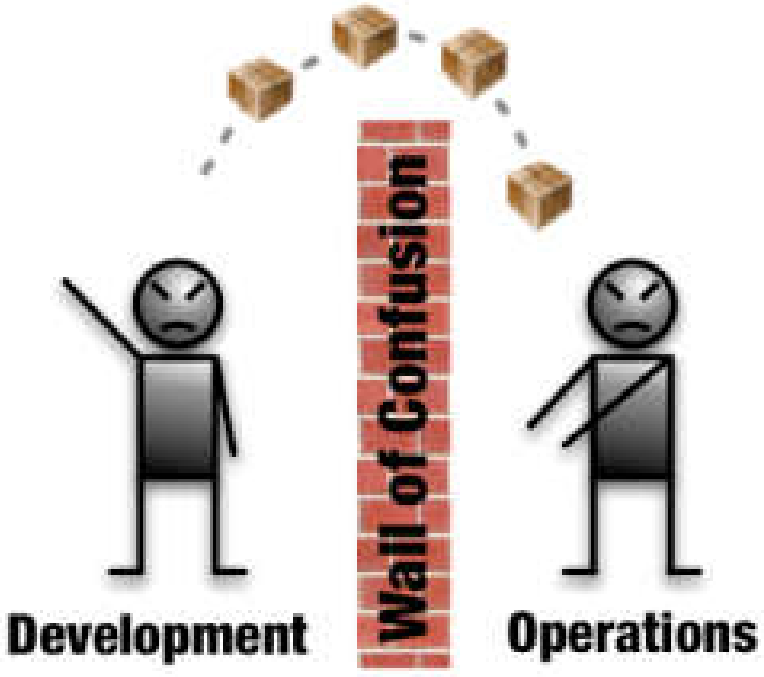
Development and Operations Roles



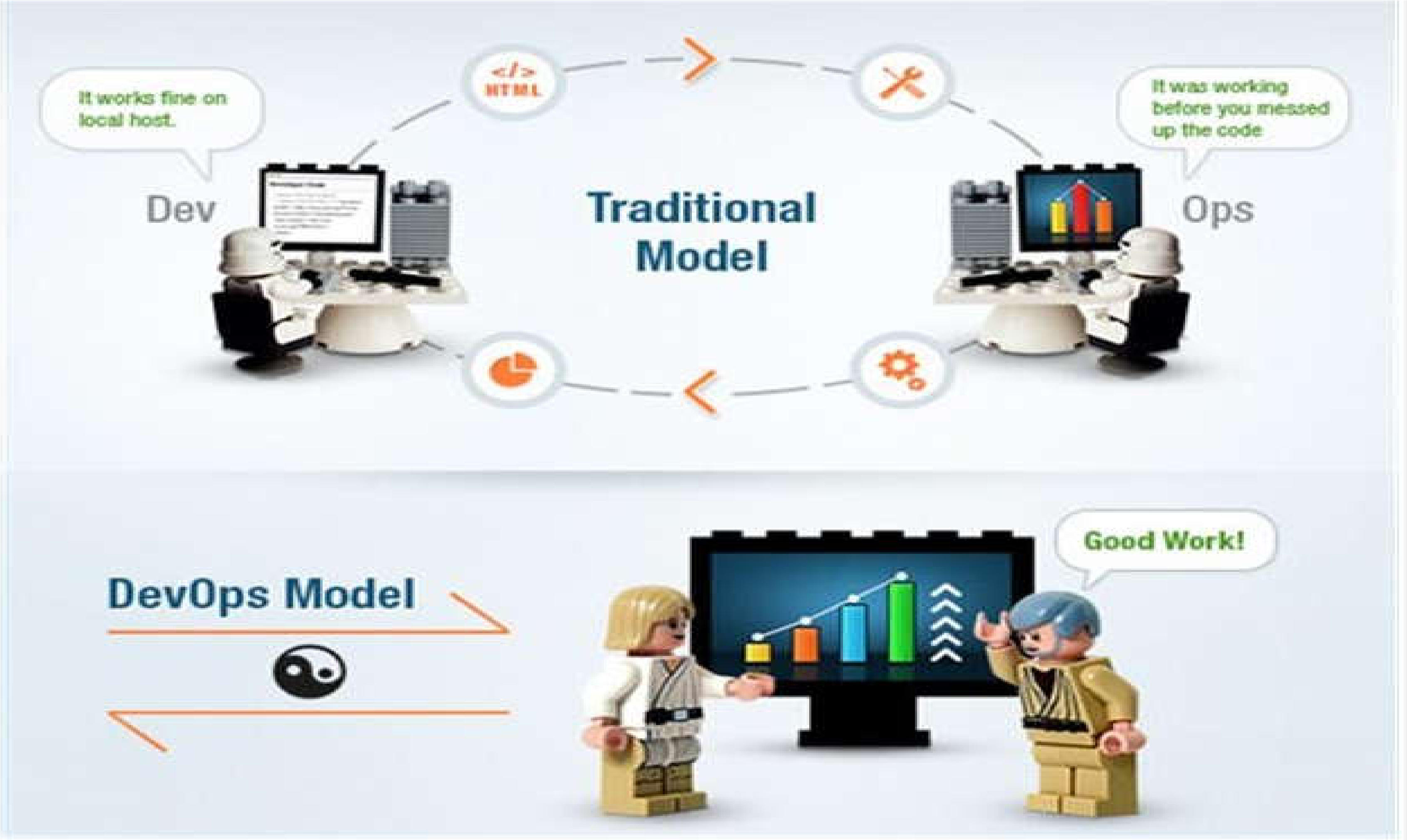
Development and Operations (Problem)



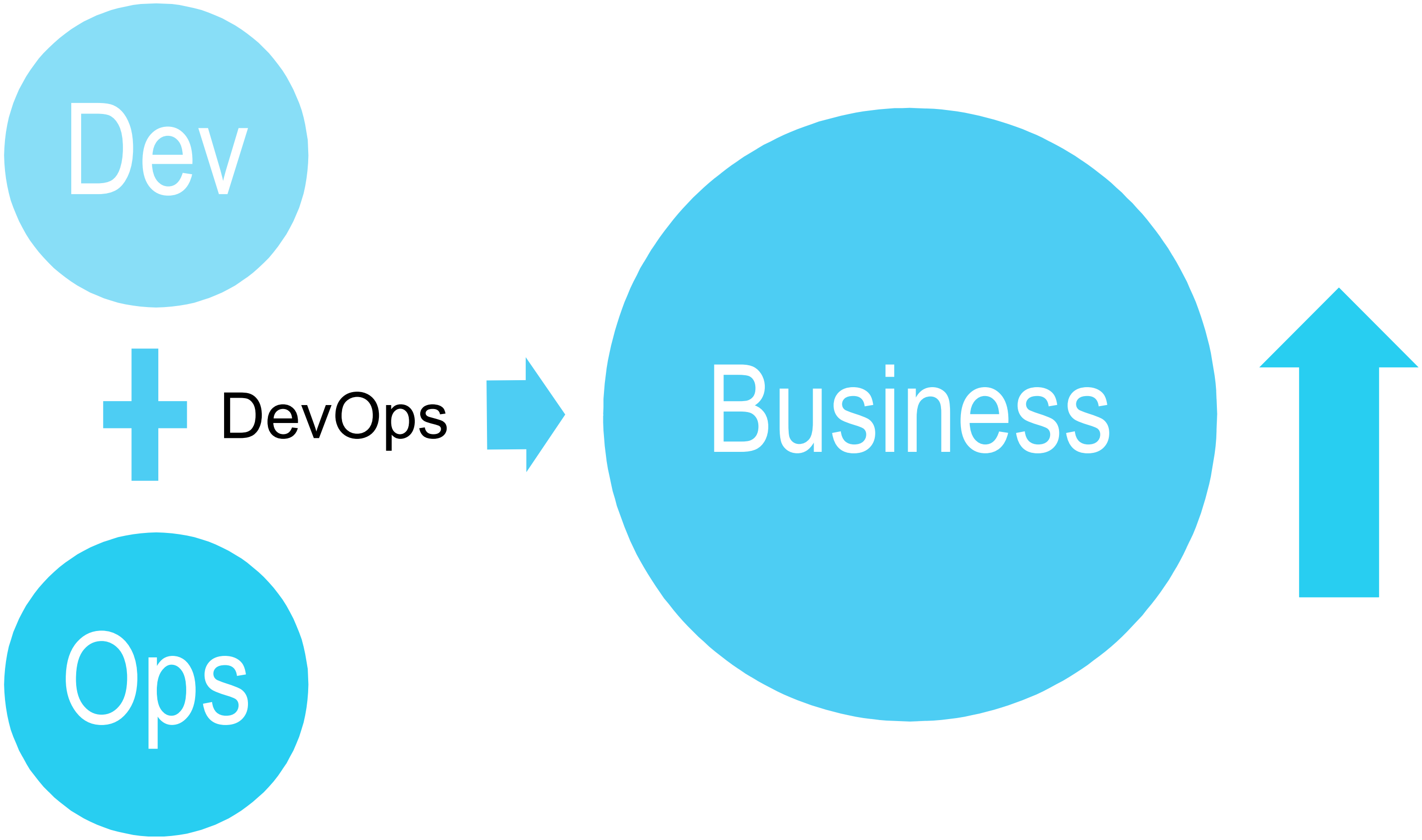
Development and Operations (Problem)



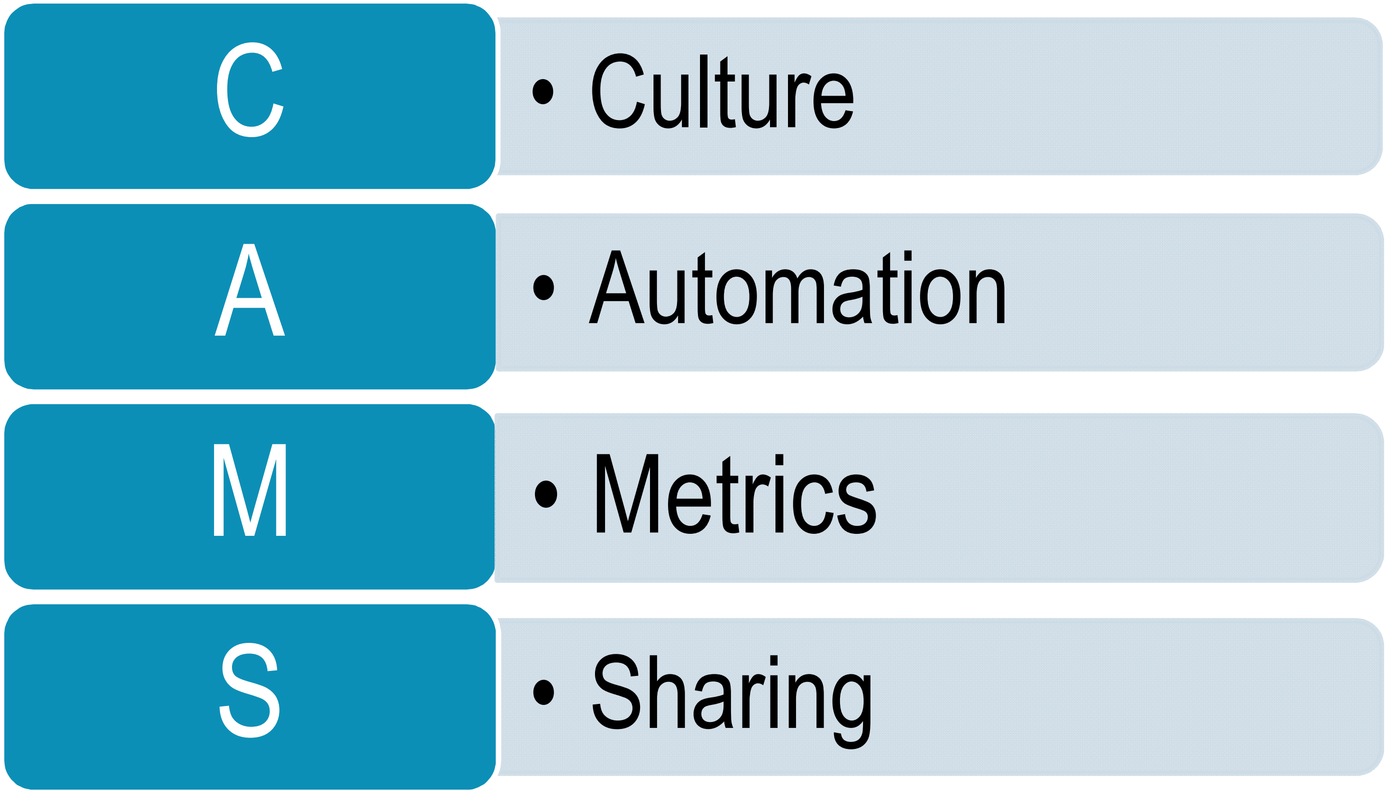
New Release


It works fine on local host.
Dev
HTML
Traditional Model
It was working before you messed up the code
Ops
DevOps Model
Good Work!

DevOps the Solution



What is DevOps(CAMS)



C	• Culture
A	• Automation
M	• Metrics
S	• Sharing

CAMS(Culture)

Relationship and Communications

- ➢Build trust.
- ➢Remove Silos.
- ➢Be Open.
- ➢Ask questions.
- ➢Involve Everyone.
- ➢Don’t say NO

CAMS(Automation)

Automation

- Automate everything(that can be automated).
- Infrastructure as code.
- Fast and efficient.
- Consistent and known states.
- Save time.

CAMS(Metrics)

Metrics

- Monitor.
- Find failures.
- Improve.
- Make a plan and fix it.

CAMS(Sharing)

Sharing

- ➢Share Idea.
- ➢Share Metrics.
- ➢Share Feedbacks.
- ➢Share success stories.
- ➢Shares changes and new functions

DevOps Benefits

Business:

- Faster time to market
- Faster delivery of features and improvements
- More stable operating environments

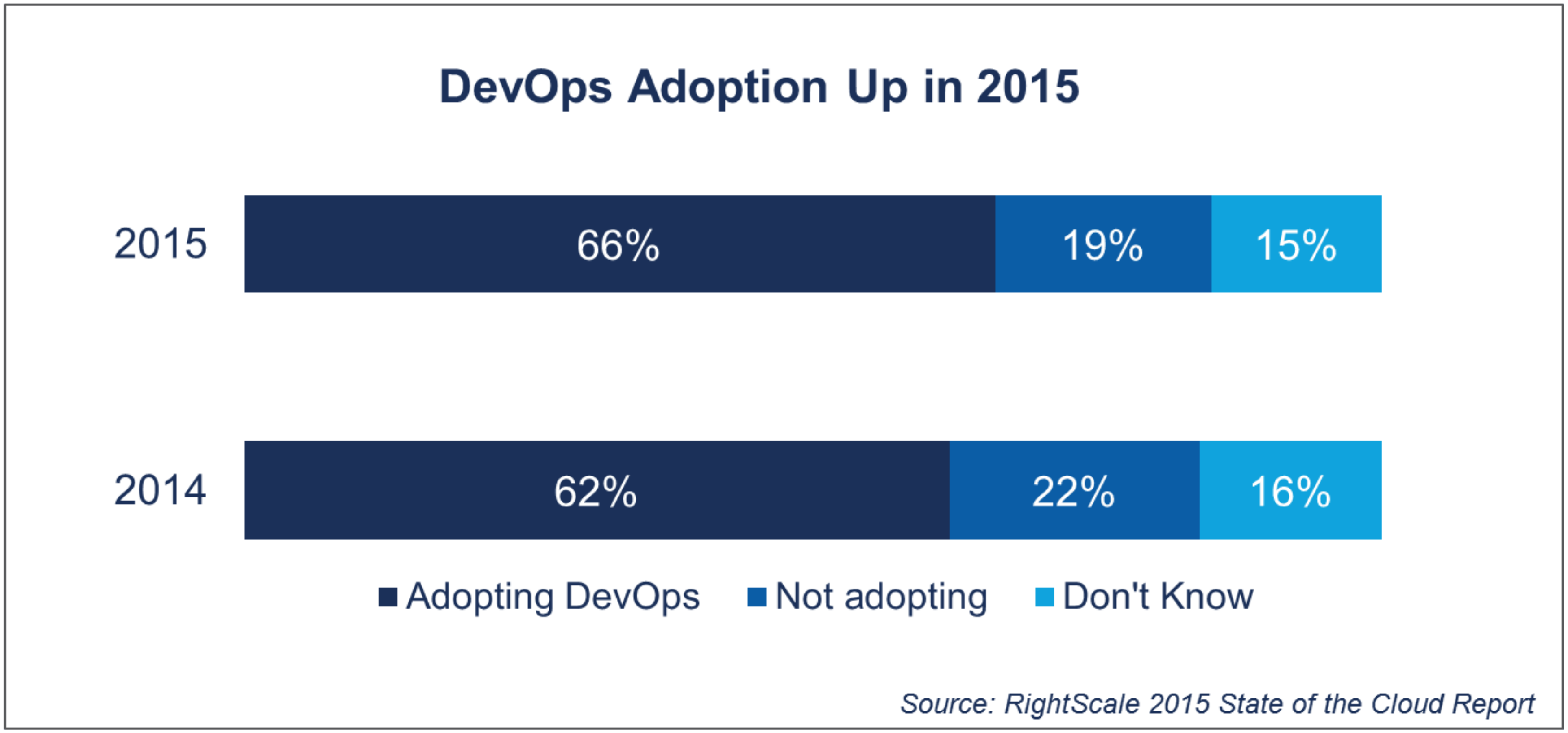
Technical:

- Continuous software delivery
- Faster resolution
- Less complex fixes
- Job satisfaction

Prerequisites for a DevOps engineer

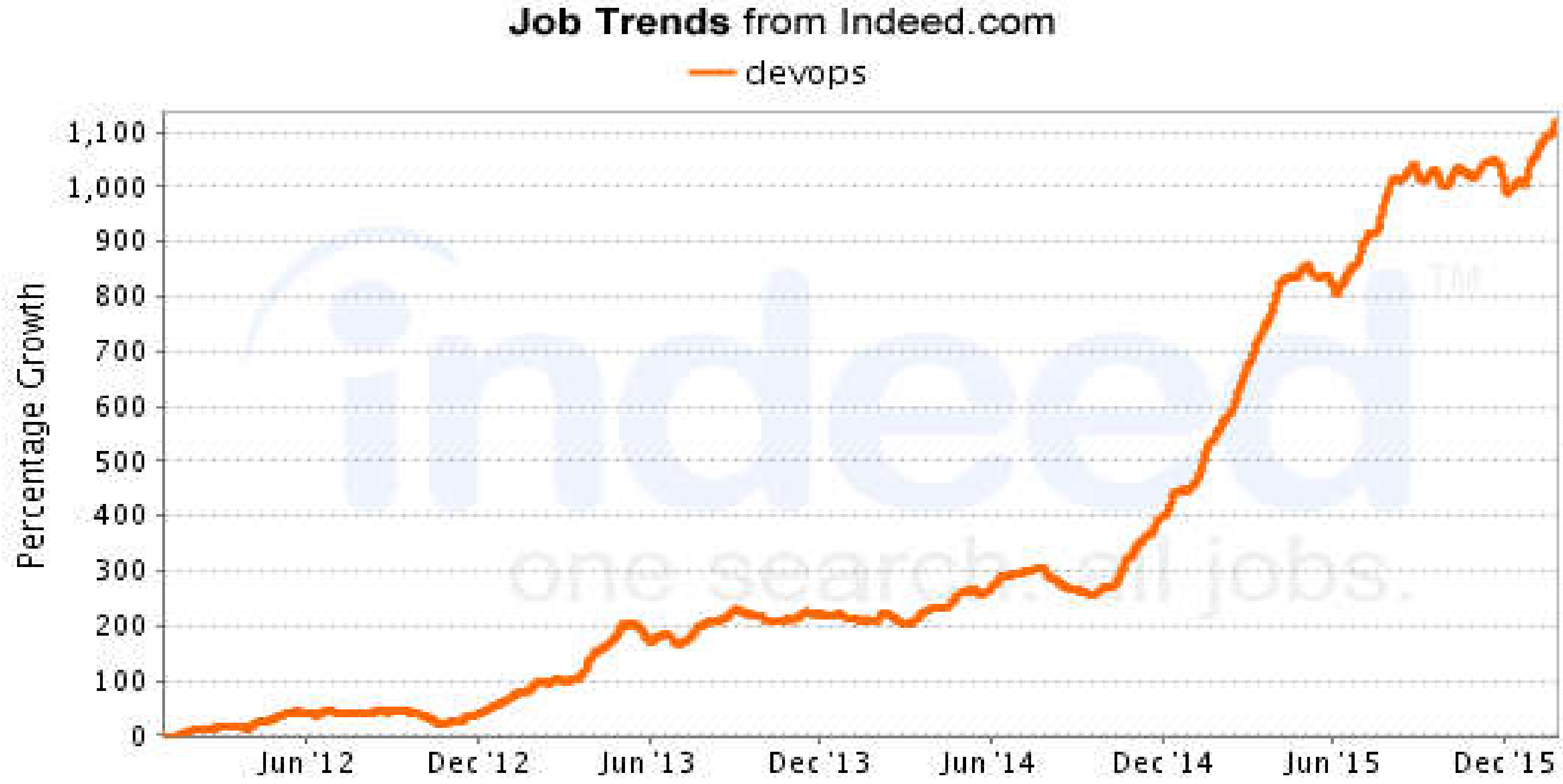
- There’s no formal career track for becoming a DevOps engineer. They are either developers who get interested in deployment and network operations, or sysadmins who have a passion for scripting and coding, and move into the development side where they can improve the planning of test and deployment.
- Either way, these are people who have pushed beyond their defined areas of competence and who have a more holistic view of their technical environments.
- Knowledge of Linux OS(For the collabera course).

DevOps Adoption

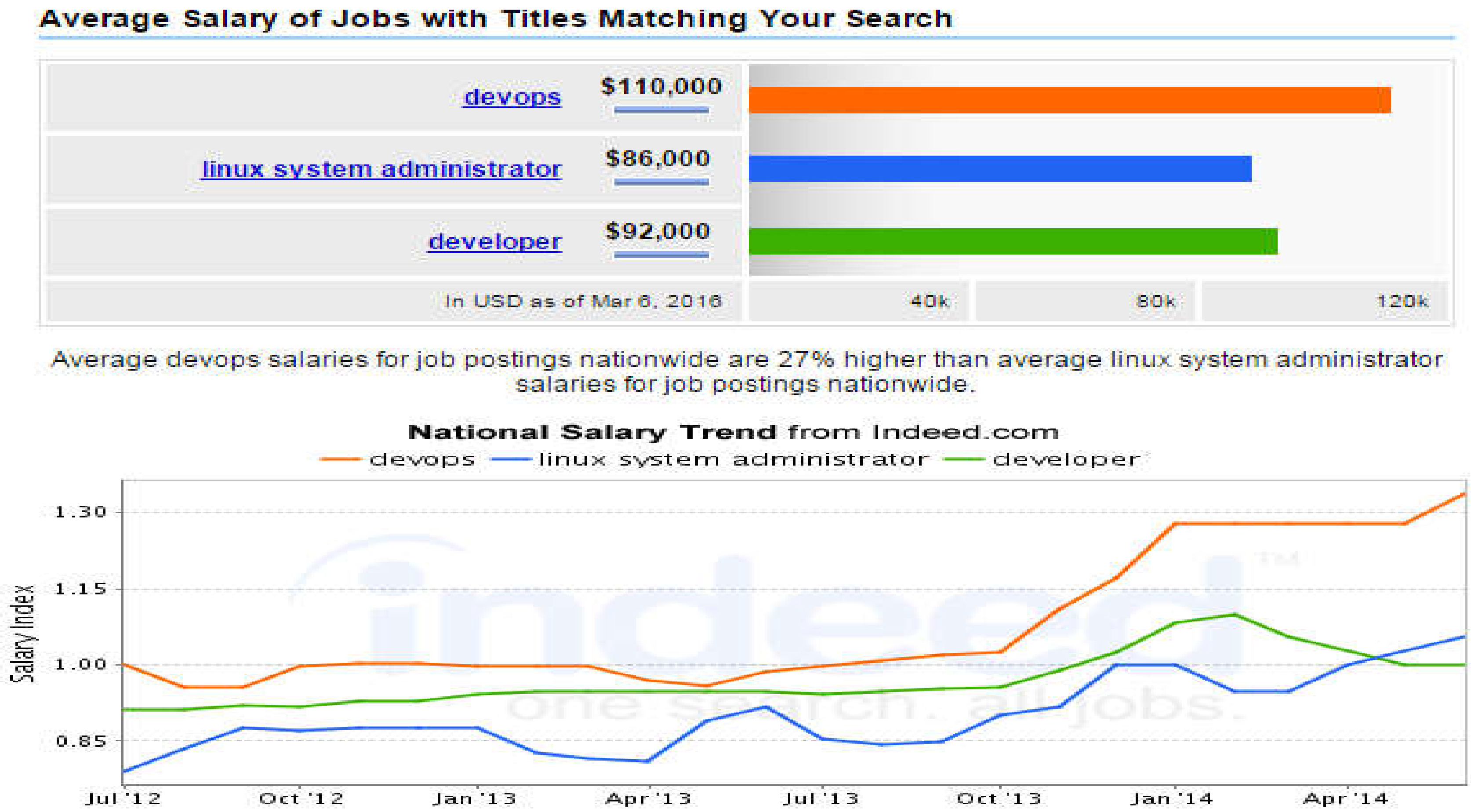


Source: RightScale 2015 State of the Cloud Report

DevOps Scope



DevOps Scope



Average Salary of Jobs with Titles Matching Your Search

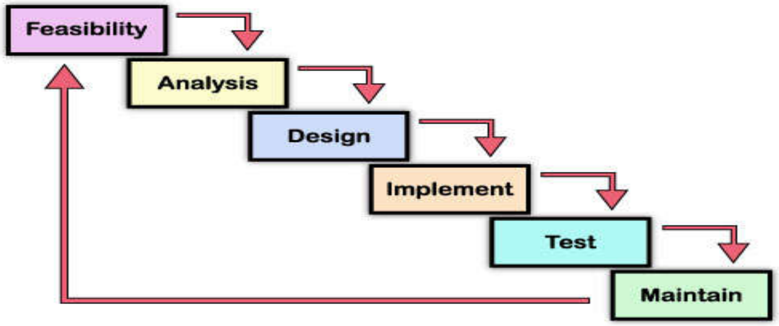
devops	$110,000	
linux system administrator	$86,000	
developer	$92,000	
	In USD as of Mar 6, 2016	40k 80k 120k

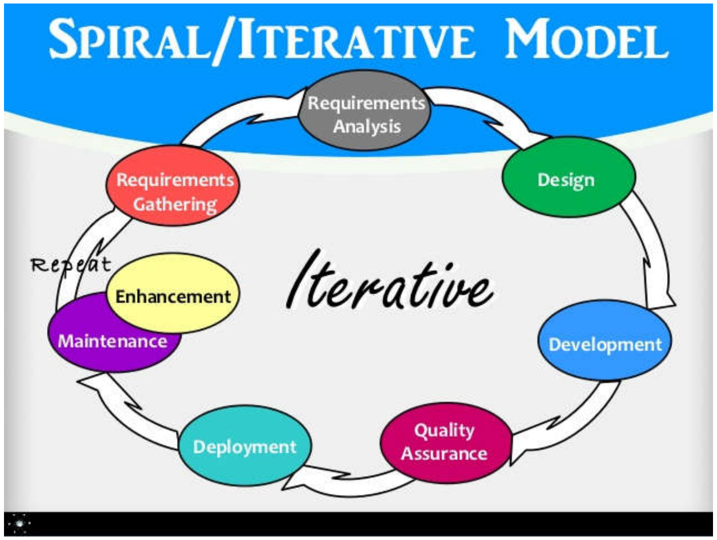
Average devops salaries for job postings nationwide are 27% higher than average linux system administrator salaries for job postings nationwide.

National Salary Trend from Indeed.com

SDLC Models

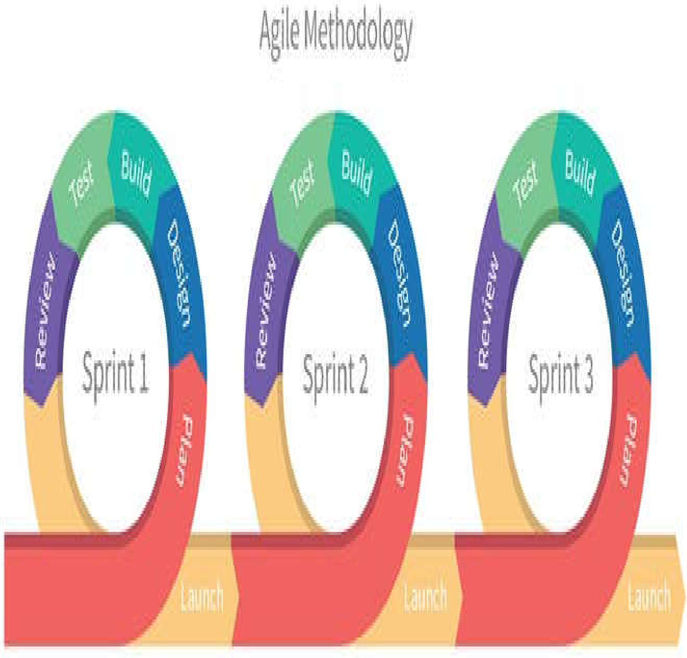
- ➢ Waterfall.
- ➢ Spiral/Iterative.
- ➢ Extreme Programing.
- ➢ Big Bang.
- ➢ Lean.
- ➢ Agile.



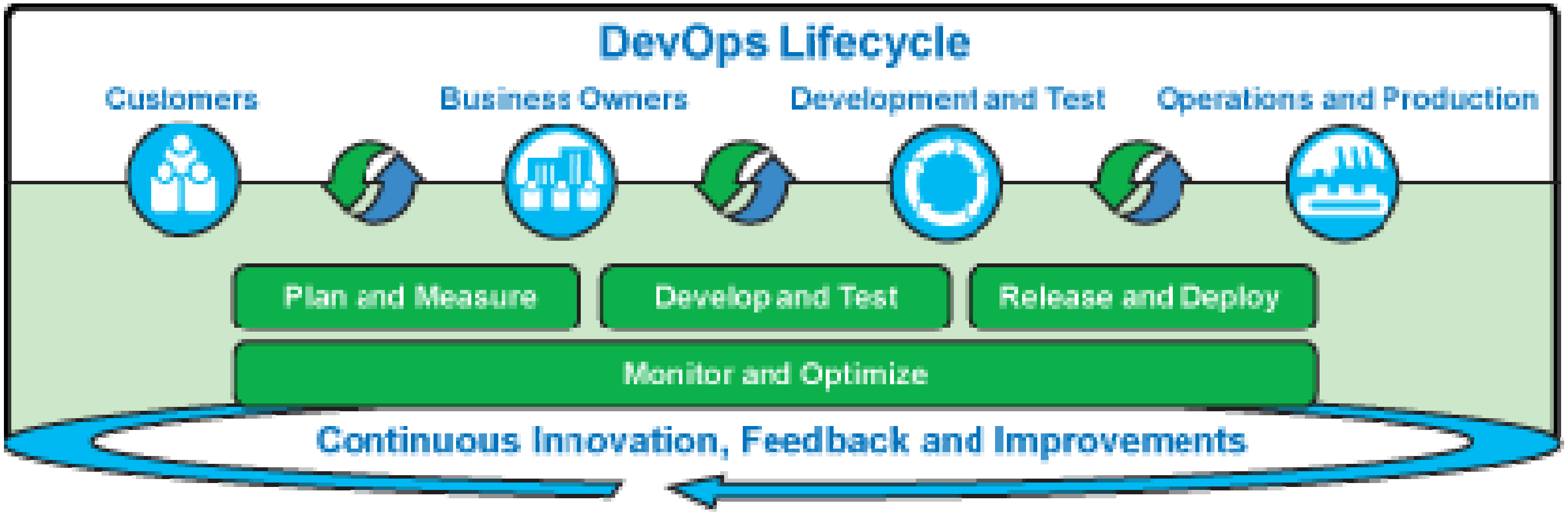


Agile and DevOps

Devops shares many common characteristics with the Agile movement, especially with the focus on individuals, interactions, and collaboration. You might wonder if devops is just “rebranded” Agile. While devops has certainly grown around Agile methodology, it is a separate cultural movement steeped in the history of software engineering with a broad reach that is inclusive of more than just developers. Devops adopts and extends Agile principles and applies them to the entire organization, not only the development process. Devops has cultural implications beyond Agile and a focus that is broader than speed of delivery.



DevOps Stakeholders



History of Devops

- **Agile 2008 Conference in Toronto** Andrew Clay Shafer's "birds of a feather" ad hoc session called Agile Infrastructure. The only person who showed up was Patrick Debois. Shafer and Debois started a Google group called "Agile System Administration"
- **June 2009** Presentation at Velocity of 10+ Deploys per Day: Dev and Ops Cooperation at Flickr by John Allspaw and Paul Hammond – Debois watched by streaming video, tweeted
- **October 30-31 2009 DevOpsDays (Ghent)** Organized through Twitter. Conversation continued on Twitter and the #DevOps hashtag was born, dropping "Days" for brevity
- **2010 Mountain View, CA** • First US DevOpsDays
- **March 2011** Gartner's first notes about

DevOps Tools

- Vagrant.
- GIT.
- Chef.
- Puppet.
- Nagios.
- Jenkins.
- Dockers

Configuration Management

Configuration management (CM) is the detailed recording and updating of information that describes an enterprise's hardware and software. Such information typically includes the versions and updates that have been applied to installed software packages and the locations and network addresses of hardware devices. Special configuration management software is available. When a system needs a hardware or software upgrade, a computer technician can access the configuration management program anddatabase to see what is currently installed. The technician can then make a more informed decision about the upgrade needed.

Continuous Testing and Integration

- Continuous integration (CI) is a software engineering practice in which isolated changes are immediately tested and reported on when they are added to a larger code base. The goal of CI is to provide rapid feedback so that if a defect is introduced into the code base, it can be identified and corrected as soon as possible.
- Time frames are crucial. Integration should be divided into three steps:
- commit new functionality and build new application
- run unit tests
- run Integration/System tests

Continuous Release and Deployment

- The relevant terms here are “Continuous Integration” and “Continuous Deployment”, often used together and abbreviated as CI/CD . Originally Continuous Integration means that you run your “integration tests” at every code change while Continuous Delivery means that you automatically deploy every change that passes your tests.

- **The Software Development Pipeline**
- From a high level, a CI/CD pipeline usually consists of the following discrete steps:
- **Commit**. When a developer finishes a change to an application, he or she commits it to a central source code repository.
- **Build**. The change is checked out from the repository and the software is built so that it can be run by a computer. This steps depends a lot on what language is used and for interpreted languages this step can even be absent.
- **Automated tests**. This is where the meat of the CI/CD pipeline is. The change is tested from multiple angles to ensure it works and that it doesn’t break anything else.
- **Deploy**. The built version is deployed to production.

Continuous Application Monitoring

- **Application monitoring and feedback solutions enable you to:**
- Help steer projects toward successful completion with better application visibility.
- Manage and optimize application and infrastructure performance in traditional IT, virtualized, cloud and hybrid environments.
- Receive customer feedback in both pre-and post-production phases, resulting in lower costs of errors and changes.
- Maximize the value of every customer visit, helping to ensure that more transactions are completed successfully.
- Gain immediate visibility into the sources of customer issues that may affect their behavior and impact business.

Cloud Computing Introduction

What is Cloud Computing?

Cloud computing is the delivery of computing as a service rather than a product, whereby shared resources, software, and information are provided to computers and other devices as a utility (like the electricity grid) over a network (typically the Internet).--WIKI

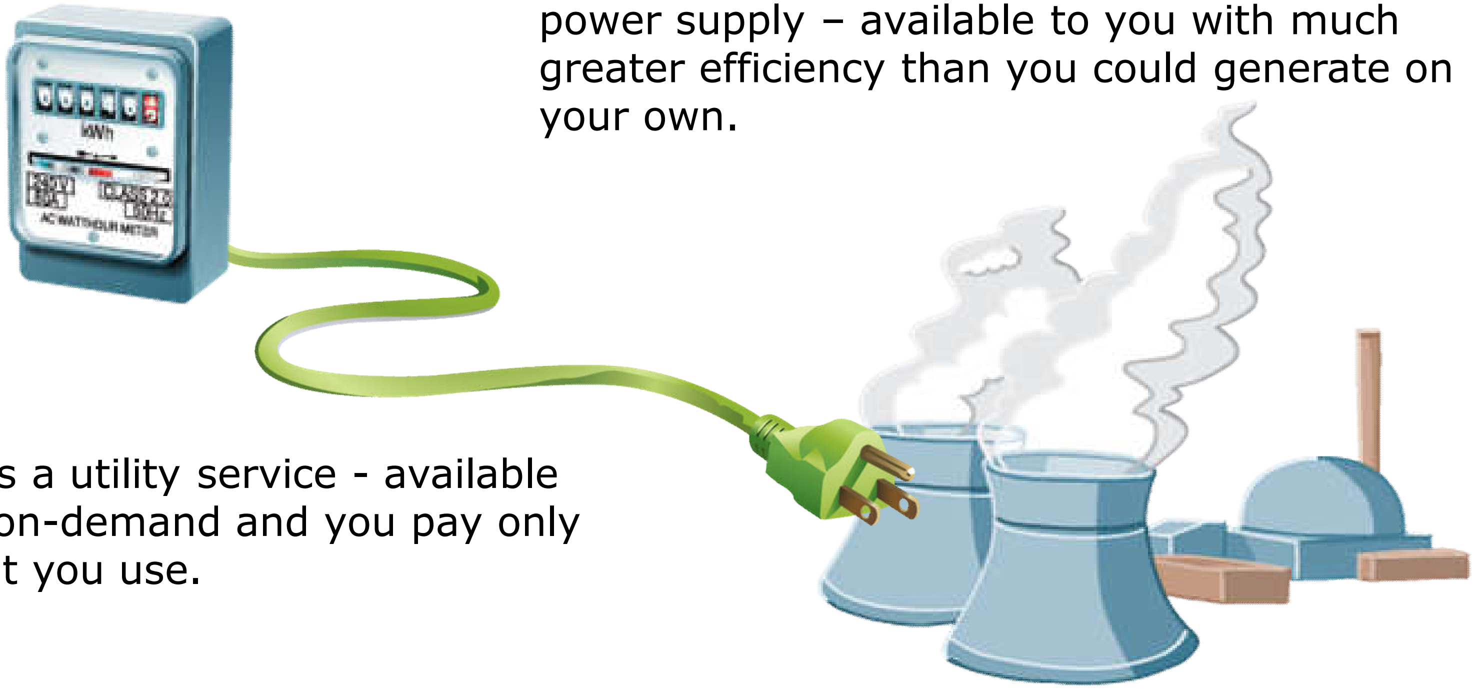
Cloud computing is a model for enabling ubiquitous, convenient, on-demand network access to a shared pool of configurable computing resources (e.g., networks, servers, storage, applications, and services) that can be rapidly provisioned and released with minimal management effort or service provider interaction. -- Nist

http://csrc.nist.gov/publications/nistpubs/800-145/SP800-145.pdf

What is Cloud Computing?

An analogy: think of electricity services…

You simply plug into a vast electrical grid managed by experts to get a low cost, reliable power supply – available to you with much greater efficiency than you could generate on your own.



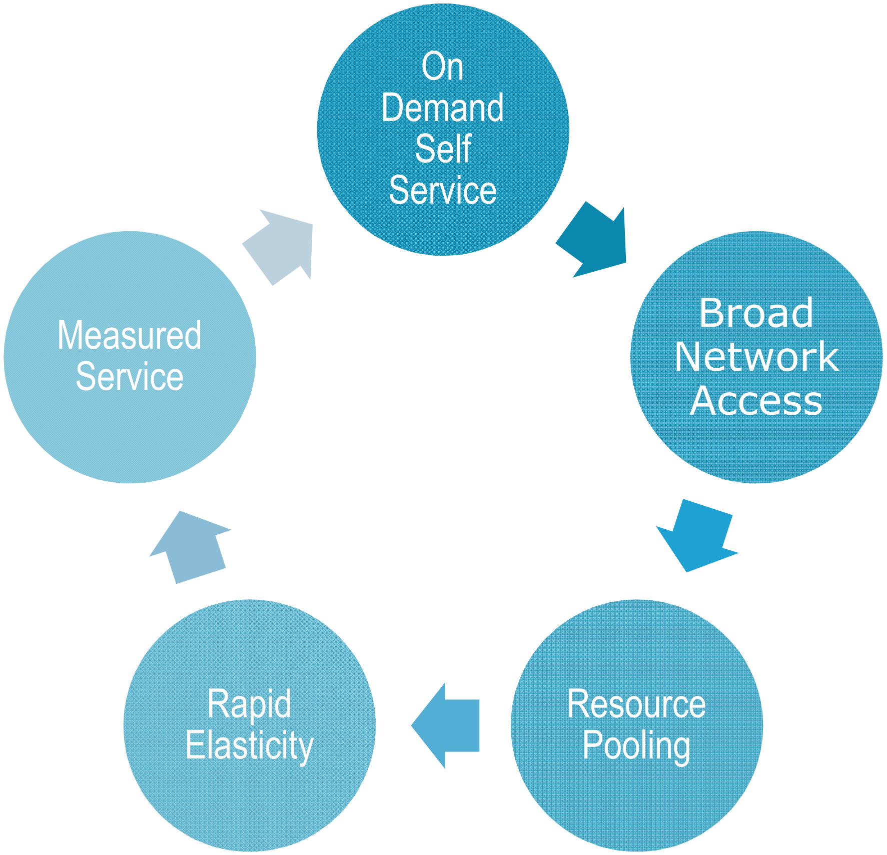
Power is a utility service - available to you on-demand and you pay only for what you use.

What is Cloud Computing?

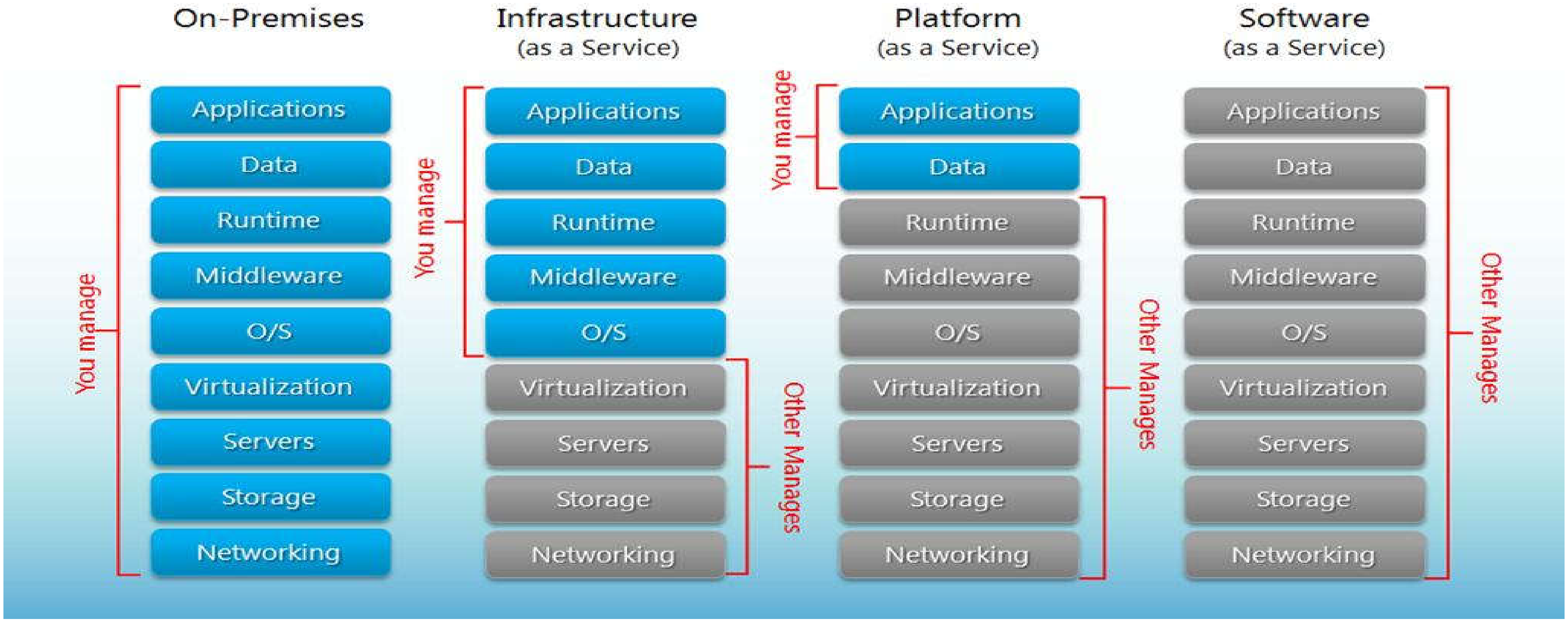
Cloud Computing is also a utility service - giving you access to technology resources managed by experts and available on-demand.

You simply access these services
over the internet, with no up-front costs and you pay
only for the resources you use.

Cloud Computing characteristics



Cloud Service Models



On-Premises

You manage

Applications
Data
Runtime
Middleware
O/S
Virtualization
Servers
Storage
Networking

Infrastructure
(as a Service)

You manage

Applications
Data
Runtime
Middleware
O/S

Other Manages

Virtualization
Servers
Storage
Networking

Platform
(as a Service)

You manage

Applications
Data

Other Manages

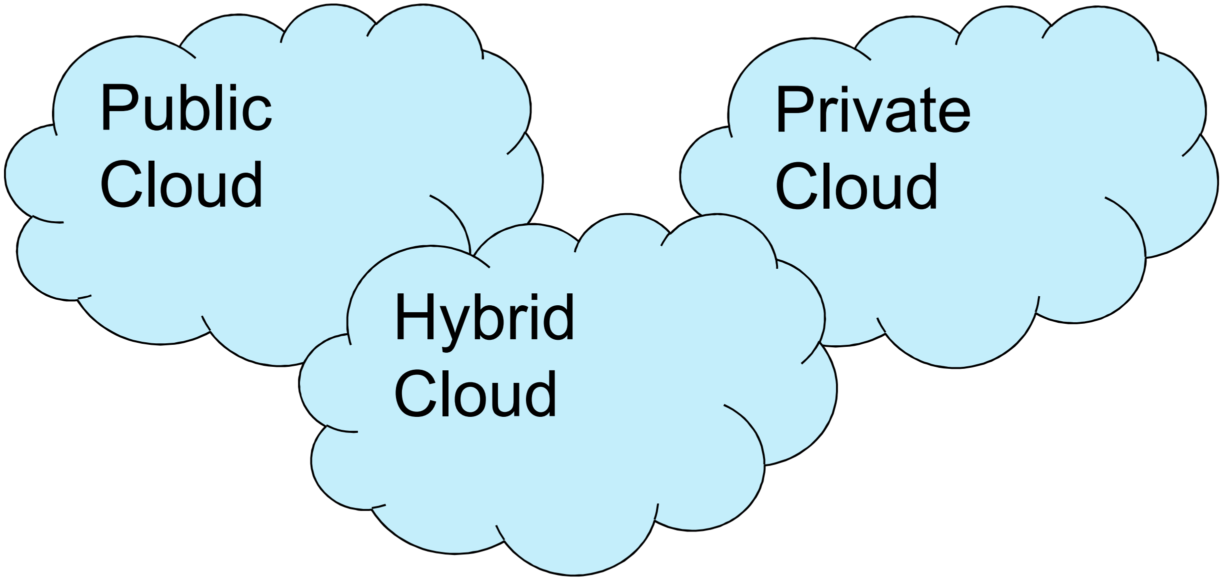
Runtime
Middleware
O/S
Virtualization
Servers
Storage
Networking

Software
(as a Service)

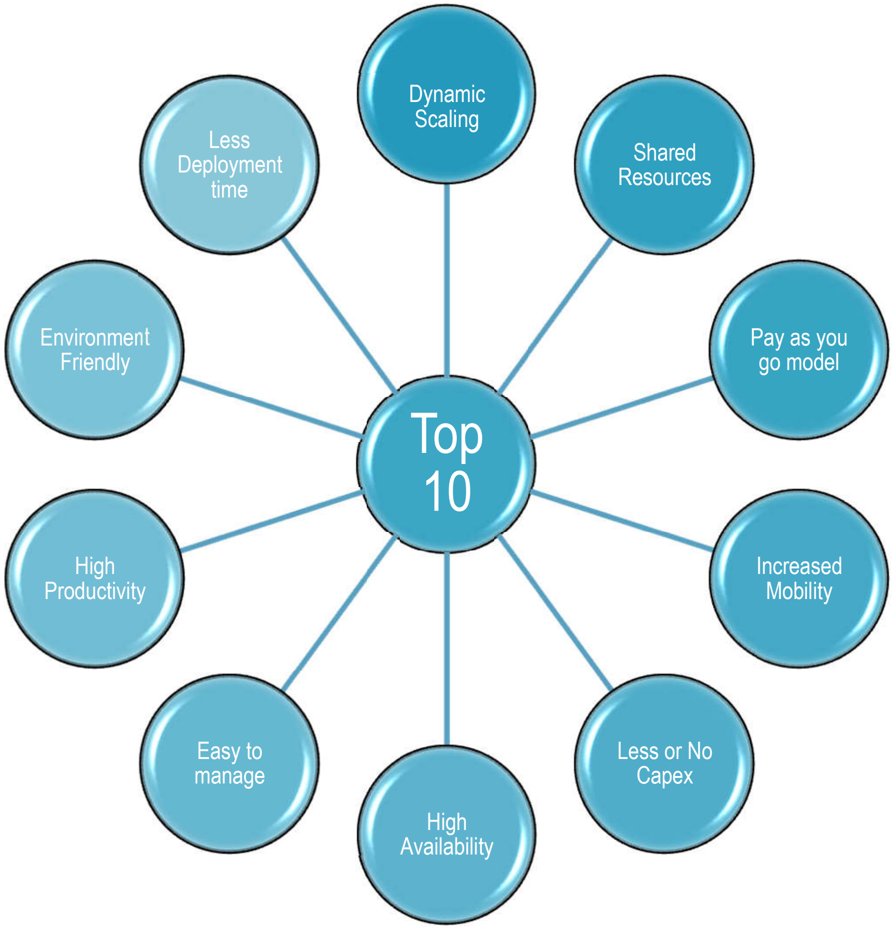
Other Manages

Applications
Data
Runtime
Middleware
O/S
Virtualization
Servers
Storage
Networking

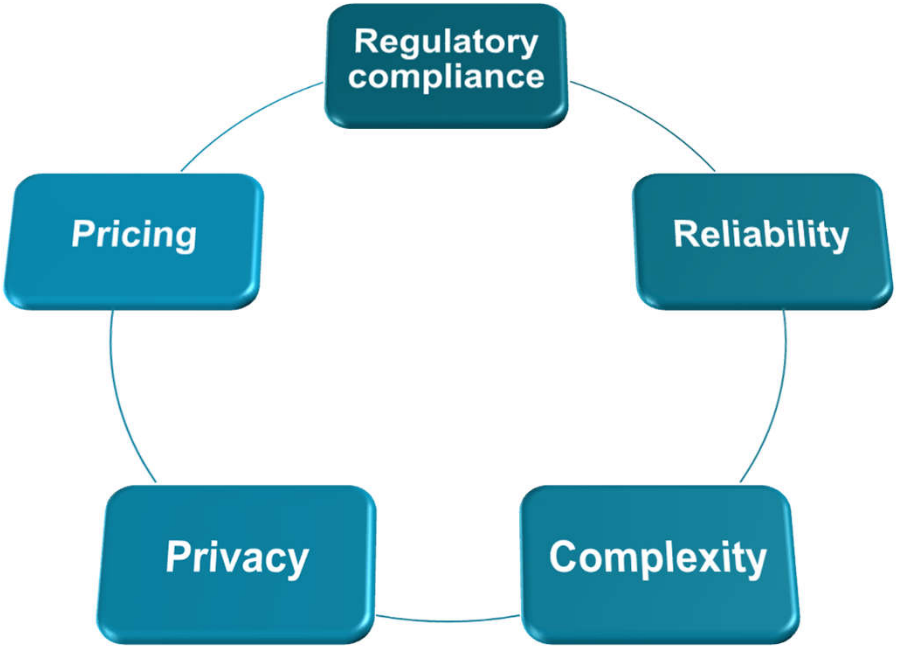
Cloud Deployment Models



Cloud Computing Benefits



Cloud Computing Concerns

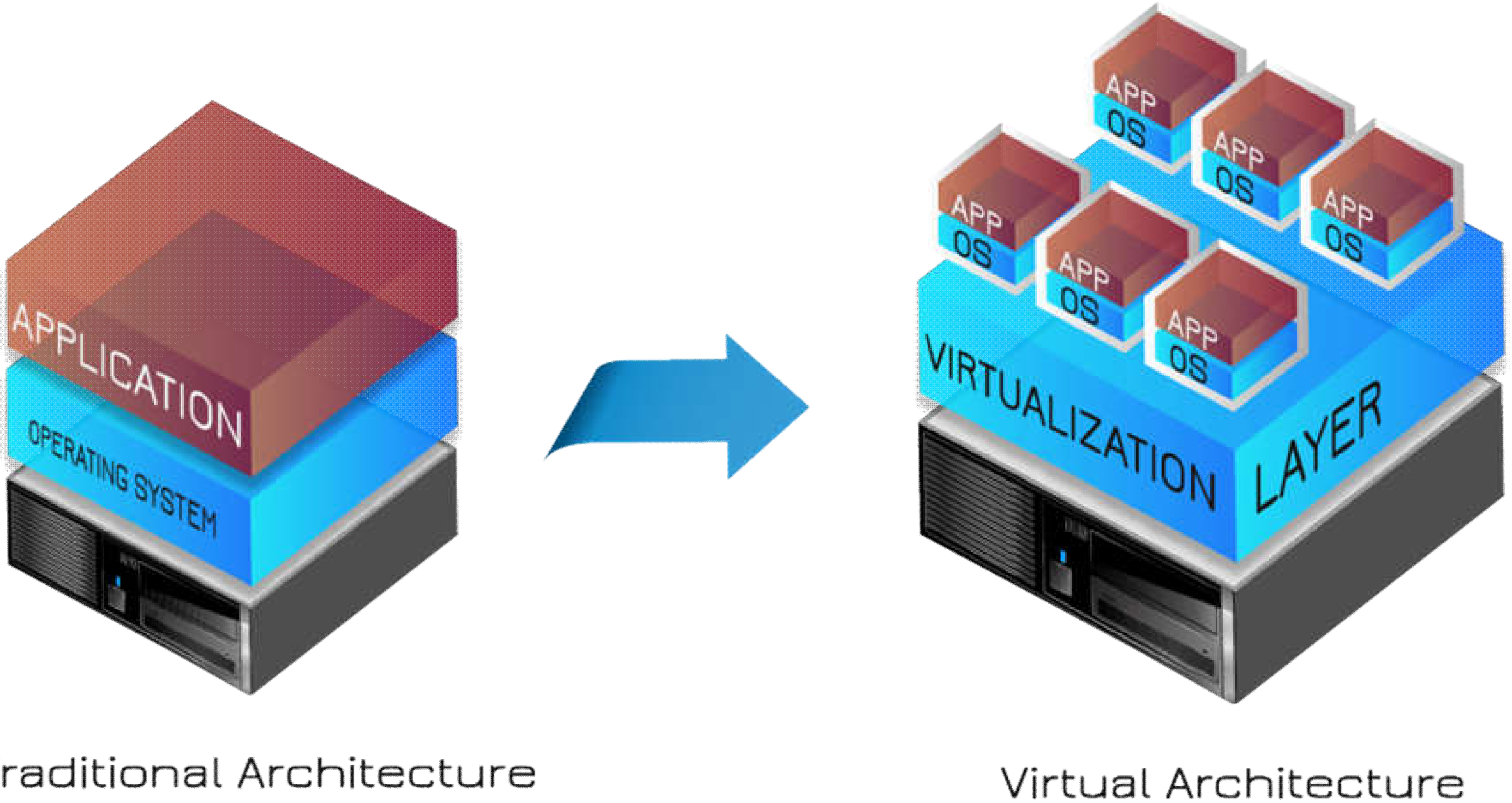


Virtualization Introduction

What is Virtualization

Virtualization, in computing, refers to the act of creating a virtual (rather than actual) version of something, including but not limited to a virtual computer hardware platform, operating system (OS), storage device, or computer network resources……wiki

What is Virtualization..Cont.



Traditional Architecture

Virtual Architecture

History of virtualization

- Virtualization was first implemented by IBM M44/44X

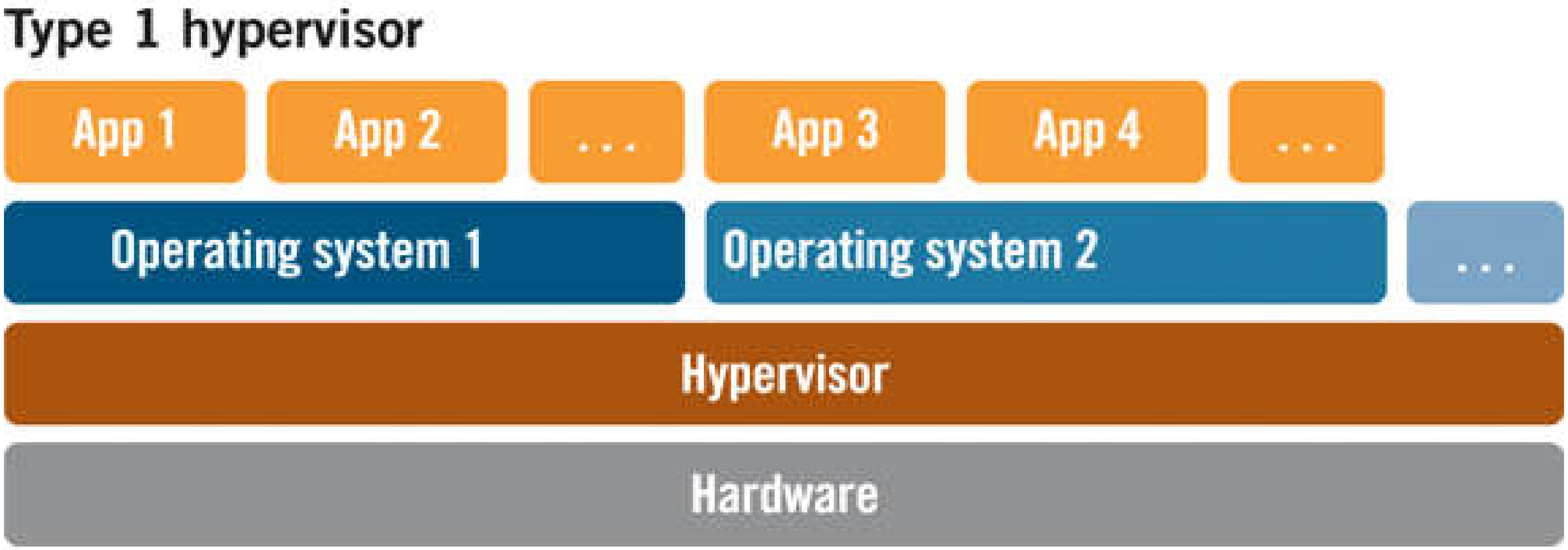
- Stopped virtualization in 1980-1990 due to the cheaper micro computers

- VMware started commercial virtualization 1999 with vmware workstation

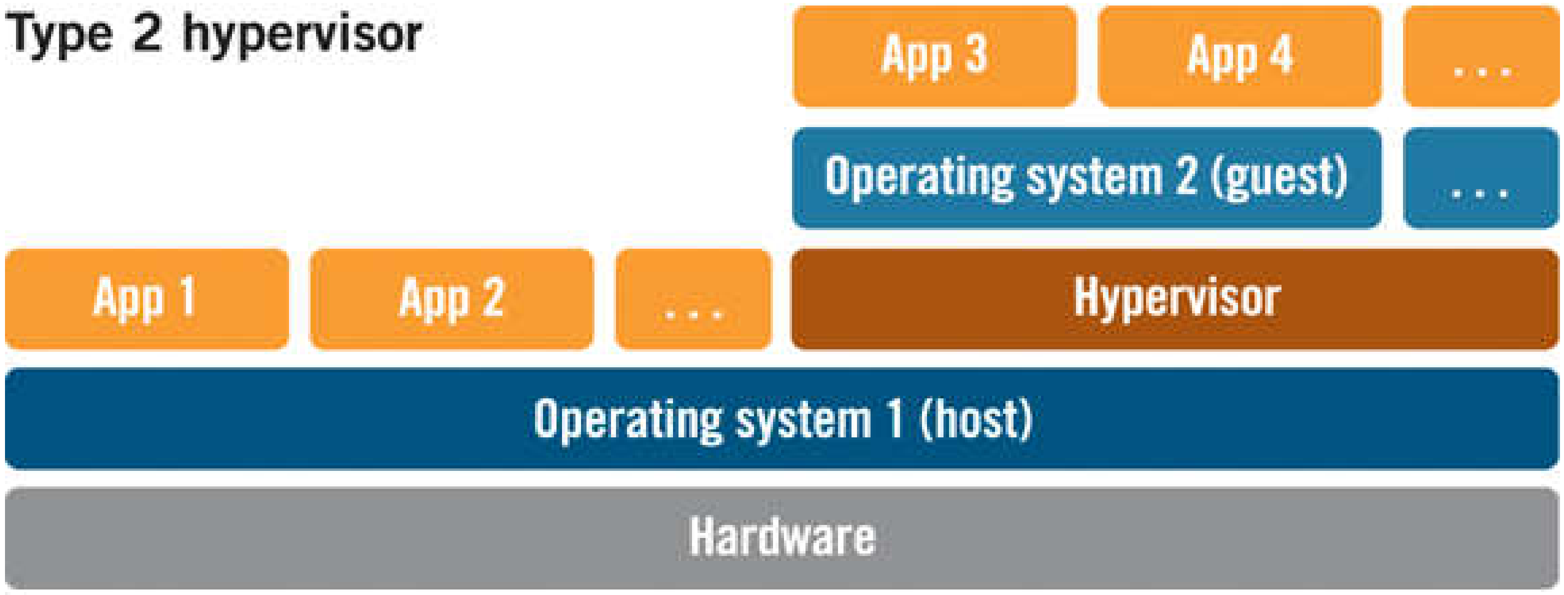
Benefits of virtualization

- Consolidation of servers
- Easy lifecycle management
- Multiple different OS’es on same hardware simultaneously
- Migrating OS’es
- Disaster Recovery
- Savings

Types of Virtualization.



Types of Virtualization..Cont.



Virtualization Software

- VMWare ESXi
- VMWare Workstation
- Oracle Virtual box
- Microsoft HyperV
- Citrix Xen
- Redhat-KVM

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