Kellton Tech Solutions, Inc.

DevOps

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IBM Lead Admin, DCE KelltonTech

About Kellton Tech

Infinite Possibilities with Technology

Milestones:

FY 2017
- $ 100 MN Run Rate.
- Acquired ProSoft Technology Group Inc., a US based ERP, EAI Solutions company.
- KLGAME was nominated in the finals of HYSEA Annual Summit and Awards 2015.
- Acquired Bokanyi Group, leading US based cloud and analytics service provider.

FY 2015
- $ 40 MN
- Acquired Supremesoft Global Inc., and eVantage Solutions Inc., US based IT consulting companies
- Acquired Vivos Professional Services LLC, a USA based focusing on life-sciences & healthcare space
- 21st in Deloitte Technology fast 50 India 2014
- Selected among the '20 Most Promising Travel & Hospitality Solution Providers' and 'Top 20 Enterprise Mobility Companies in India by CIO Review

FY 2013
- $ 10 MN
- Acquired and merged Tekriti Software Private Limited, a software services company focusing on web/open source
- Acquired SKAN DbyDx Software Private Limited, a mobility solutions company

FY 2009
- New management takes over led by Niranjan Chintam and Krishna Chintam

FY 1993
- Incorporated

Our Values:

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Who we are

We Are:

Thought Leaders in Technology Adoption:

As an early entrant in IoT and SMAC, we provide innovative transformation solutions to the clients leveraging cloud ERP solutions, digital business platforms, and digital systems integration

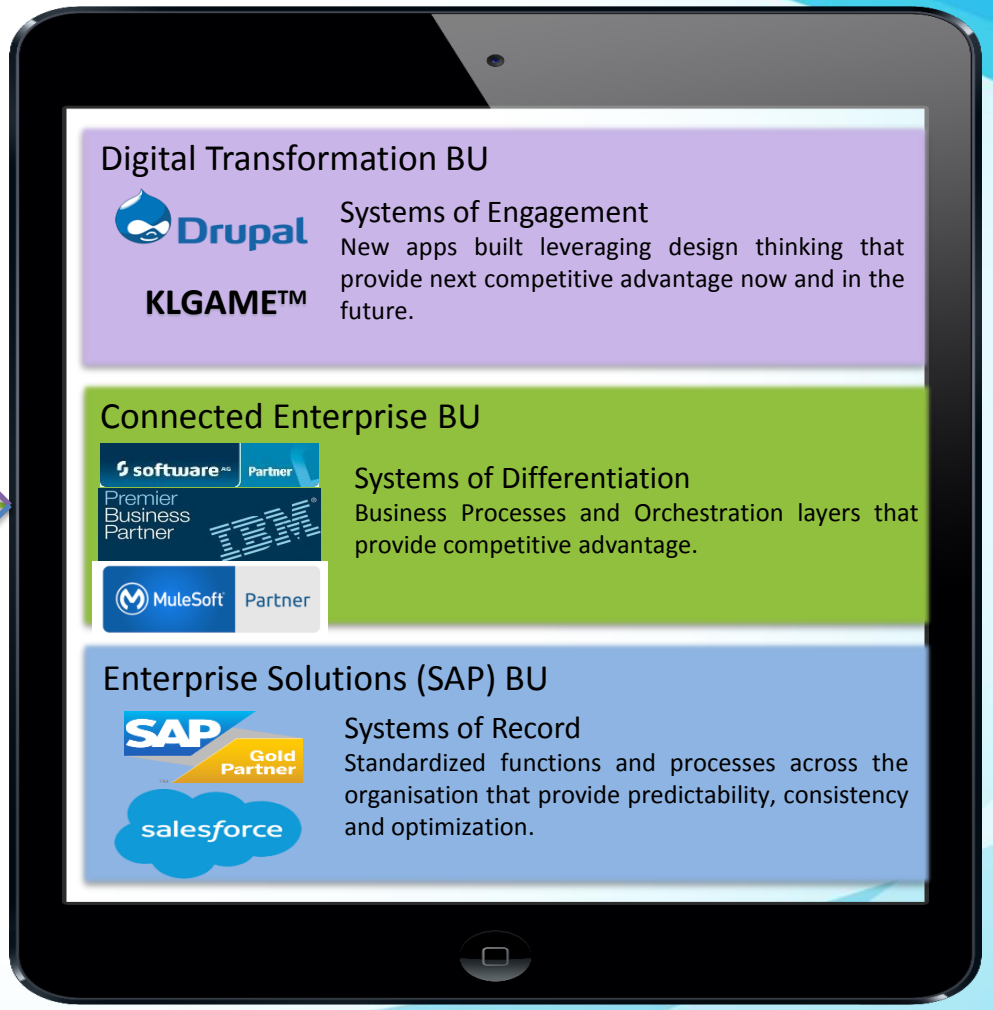
Focused on Design Thinking:

We understand the importance of digital customer experience and operational excellence and explore infinite possibilities with the technology to deliver desired business outcomes.

Disciplined and Experienced Team:

We hire the best talent, leverage the best practices from design, development and implementation of systems of record, differentiation, engagement and insight.

We Do:



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Our Numbers

Millions:
Software we have developed is being used by millions of people worldwide.

600:
We have partnered with more than 600 innovative clients (39 Fortune 1000) in Healthcare, Retail, Insurance, Media, Software and Technology industries.

2 Million:
We perform more than 2 Million hours of engineering work for our clients every year.

1100+ People:
Headquartered in Princeton, NJ we have global delivery centers across US, UK, and India

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DCE - Partial Customers by Industry

Retail	Manufacturing	Energy Utilities	Financials Services	Others
J.CREW	JACK LINK'S BEEF JERKY	AEP AMERICAN ELECTRIC POWER		STARBUCKS COFFEE
STAPLES that was easy.	Electrolux	bp	Vantive.	UNIVISION COMMUNICATIONS INC
DISCOUNT TIRE	ThyssenKrupp	TESORO	unum	DealerTrack
BIG LOTS!	US FOODS	DUKE ENERGY	BANK OF THE WEST	LUTRON
POLO RALPH LAUREN	Don	OUC The Reliable One	JPMorgan	PerkinElmer For the Better
Dunn-Edwards PAINTS	MOMENTIVE	MARATHON	Fidelity INVESTMENTS	Marriott
Citizia	KOMATSU	VALERO	NJM Insurance Group	ESTES
Delek US	Johnson & Johnson	FirstEnergy	PNCBANK	UNITED

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Digital Connected Enterprise BU – Core Services Portfolio

- Digital Transformation and Enterprise Architecture Strategy – Advisory Services
- API / SOA / ESB Core Application Integration – API/SOA Strategy, Governance and COE
- BPM Solutions with Business Workflows, Rules, Analytics and Dashboards
- Distributed In-Memory Data Solutions for High Throughput and Low Latency Applications
- Real-time and Streaming Analytics Solutions in IoT and Big Data Applications
- SaaS Integration, Cloud Enablement and Hybrid Infrastructure Services
- Infrastructure Modernization, Continuous Integration / Dev-Ops Services and AMS

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DCE - Technology Partnerships

Digital Connected Enterprise – Core Technology Expertise

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IBM WebSphere Cast Iron Cloud Integration

IBM Business Process Manager

IBM WebSphere

IBM DataPower

BlueworksLive

IBM Bluemix

SOFTLAYER an IBM Company

IBM InfoSphere Guardium

WebSphere Message Broker

webMethods

Software AG Cloud
Powering the Digital Enterprise

TERRACOTTA by Software AG

APAMA

Universal Messaging

WEBMETHODS AgileApps Cloud

CentraSite

ALFABET by Software AG

informatica powercenter

Anypoint Platform

Premier Business Partner IBM

software AG Partner

MuleSoft

informatica

ca technologies

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Industry Solutions and Domain Expertise

Banking and Finance

- ✓ Treasury Services – Payment and Forex Gateways
- ✓ SWIFT Integration
- ✓ Business Process modeling and Optimi
  - Loan Origination
  - Account Opening
  - Risk and Regulatory

Retail and Manufacturing

- ✓ ERP Integration
- ✓ Omni Channel Services Architecture
- ✓ PoS and eCommerce Integration

Transportation and Logistics

- ✓ Fleet Management and Real-time On-Board Application services
- ✓ B2B and Vendor Managed Inventory Solutions

Energy and Utilities

- ✓ Energy Trading and Power Scheduling
- ✓ RTO Integration and Market Participation
- ✓ Smart Grid Integration and enablement

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Our Practices and Technology Centers of Excellence

- Dedicated and Focused Integration and Middleware Expertise
- Extensive experience in Strategic Advisory and Architecture from proven success stories – over 20 years
- Being an equal partner of multiple technologies and vendors, Our solutions are technology agnostic and more focused in solving problems the right-way rather than be biased on a particular technology approach
- Strong Center of Excellence (CoE) focused on maturing architectural paradigms like API, SOA, BPM, BAM, CAF, EDA and many more
- Heavily invested into non-revenue generating operations and initiatives to develop and prove concepts and solutions on behalf of our customers - LABS

- ✓ Integration CoE
- ✓ BPM CoE
- ✓ Cloud CoE
- ✓ MuleSoft CoE
- ✓ webMethods CoE
- ✓ Terracotta/BigMemory CoE
- ✓ IBM IIB CoE
- ✓ Informatica / ETL CoE

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Our People and How we are engaged

- IT / Business Strategists and Advisors for focused engagements
- 200+ Senior Technology specific Engineers across various supported technologies
- 80+ on-going engagements across many industries
- All consultants are Certified professionals with cross domain vertical experience
- Extensive and Mandatory training programs
- Global delivery model (Onshore/Offsite/Offshore) from North America, Europe and India for Design, Build and Run services
- Preferred to be Engaged as Trusted Partner providing for all resource and project needs of the domain and bringing about overall reduction in TCO in all phases
- Short-term, Project-Based, Fixed-Cost and T&M are also common models

- ✓ Enterprise Architects
- ✓ Solution Engineers
- ✓ Integration/Middleware Architects
- ✓ Project Managers
- ✓ Senior Developers
- ✓ Testers
- ✓ Support Analysts
- ✓ Trainers

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Key differentiators – Digital Transformation Experts

- Our approach to partnership is by building repeatable solutions, best practices, frameworks to leverage our prior experience with customer eco system to deliver high quality value added services
- Over 17 years of EAI, B2B, CEP, BPM, BAM and Cloud expertise
  - ✓ Specialized Integration/Middleware/Analytics/Cloud consulting services provider
  - ✓ Proven API/SOA/ESB Reference Architecture for agile solution development and delivery
  - ✓ Indigenously developed tools and framework to optimize the application management/administration
- 3-Tier Global delivery model – onsite/offsite/offshore
- Managed Services in Application Management and Project/Solution Delivery

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Agenda

- Overview of DevOps
- DevOps implementation with tools
- Overview of Chef
- A Client Case Study

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- Overview of DevOps

DevOps

- What is DevOps

DevOps is the practice of operations and development engineers participating together in the entire service lifecycle, from design through the development process to production support.

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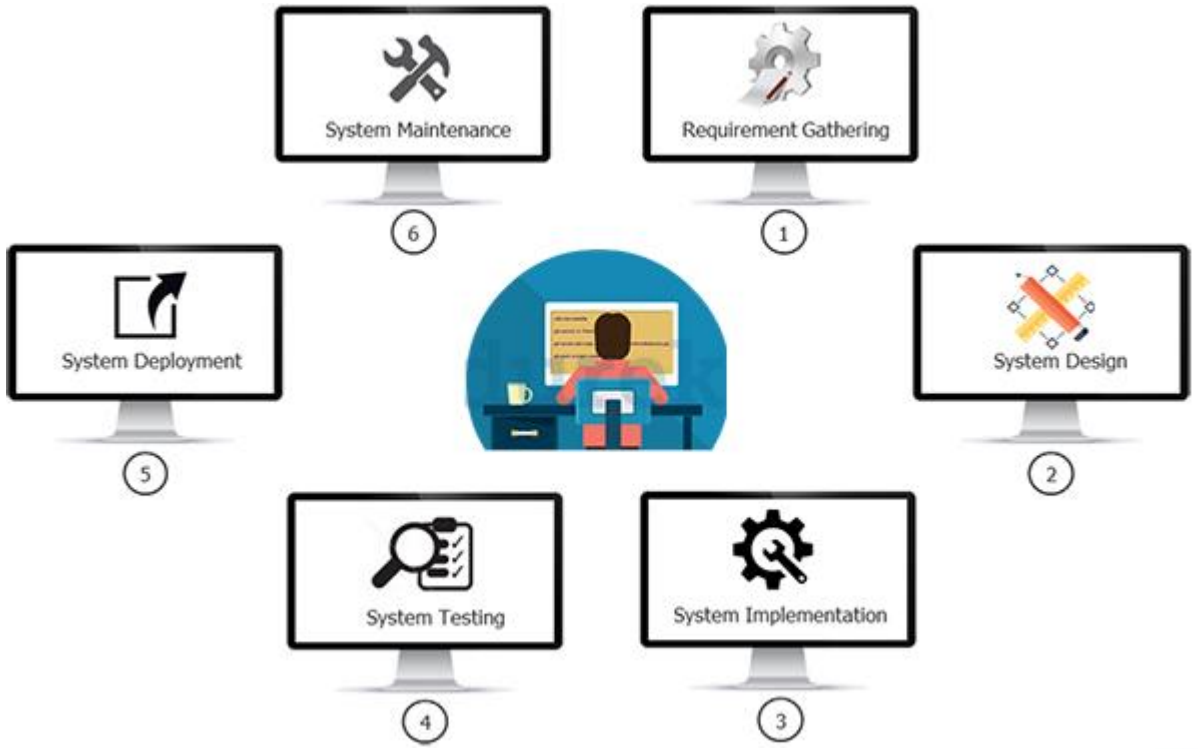
Prior to DevOps : WaterFall Model



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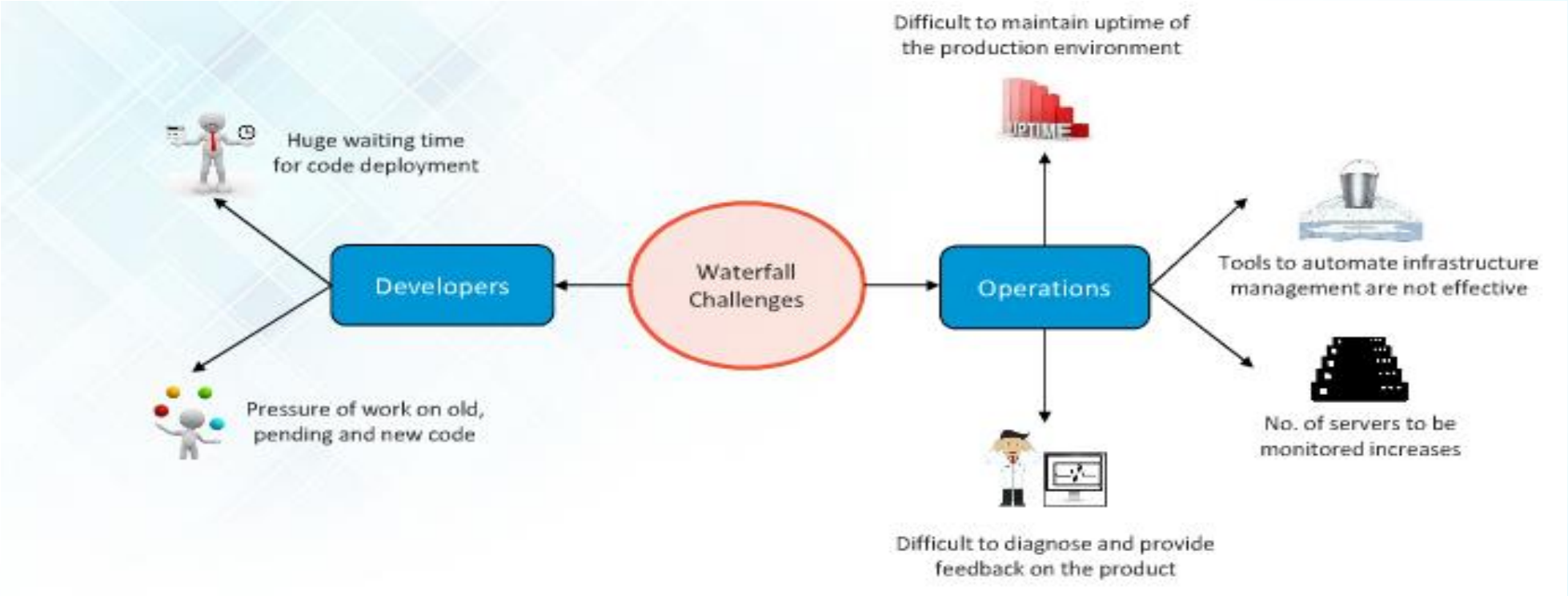
Waterfall Model Challenges



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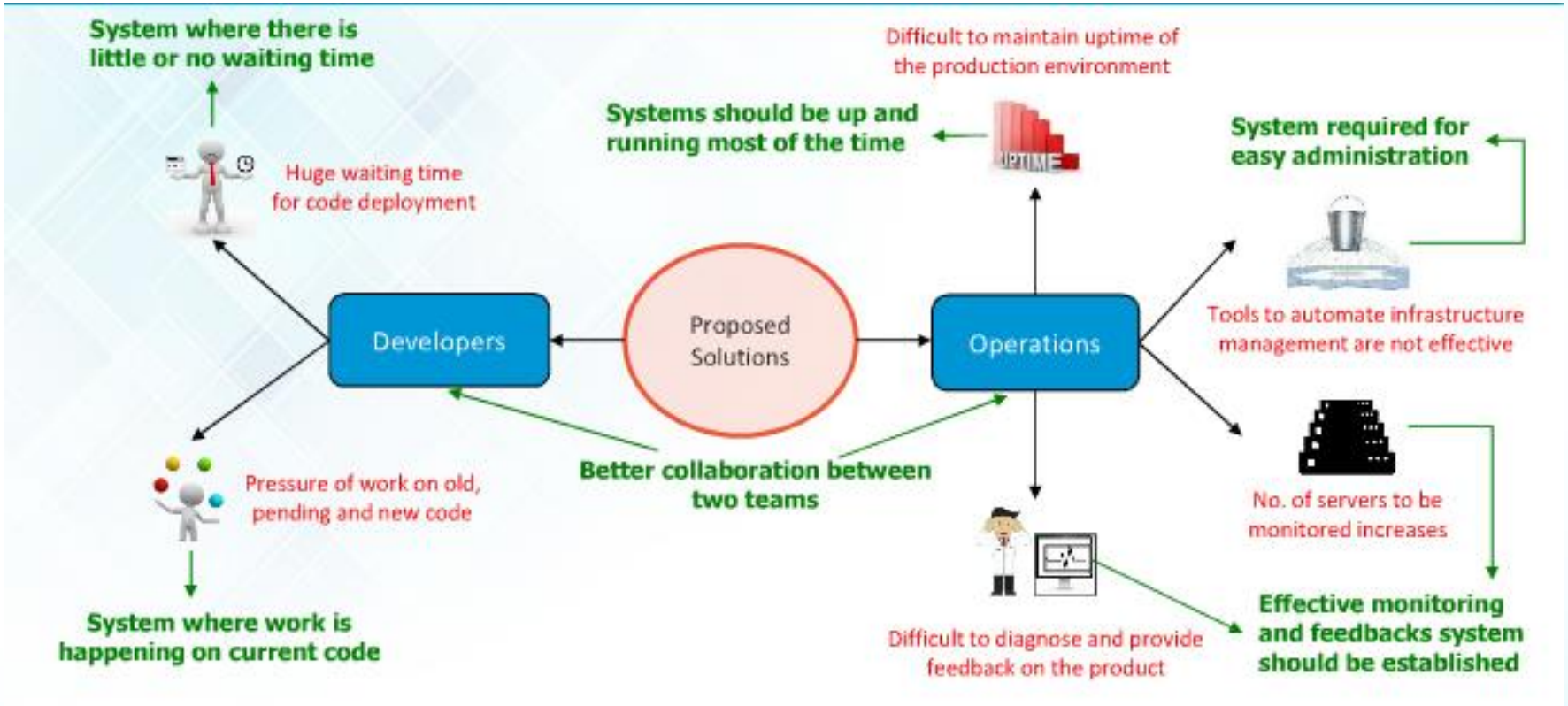
Solution to Challenges of WaterFall Model



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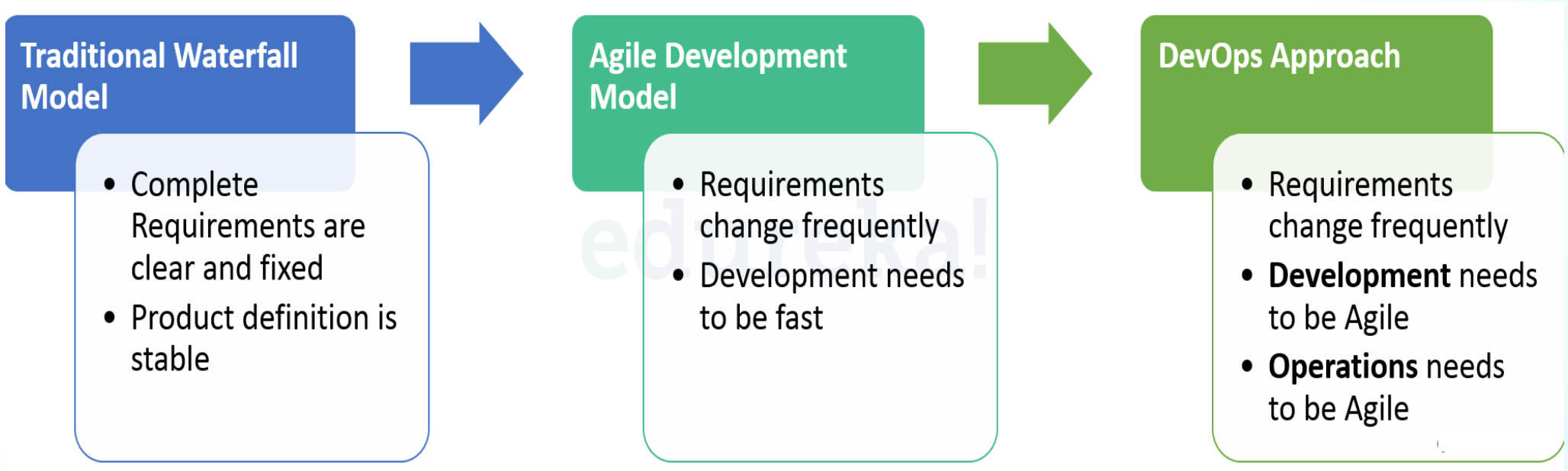
Evolution of DevOps



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Agile Model

- Agile model is a combination of iterative and incremental process models With focus on process adaptability and customer satisfaction by rapid delivery of working software product.
- Agile Methods break the product into small incremental builds.
- Agile SCRUM approach brought agility to development
- Lack of collaboration between Developers and Operations Engineers still slowed down the development process and releases

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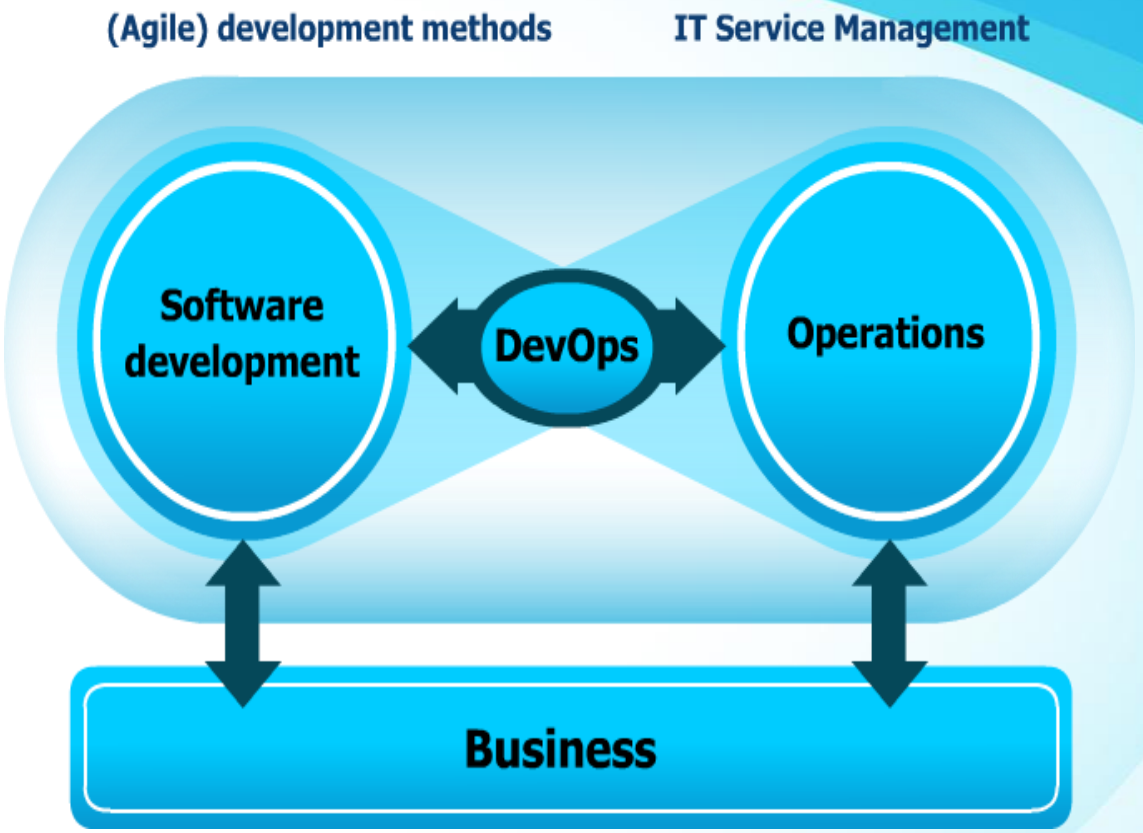
DevOps Model

- DevOps links software development to operations.
- It also bridges the gap between agile software development and operations experiences.
- All experts have at least a basic understanding of others business subjects.



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DevOps for Dev Challenges

	Dev Challenges	DevOps Solution
	Waiting time for code deployment	• Continuous Integration ensures there is quick deployment of code, faster testing and speedy feedback mechanism • Thus there is no waiting time to deploy the code. Hence the developer focuses on building the current code
	Pressure of work on old, pending and new code	

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DevOps for Ops Challenges

	Ops Challenges	DevOps Solution
	Difficult to maintain uptime of the production environment	Containerization / Virtualization ensures there is a simulated environment created to run the software as containers offer great reliability for service uptime
	Tools to automate infrastructure management are not effective	Configuration Management helps you to organize and execute configuration plans, consistently provision the system, and proactively manage their infrastructure
	No. of servers to be monitored increases	Continuous Monitoring Effective monitoring and feedbacks system is established through Nagios Thus effective administration is assured
	Difficult to diagnose and provide feedback on the product	

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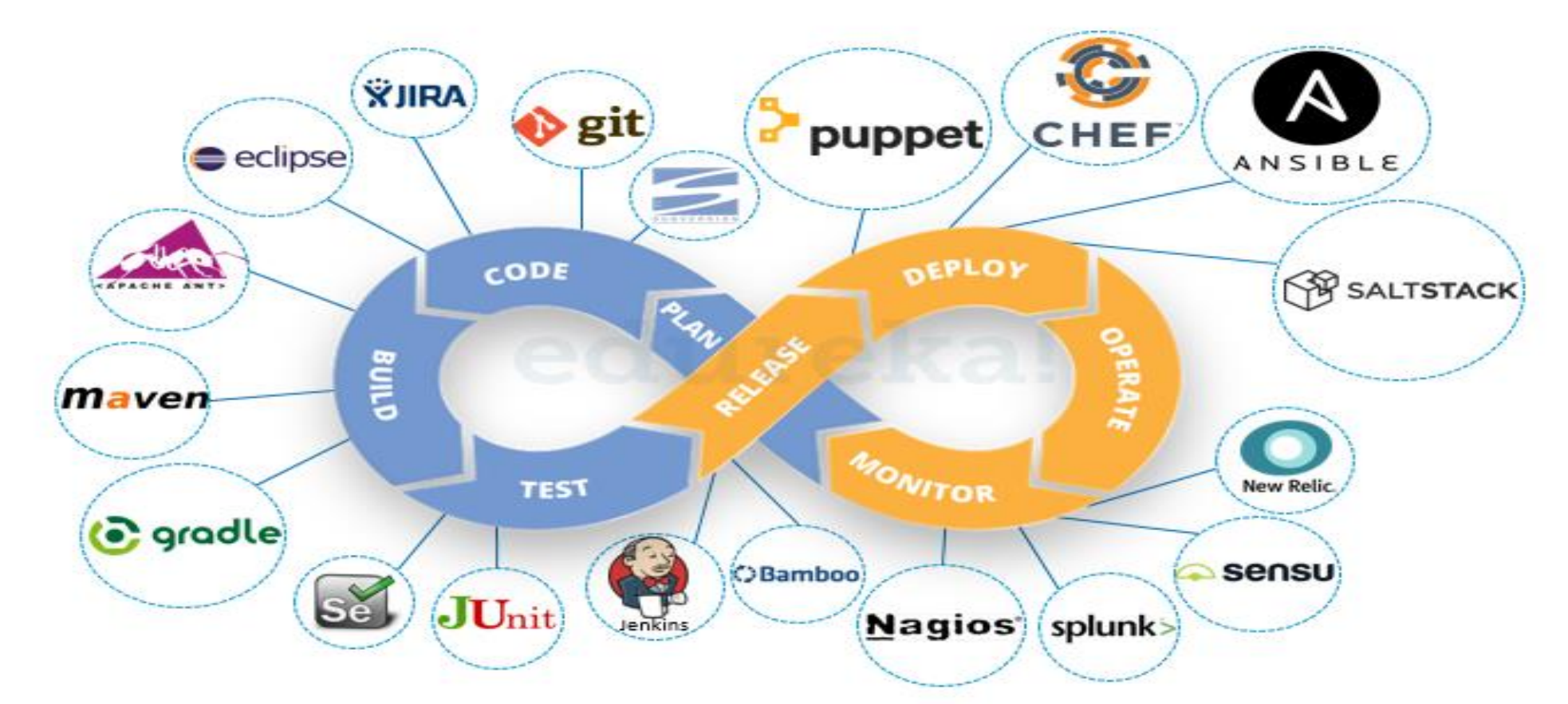
DevOps - LifeCycle



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DevOps: LifeCycle

- DevOps Lifecycle can be broadly broken down into the below DevOps Stages:
  - Continuous Development
  - Continuous Integration
  - Continuous Testing
  - Continuous Monitoring
  - Virtualization and Containerization

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DevOps : Benefits

- Technical benefits
- Business benefits
- Cultural benefits

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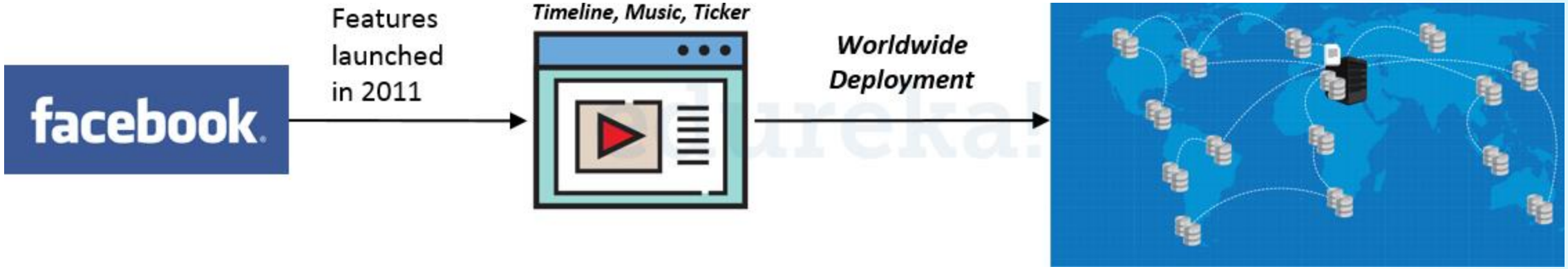
Case Study: With Out DevOps



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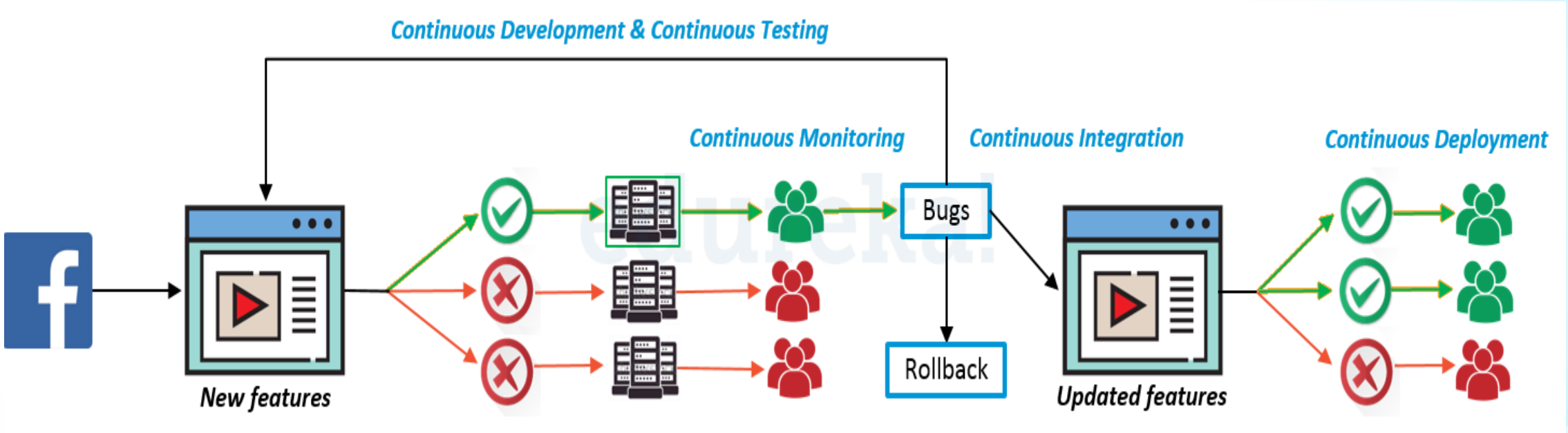
Case Study : With DevOps



- DevOps Implementation Tools
  - Continuous Development
  - Continuous Integration
  - Continuous Testing
  - -Continuous Deployment

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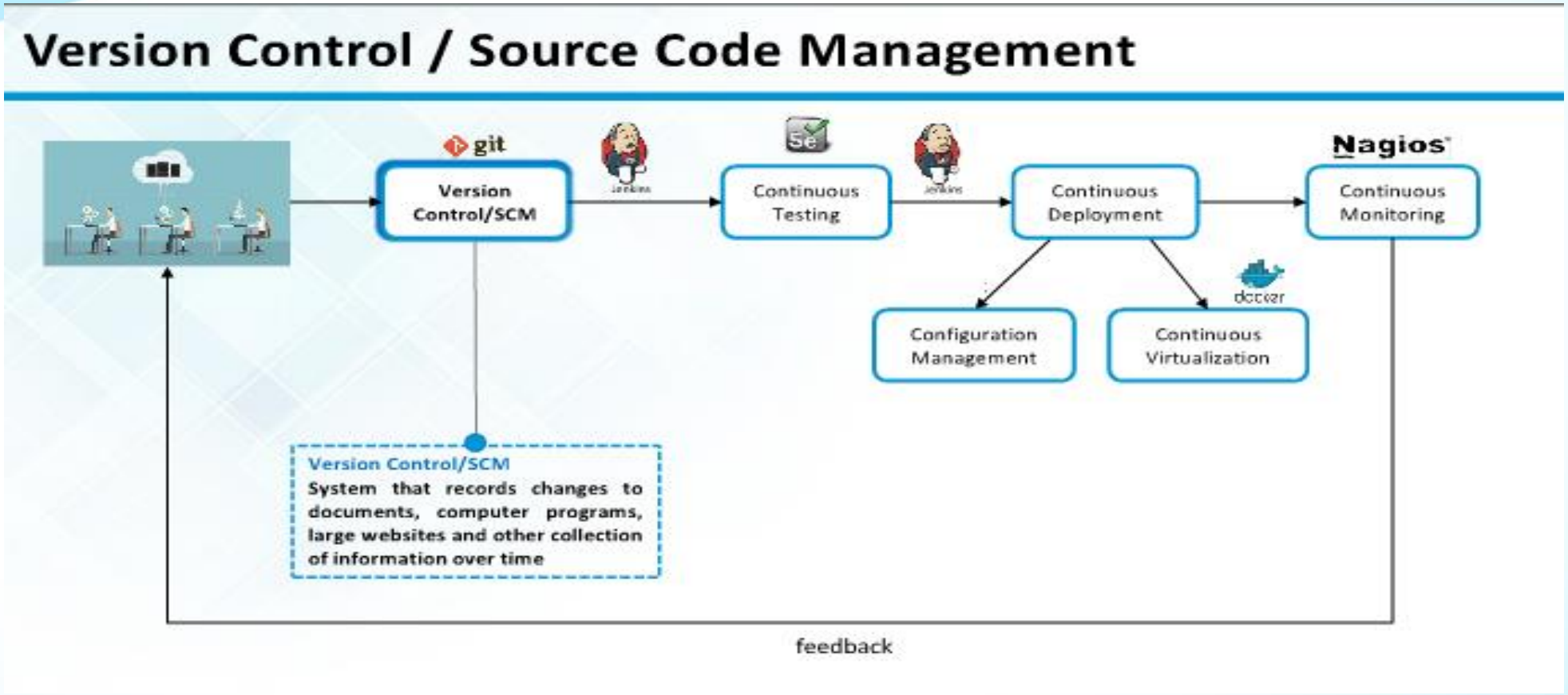
Continuous Development : Git Hub



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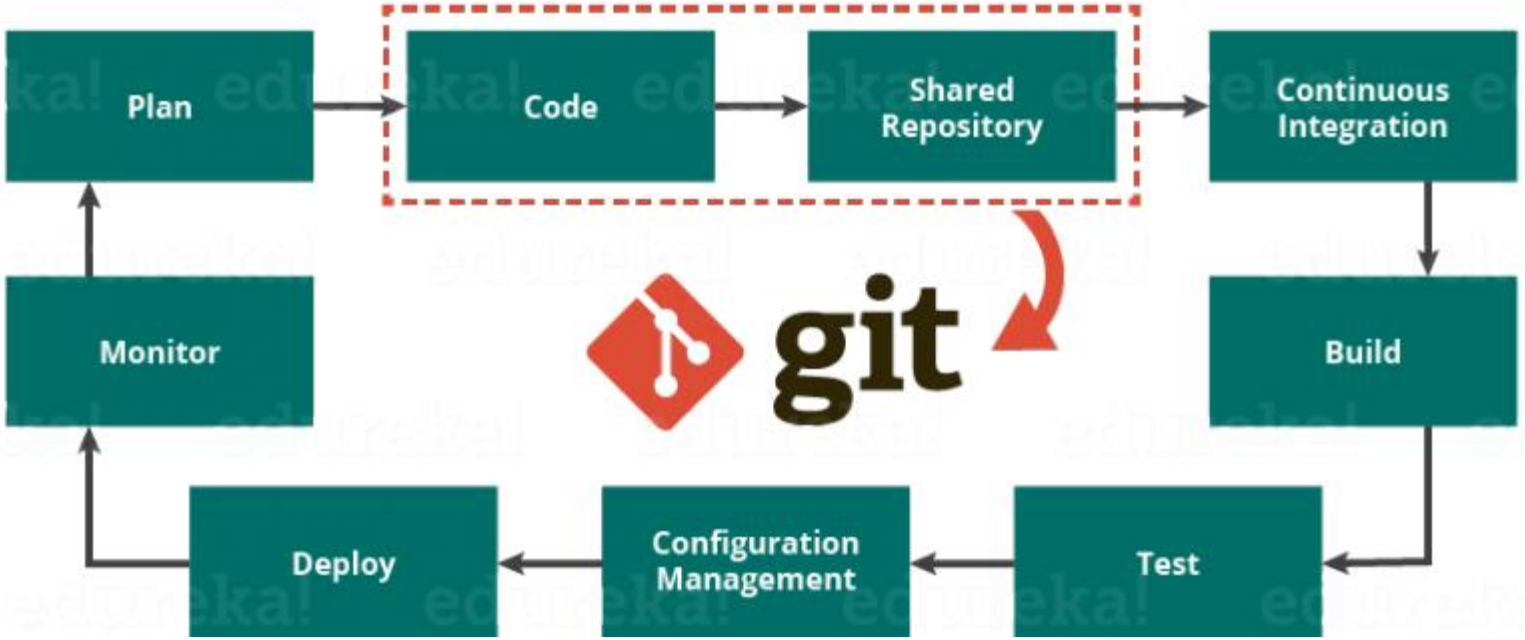
Role of GIT in DevOps



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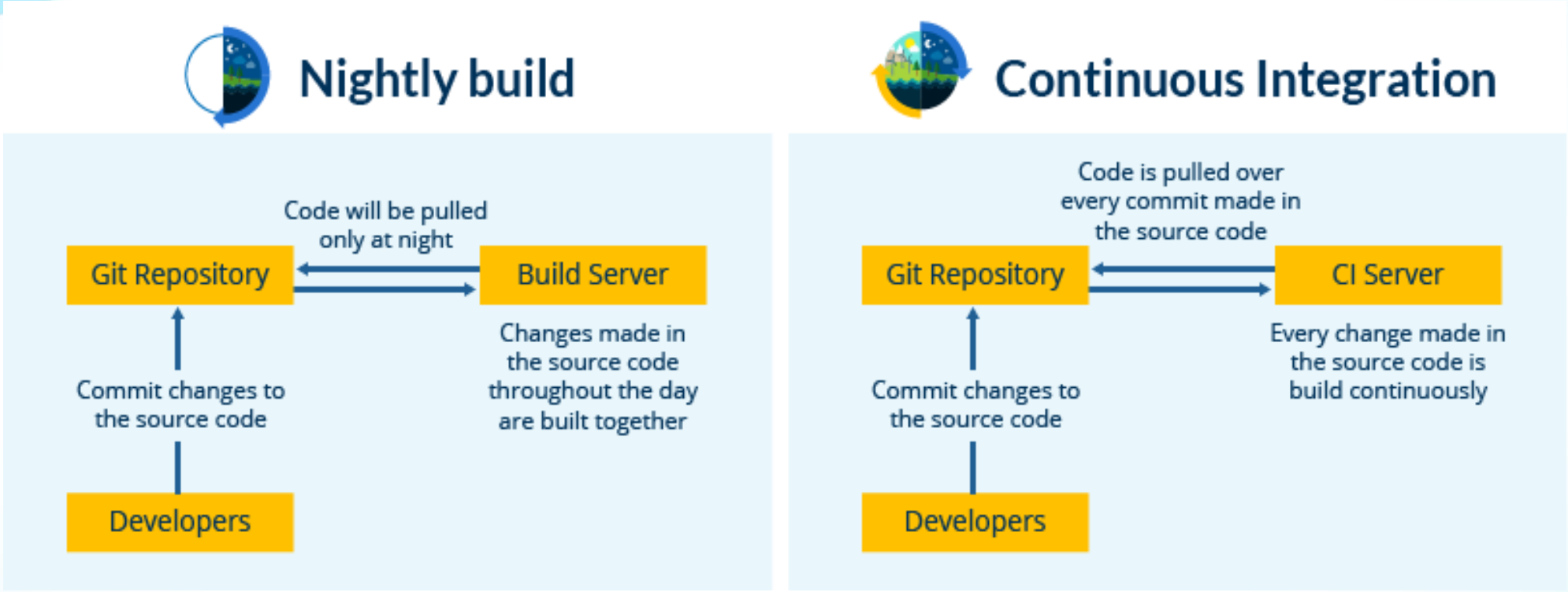
Continuous Integration



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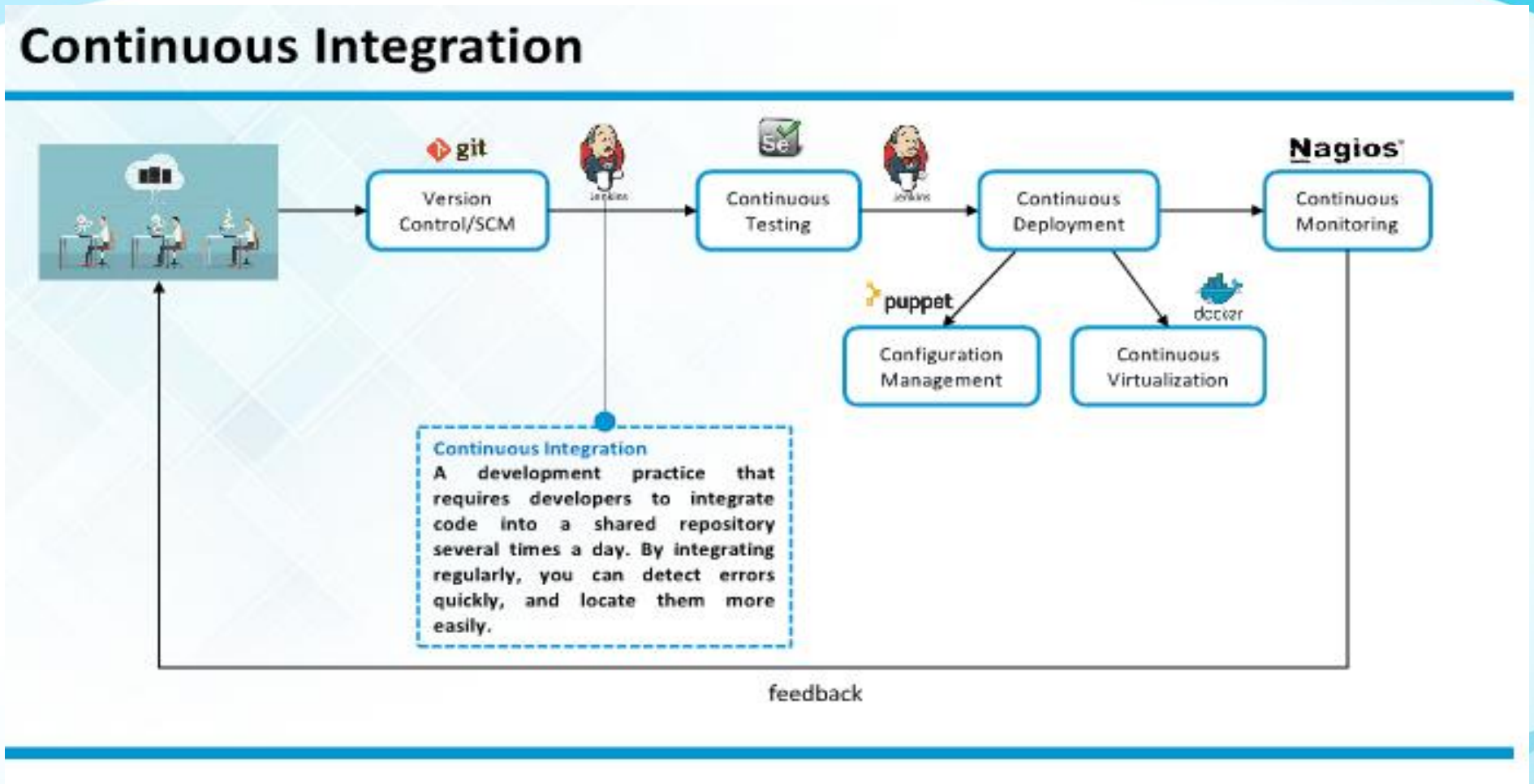
Where does Jenkins fit ?



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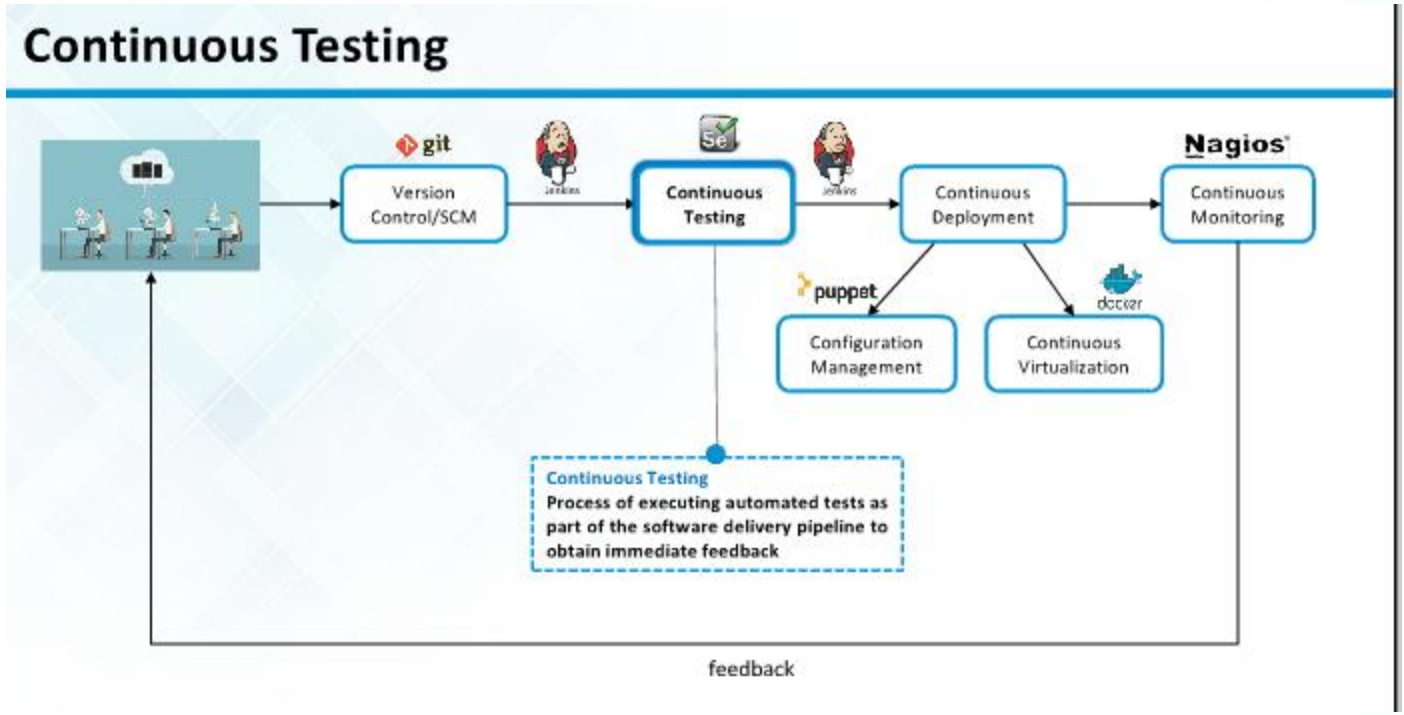
Continuous Testing



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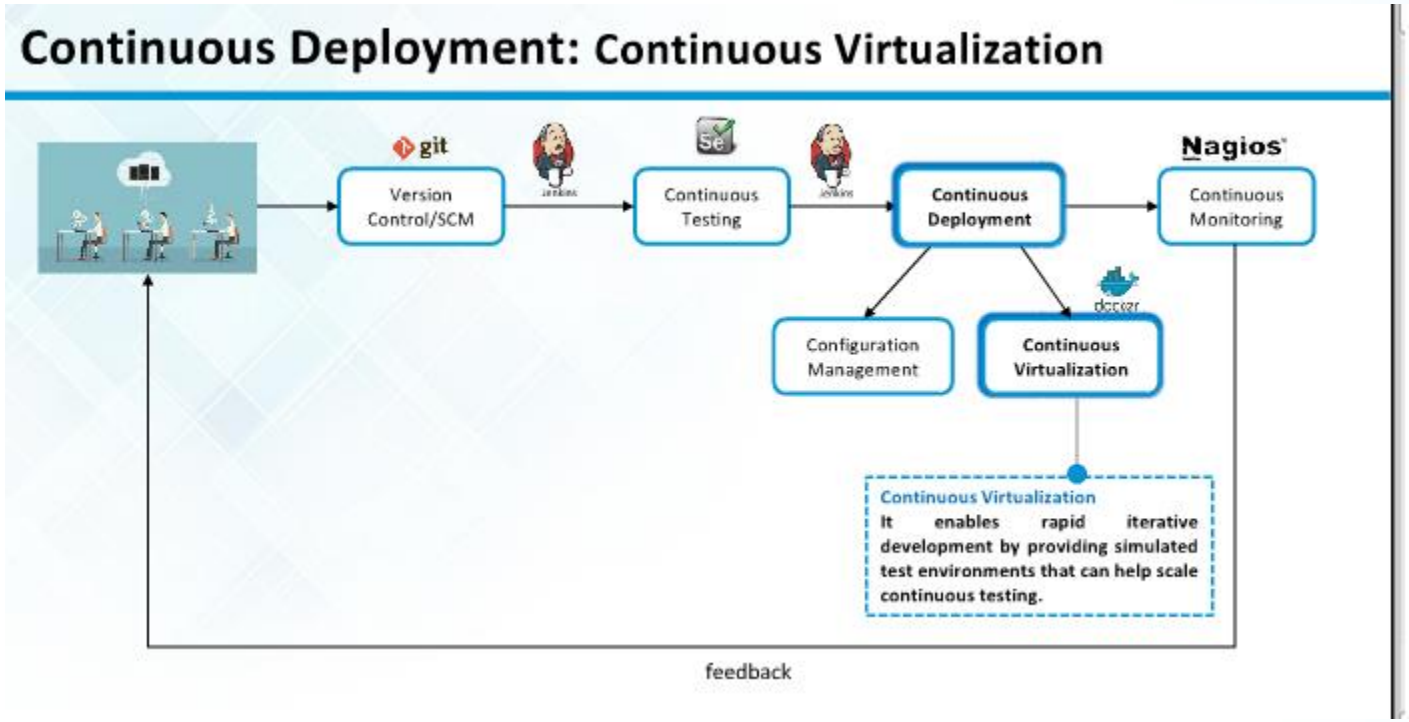
Continuous Virtualization



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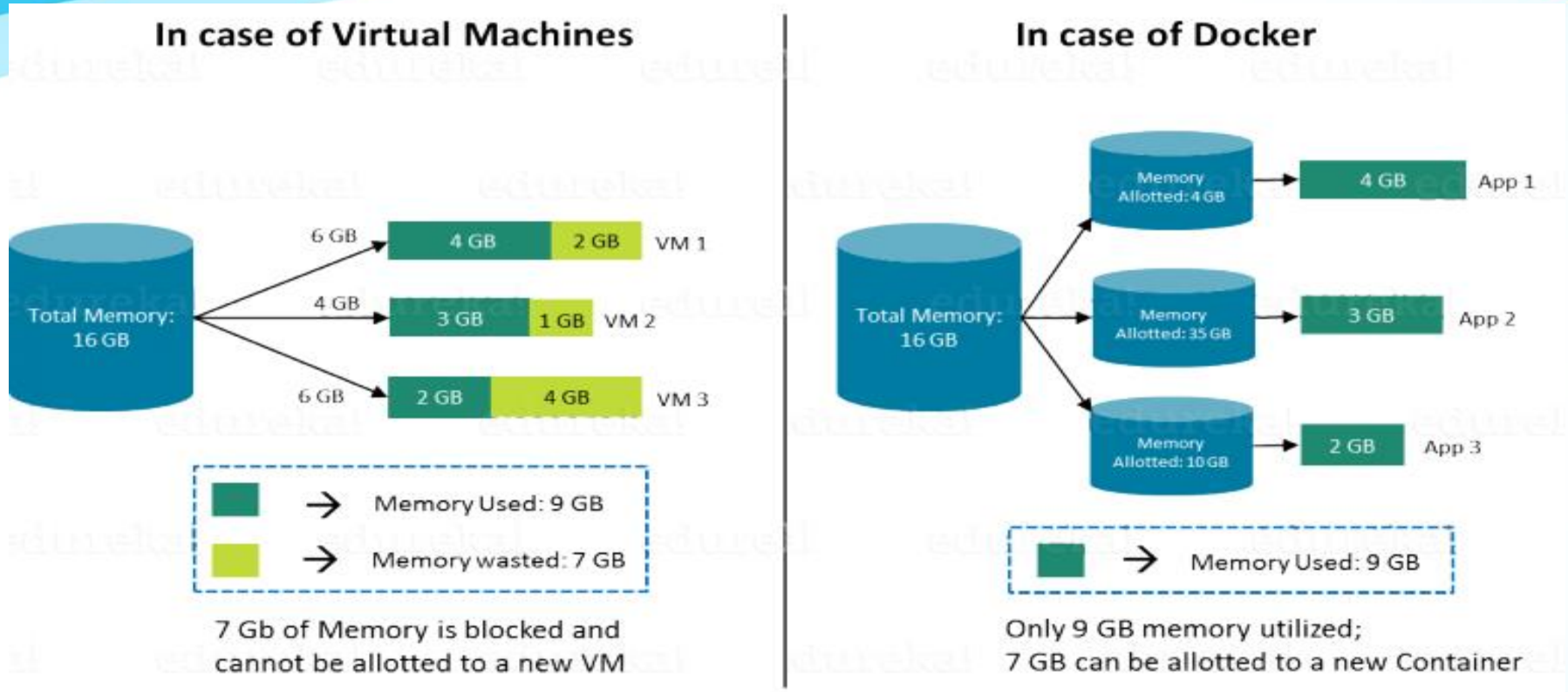
Containerization Vs Virtualization



- DevOps Implementation Tools
  - Continuous Deployment

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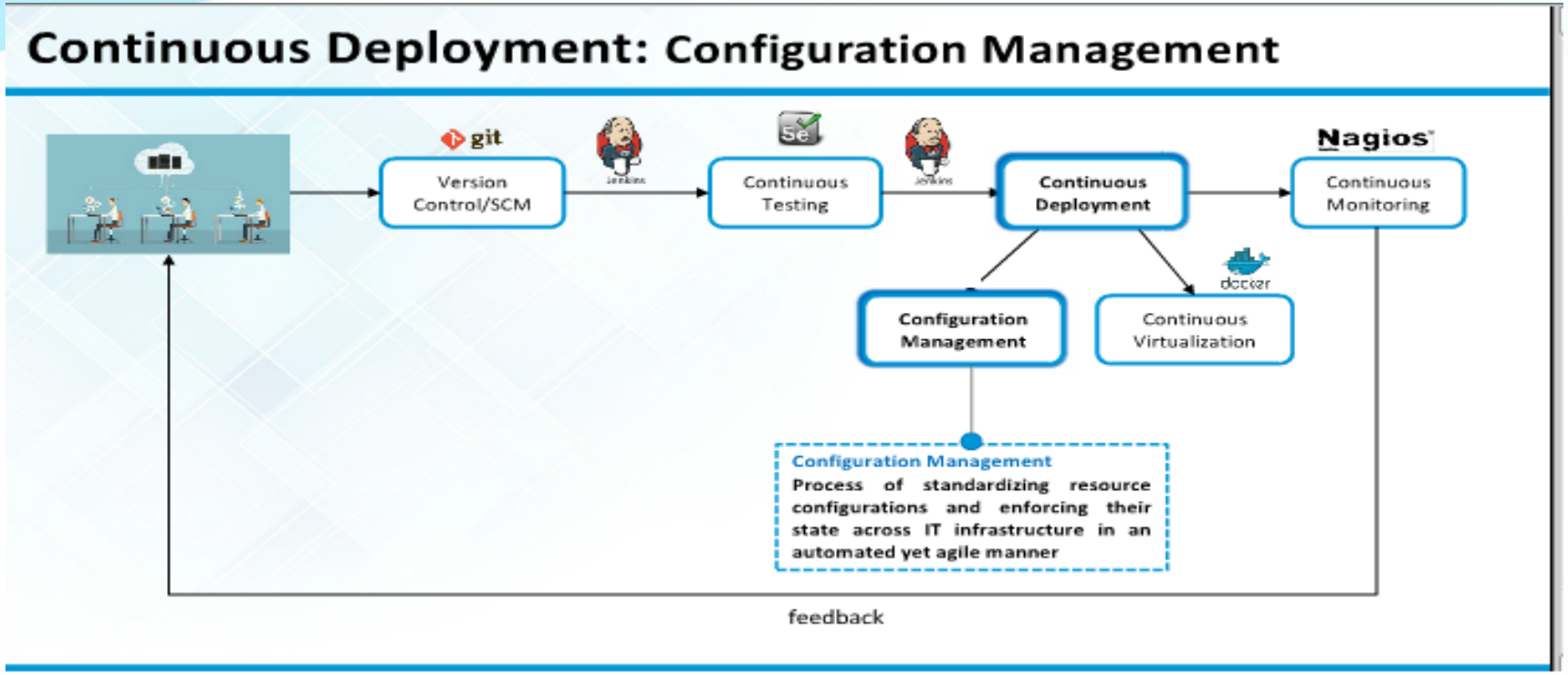
Continuous Deployment



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Continuous deployment: Chef

- Chef is an automation tool that provides a way to define infrastructure as code.
- Infrastructure as code (IAC) simply means that managing infrastructure by writing code (Automating infrastructure) rather than using manual processes.
- It can also be termed as programmable infrastructure.
- Chef uses a pure-Ruby, domain-specific language (DSL) for writing system configurations.

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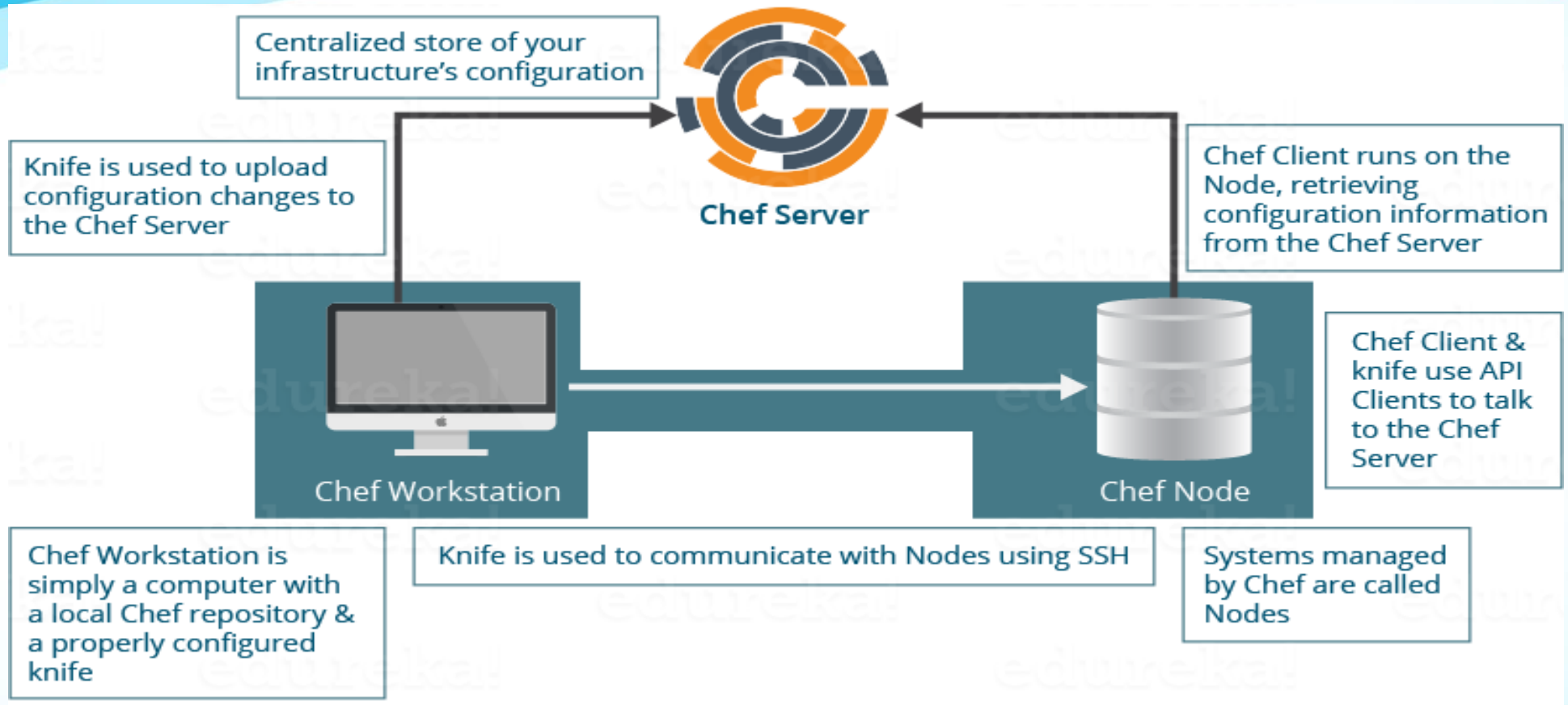
Chef Standalone Architecture



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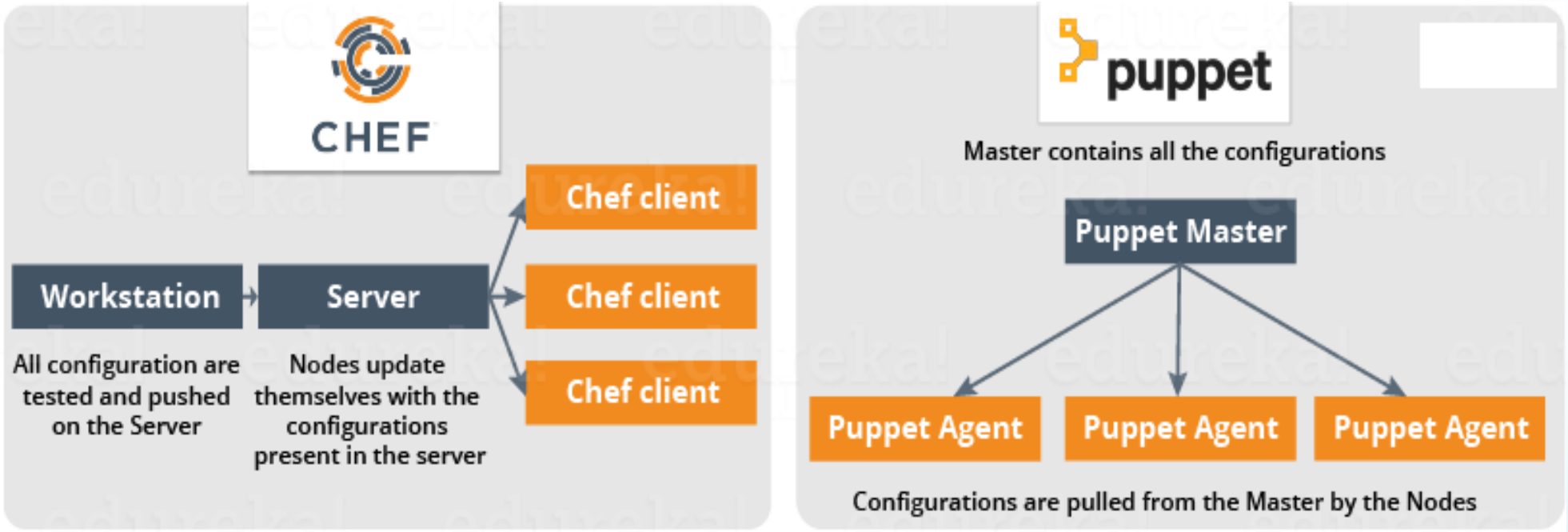
Chef : Distributed Architecture

Master Slave Architecture



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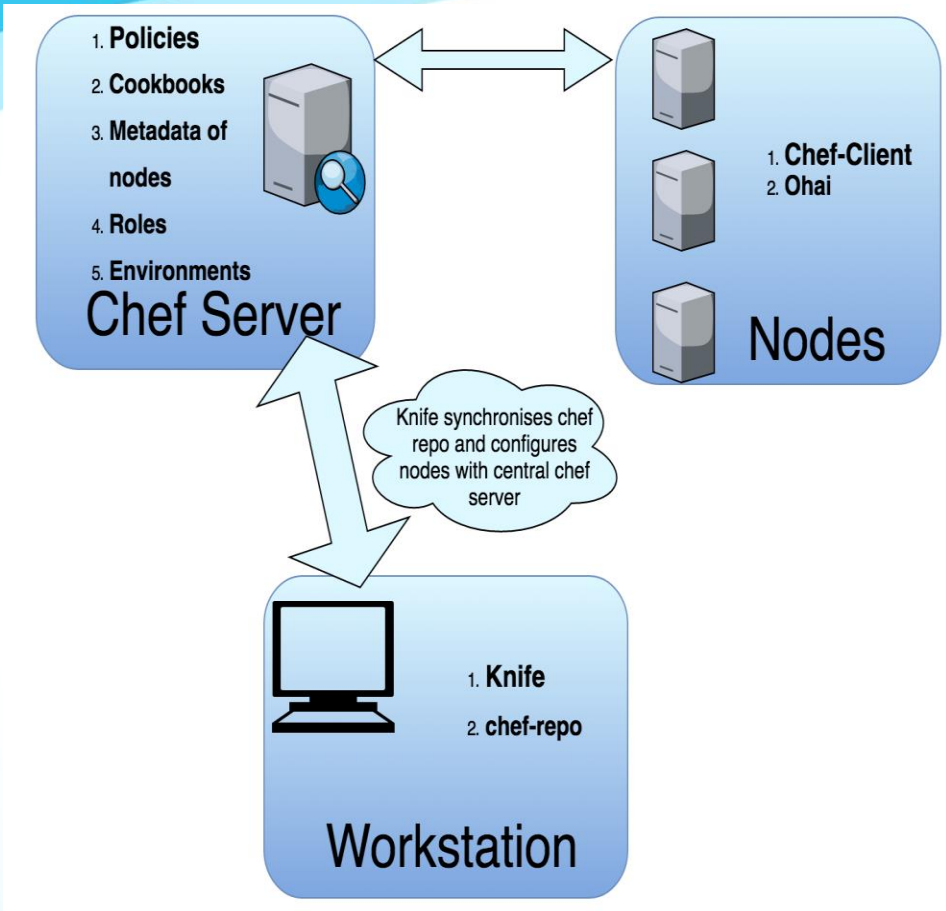
Chef Components



Chef Server :

- The Chef Server acts as a hub for configuration data.
- The Chef Server stores Cookbooks and policies
- Policies that are applied to Nodes, and metadata that describes each registered Node that is being managed by the Chef-Client

Chef Components

Work Station Components

- Knife Utility
- Local Chef Repository

Responsibilities

- Writing Cookbooks and Recipes that will later be pushed to the central Chef Server
- Managing Nodes on the central Chef Server

Chef Node:

- The Chef Server acts as a hub for configuration data.
- The Chef Server stores Cookbooks and policies
- Policies that are applied to Nodes, and metadata that describes each registered Node that is being managed by the Chef-Client

Cookbooks and Recipes

Cook Book :

- A Cookbook defines a scenario and contains everything that is required to support that scenario:
    - Recipes, which specifies the resources to use and the order in which they are to be applied
    - Attribute values
    - File distributions
    - Templates
    - Extensions to Chef, such as libraries, definitions, and custom resources

Recipes :

- A Recipe is a collection of resources that describes a particular configuration or policy.
- It describes everything that is required to configure part of a system.
- The user writes Recipes that describe how Chef manages applications and utilities (WAS, IIB , Rules , Hadop) and how they are to be configured.

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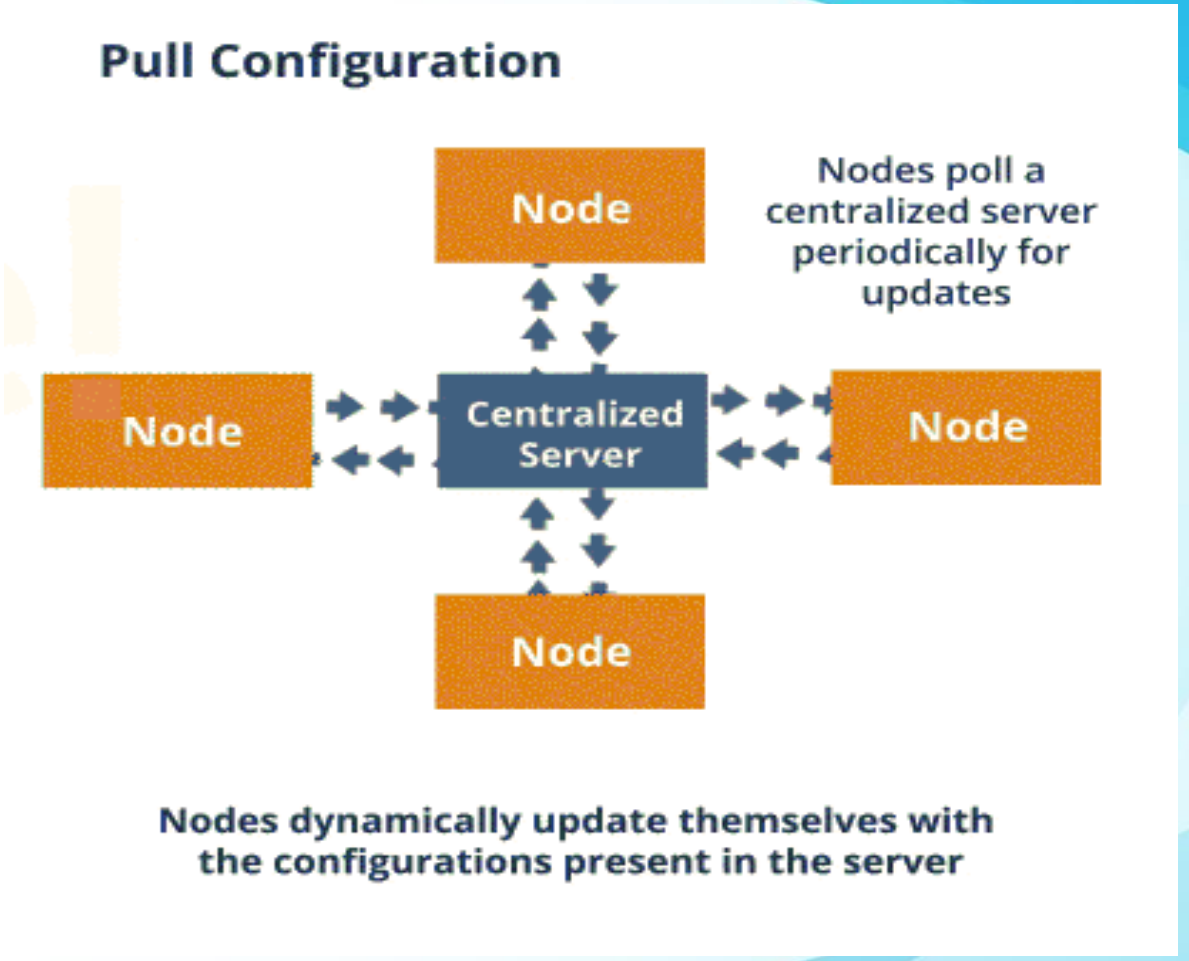
Chef : Pull Configuration

- Nodes are dynamically updated with the configurations in the Server.
- This is called **Pull Configuration** which means that we don't need to execute even a single command on the Chef server to push the configuration on the nodes.
- nodes will automatically update themselves with the configurations present in the Serve



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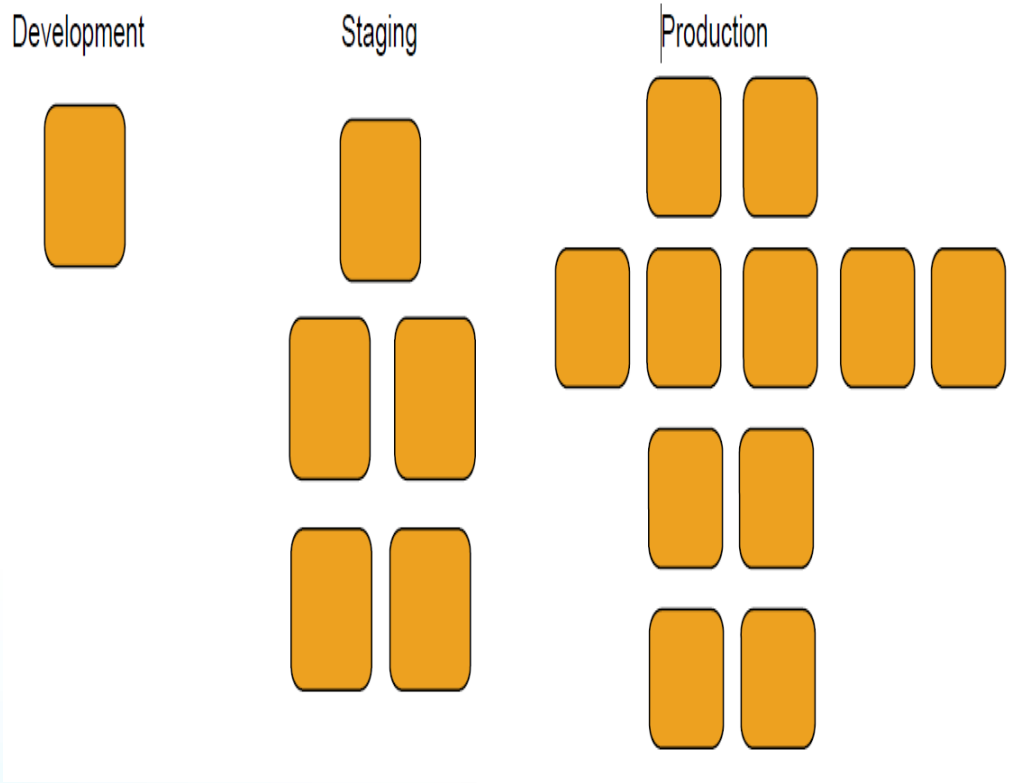
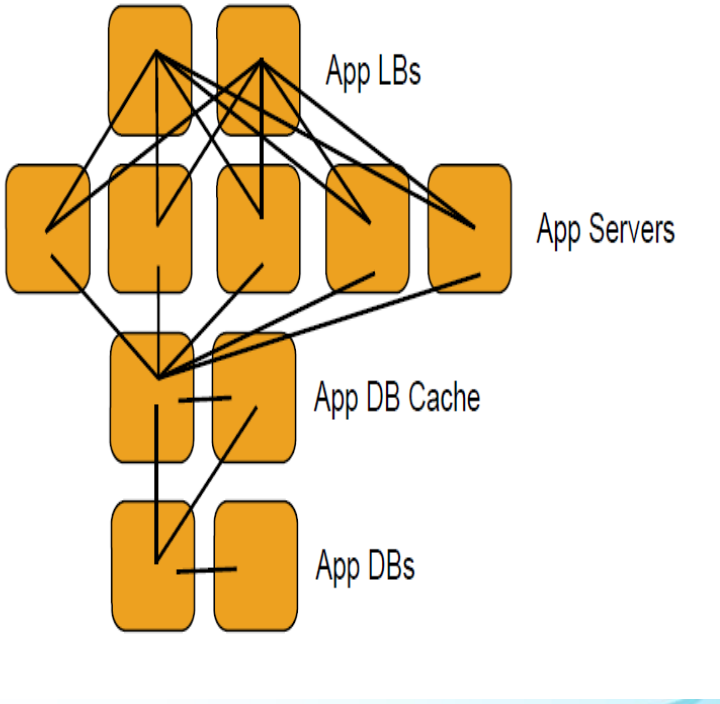
Infrastructure ..as Code

- Infrastructures





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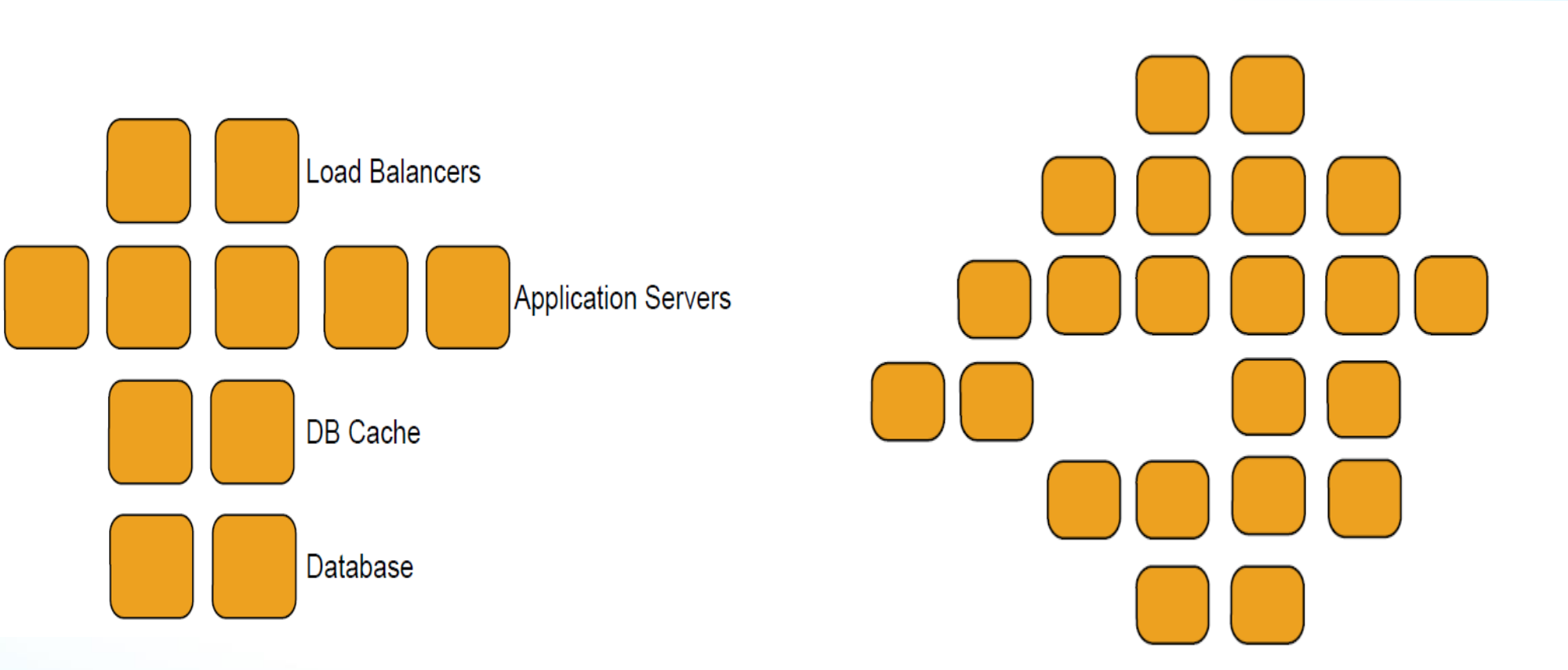
Nodes & Roles ..as Code

- Roles and Nodes



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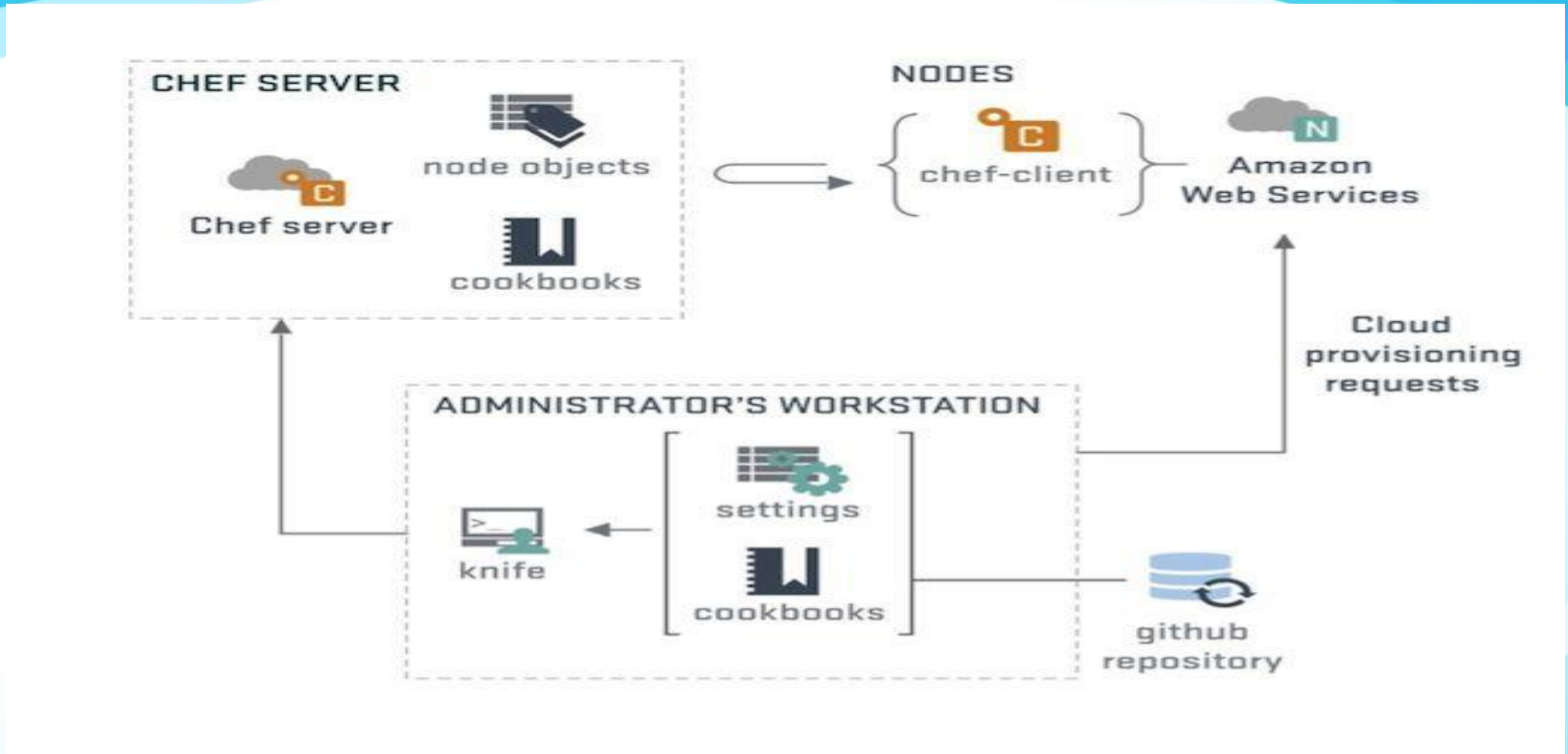
How Chef Works



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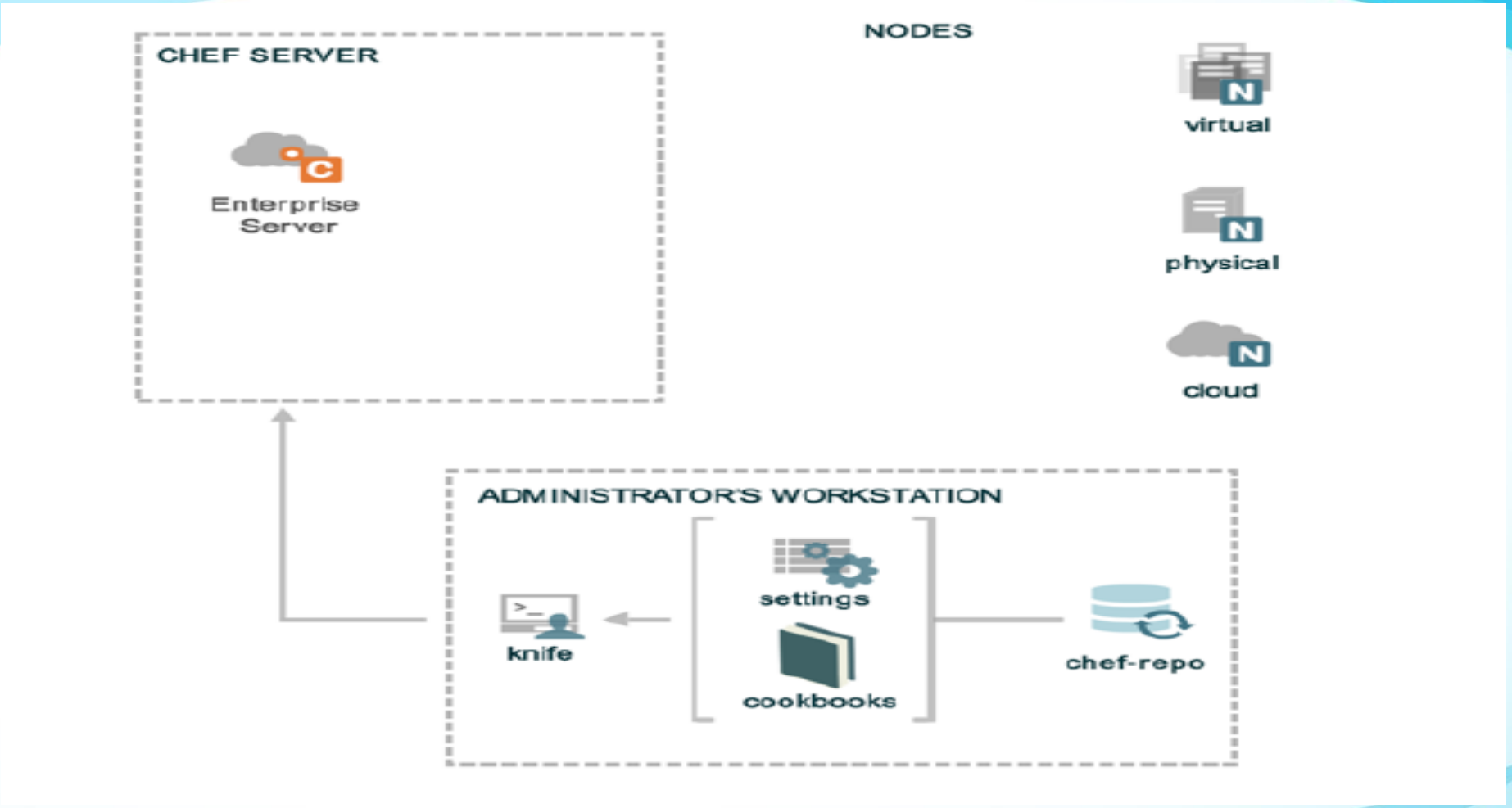
Nodes



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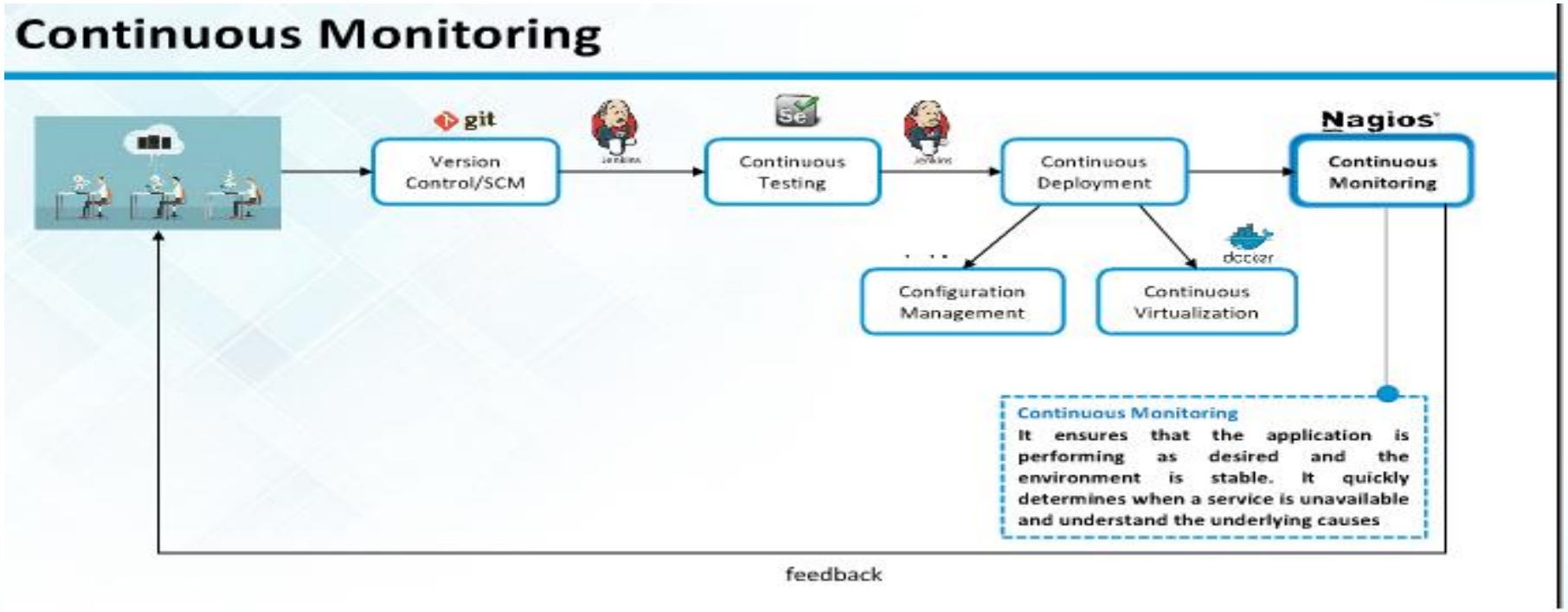
Continuous Monitoring



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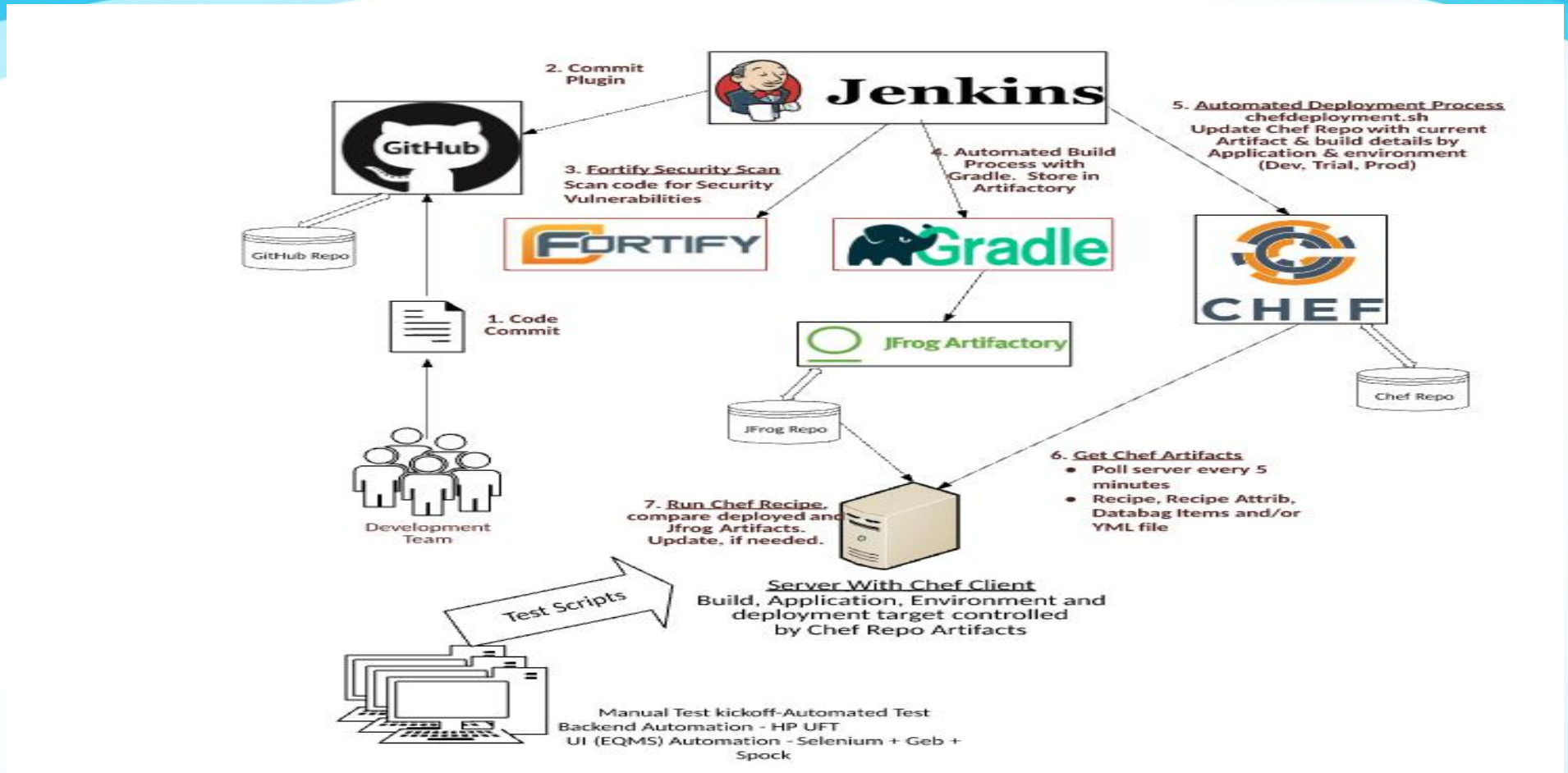
Clients DevOps Lifecycle



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Client's DevOps Methodolgy

- Continuous Development – Git Hub, Gradle, Maven
- Continuous Integration – Jenkins , Jfrog, Fortify
- Continuous Deployment – Chef
- Continuous Testing - Selenium
- Continuous Virtualization – docker , Oracle Virtual Box
- Continuous Monitoring – Tivoli Monitoring , Dynatrace

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Case study details

GitHub -> Jenkins -> Artifactory -> WebSphere deployment (Chef)

- Code checked into Github (Master) by dev team.
- Jenkins build is configured to pull code from Github (Master) and create the binaries using gradle.
- Jenkins build can be configured to run with every check in or overnight or ad-hoc dev team whenever needed.
- Once the ear file is created , it is uploaded to Artifactory.

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Case study details

- Also a script is triggered by the build which updates the databag for the service (in Chef Server) with the new URL of the artifactory where the ear is uploaded in the above step.
- A YAML project is created in GitHub which contains details of servers (dev and trial) and services which needs to be deployed automatically.
- This YAML project is changed to tar format by a Jenkins build and uploaded to the Artifactory.

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Case study details

- Chef client is configured to run every 5 min on Dev and Trial server boxes
- This chef client downloads the YAML tar file from artifactory locally to the server where chef client runs.
- This YAML file is read by Chef iteratively service by service. One service at a time.
- Chef client read the first service and downloads the databag from chef server for that service containing the Artifactory URL where EAR is uploaded.

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Case study details

- If it is different then EAR file from artifactory is downloaded locally in Chef cache folder (/var/chef/cache).
- Webshphere utilities (Admin.backup, Admin.update , Admin.save) are used to deploy this new EAR in the server. These three commands are run using chef bash resource.

Case Study YAML File

```
me_ioc_referencedataservice:
  artifact: "ReferenceDataService"
  type: "ear"
  startup-command: ""
  shutdown-command: ""
  background: " &"
  dev:
   dir: "/home/ibmadmin/ioc_referencedataservice"
   user: "ibmadmin"
   group: "ibmadmins"
   pre-params: ""
   post-params: "“
# Properties related to EAR deployment
   password-file: "/home/ibmadmin/pwd"
   application-id: "ibmadmin"
   was-user: "admin"
```

```
me_ioc_alarmmanagerservice:
  artifact: "AlarmManagerService"
  type: “bar"
  startup-command: ""
  shutdown-command: ""
  background: " &"
  dev:
   dir: "/home/ibmadmin/ioc_alarmmanagerservice"
   user: "ibmadmin"
   group: "ibmadmins"
   pre-params: ""
   post-params: ""

   # Properties related to BAR deployment
   password-file: "/home/ibmadmin/pwd"
   application-id: "ibmadmin"
   was-user: "admin"
```

Case Study Recipe

EAR deployment in WAS

```
# -- Update deployed EAR file in WAS with the downloaded one --
                execute "update-ear-#{app_name}" do
                  command
"/opt/IBM/WebSphere/AppServer/profiles/dmgr/bin/wsadmin.sh -lang jython -
username #{was_admin} -password #{pwd} -c \"AdminApp.update('#{artifact}',
 'app', ['-operation', 'update', '-contents', '#{file}' , '-update.ignore.new'])"
                  user application_id
                  cwd app_dir
                  action :nothing
                  notifies :run, "execute[save-ear-#{app_name}]", :immediately
                end
```

```
# -- Bar file deployment for IIB
# -- Deploy bar file --
execute "deploy bar file-#{app_name}" do
command "mqsideploy '#{IIBNode}' -e '#{EG}' -a '#{Barfile}' -m“
user application_id
cwd app_dir
action :nothing
notifies :nothing
end
```

Case Study Data bag

For EAR deployment

```
{
 "id": "IOCServices",
 "comment": "IOCServices Application",
 "AppName": "IOCServices"
 "Environment": "Dev"
 "Hostname":"Server Name"
 "Cluster":"Cluster Name"
 "Node":"Node Name"
 "Location" " "Artifactory Location of the Ear file or BAR file

 "id": "IOCServices",
 "comment": "IOCServices Application",
 "AppName": "IOCServices"
 "Environment": "Trial"
 "Hostname":"Server Name"
 "Cluster":"Cluster Name"
 "Node":"Node Name"
 "Location" " "Artifactory Location of the Ear file or BAR file
}
```

BAR File

```
{
 "id": "IOCServicesBar",
 "comment": "IOCServices Application",
 "AppName": "IOCServices"
 "Environment": "Dev"
 "Hostname":"Server Name"
 "IIB Node":"IIB Node Name"
 "EG":"Execution Group Name"
 "Location" " "Artifactory Location of the Ear file or BAR file
}
```