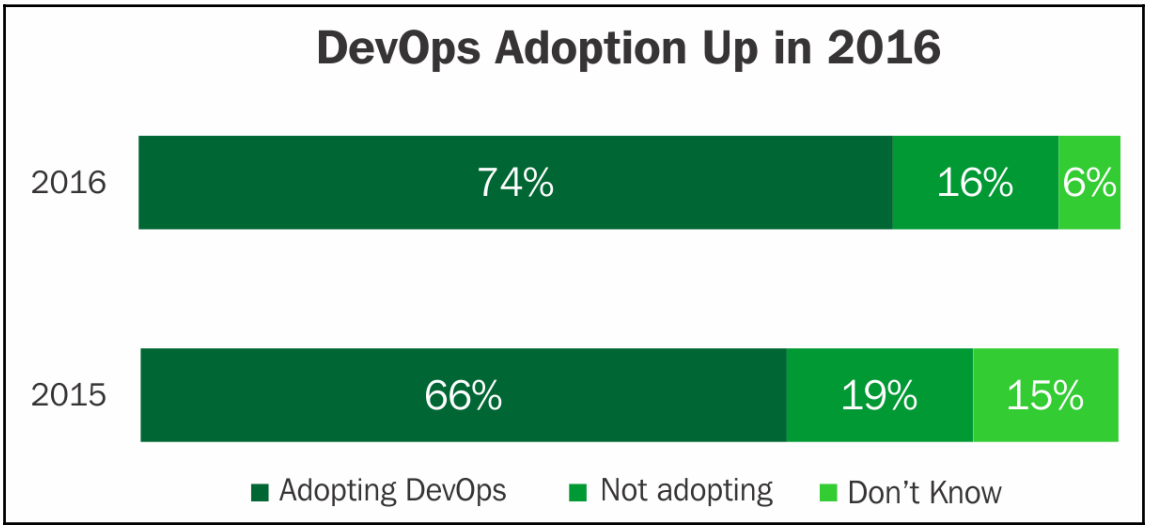
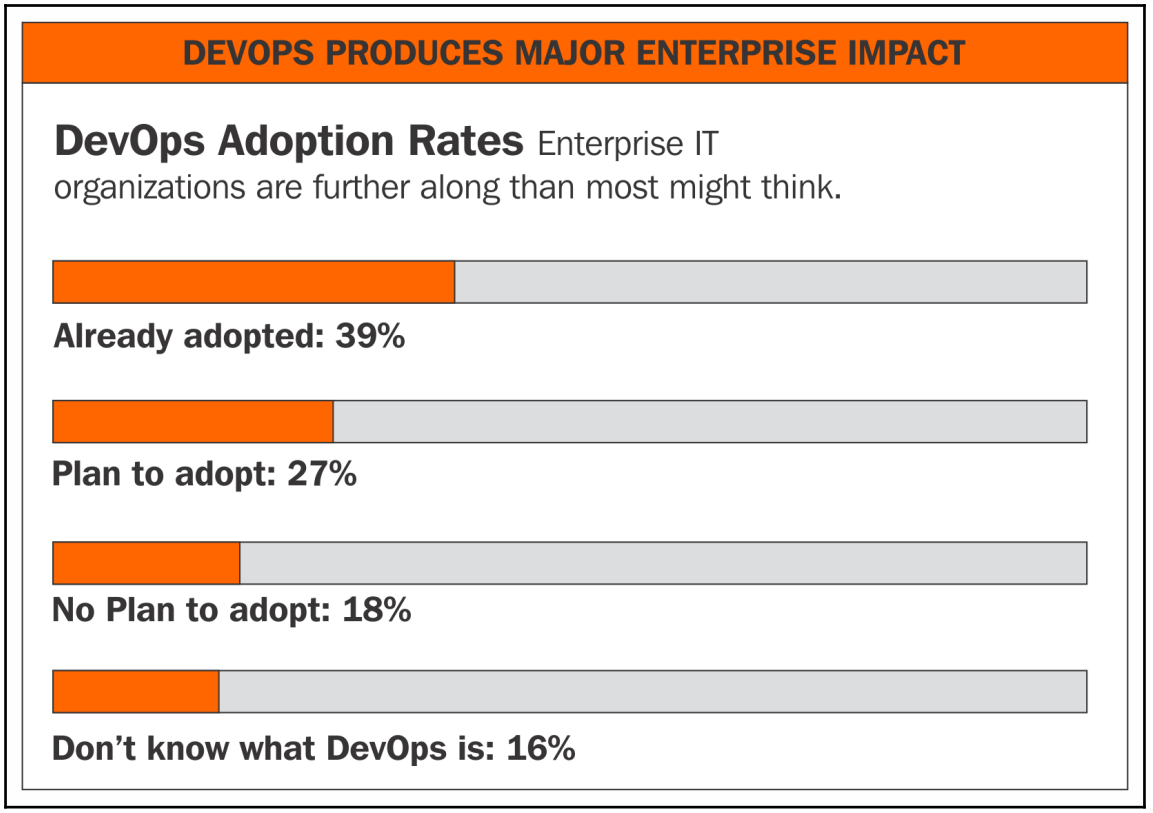
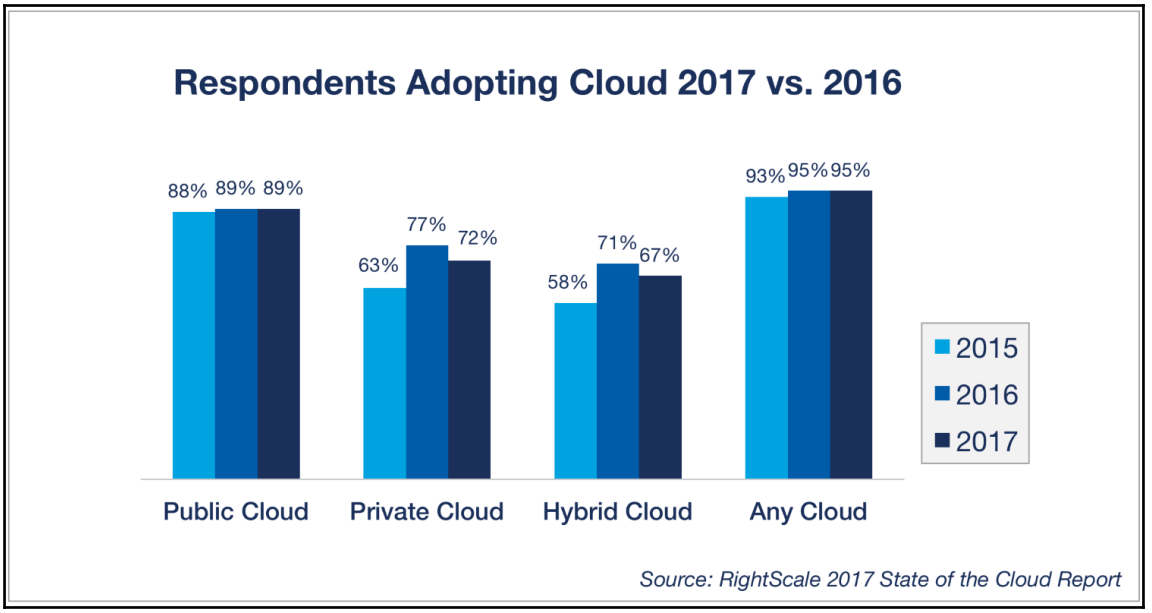
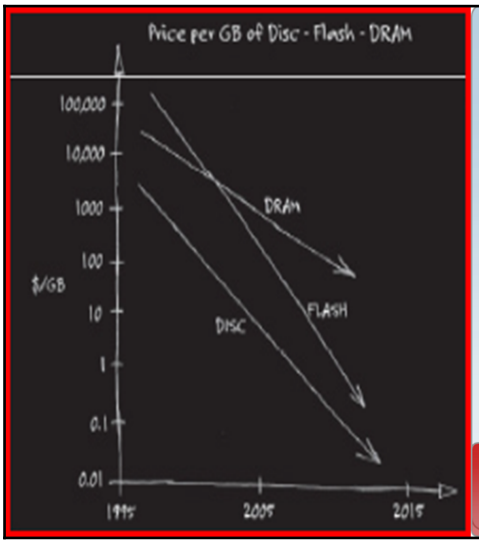
Chapter 1: Introduction to DevOps



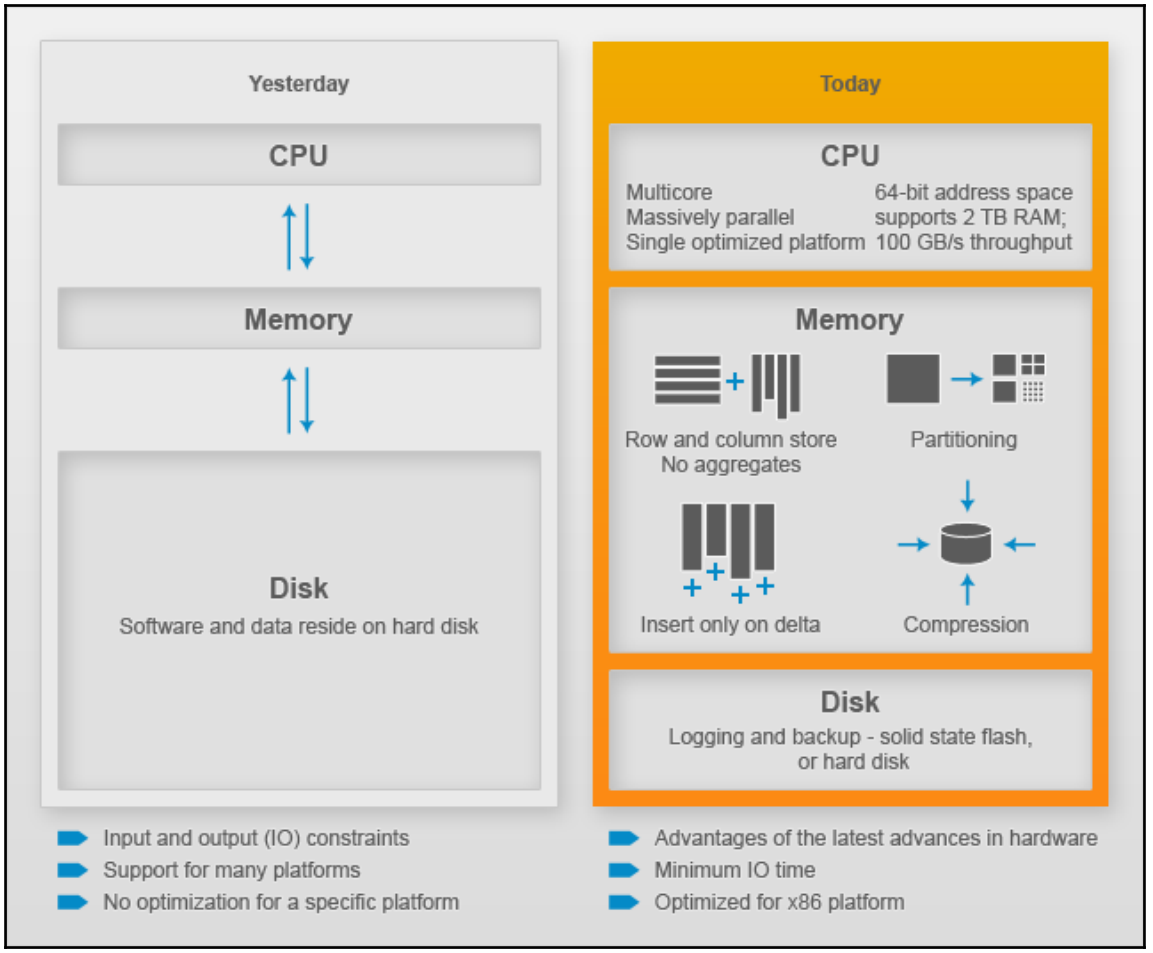

DEVOPS PRODUCES MAJOR ENTERPRISE IMPACT
DevOps Adoption Rates Enterprise IT organizations are further along than most might think.
Already adopted: 39%
Plan to adopt: 27%
No Plan to adopt: 18%
Don't know what DevOps is: 16%

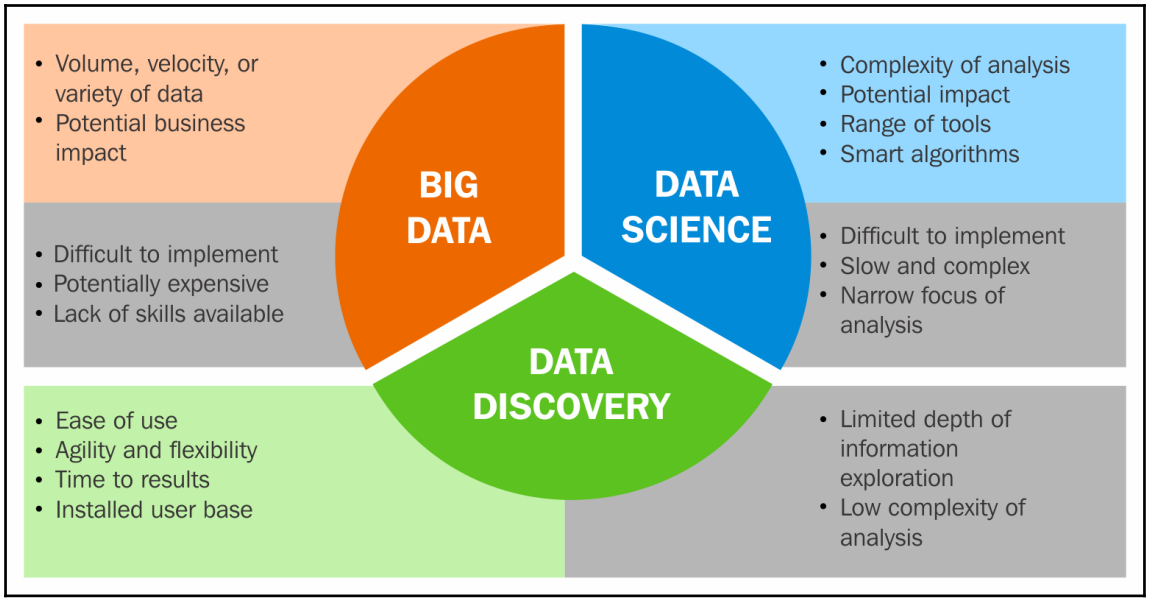

Respondents Adopting Cloud 2017 vs. 2016
88%
89%
89%
63%
77%
72%
58%
71%
67%
93%
95%
95%
2015
2016
2017
Public Cloud
Private Cloud
Hybrid Cloud
Any Cloud
Source: RightScale 2017 State of the Cloud Report

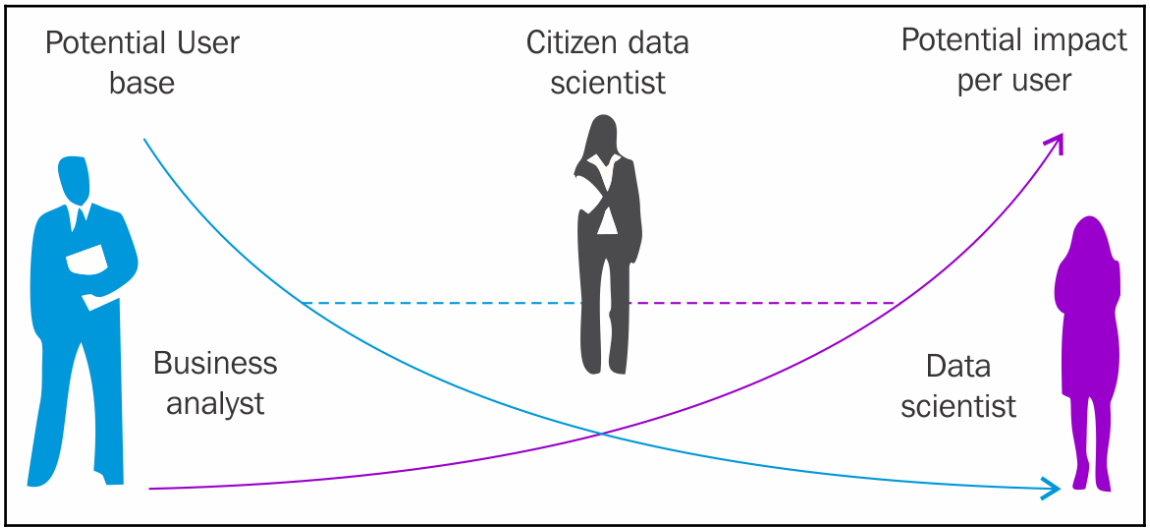
Chapter 2: Introduction to Big Data and Data Sciences



	1990	Now	Improvement
CPU	0.05 MIPS/$	7.15 MIPS/$	143x
Main Memory	0.02 MB/$	5 MB/$	250x
Addressable Memory	2^{16}	2^{64}	2^{48}x
Network Speed	100 Mbps	10 Gbps	100 x
Disk Transfer	5 MBPS	130 MBPS	25x


Yesterday
CPU
Memory
Disk
Software and data reside on hard disk
Today
CPU
Multicore
Massively parallel
Single optimized platform
64-bit address space
supports 2 TB RAM;
100 GB/s throughput
Memory
Row and column store
No aggregates
Partitioning
Insert only on delta
Compression
Disk
Logging and backup - solid state flash,
or hard disk
Input and output (IO) constraints
Support for many platforms
No optimization for a specific platform
Advantages of the latest advances in hardware
Minimum IO time
Optimized for x86 platform

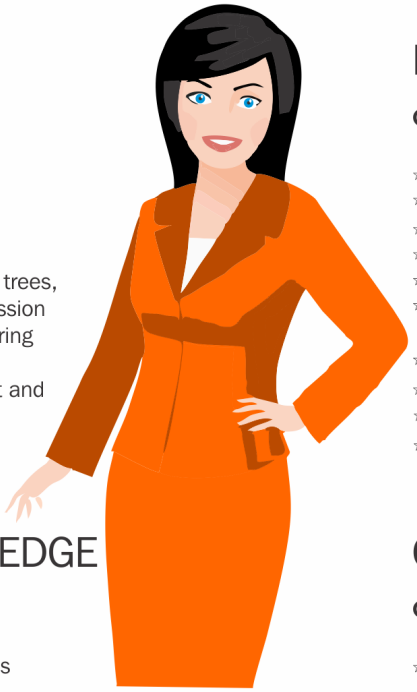

• Volume, velocity, or variety of data
• Potential business impact
BIG DATA
• Difficult to implement
• Potentially expensive
• Lack of skills available
• Complexity of analysis
• Potential impact
• Range of tools
• Smart algorithms
DATA SCIENCE
• Difficult to implement
• Slow and complex
• Narrow focus of analysis
DATA DISCOVERY
• Ease of use
• Agility and flexibility
• Time to results
• Installed user base
• Limited depth of information exploration
• Low complexity of analysis


Potential User base
Citizen data scientist
Potential impact per user
Business analyst
Data scientist

MODERN DATA SCIENTIST

MATH & STATISTICS

- ☆ Machine learning
- ☆ Statistical modeling
- ☆ Experiment design
- ☆ Bayesian inference
- ☆ Supervised learning: decision trees, random forests, logistic regression
- ☆ Unsupervised learning: clustering dimensionality reduction
- ☆ Optimization gradient descent and variants



PROGRAMMING & DATABASE

- ☆ Computer science fundamentals
- ☆ Scripting language e.g Python
- ☆ Statistical computing packages, e.g., R
- ☆ Databases: SQL and NoSQL
- ☆ Relational algebra
- ☆ Parallel databases and parallel query processing
- ☆ MapReduce concepts
- ☆ Hadoop and Hive/Pig
- ☆ Custom reducers
- ☆ Experience with xaaS like AWS

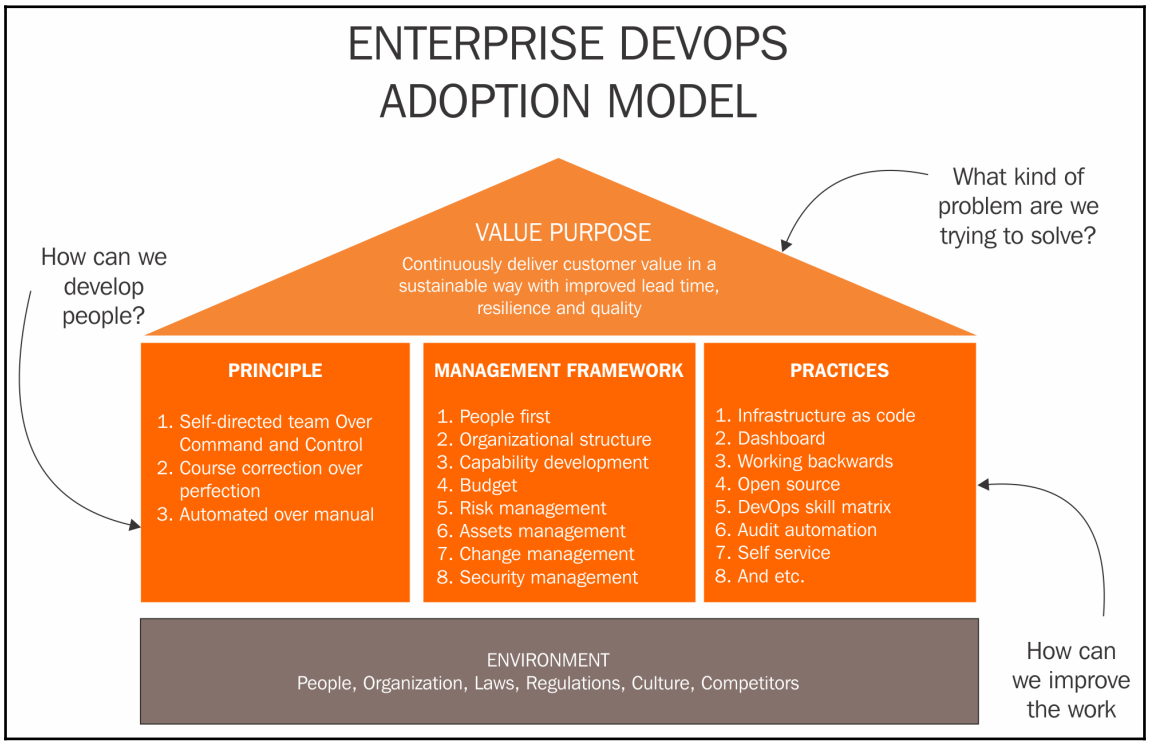
DOMAIN KNOWLEDGE & SOFT SKILLS

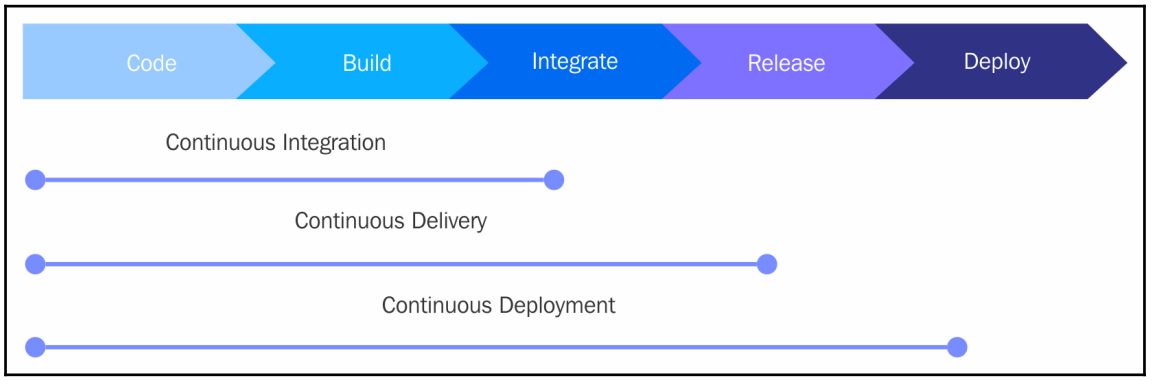
- ☆ Passionate about the business
- ☆ Curious about data
- ☆ Influence without authority
- ☆ Hacker mindset
- ☆ Problem solver
- ☆ Strategic, proactive, creative, innovative and collaborative

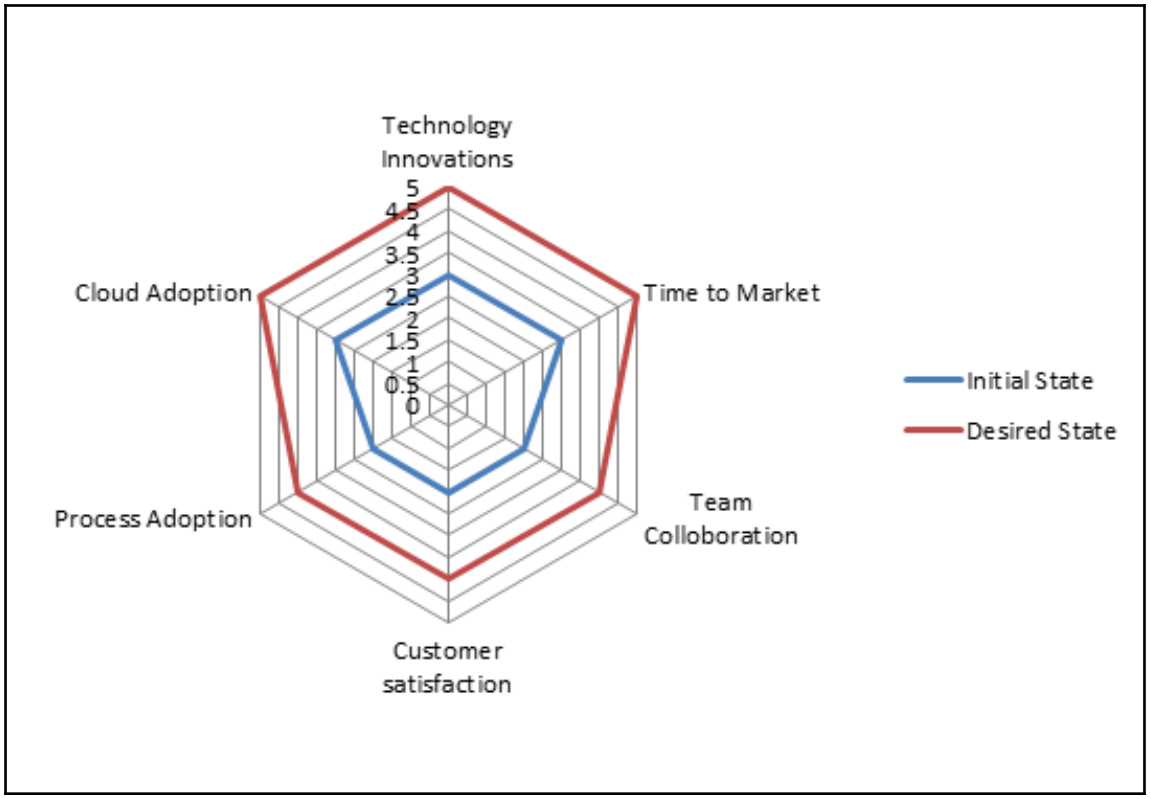
COMMUNICATION & VISUALIZATION

- ☆ Able to engage with senior management
- ☆ Story telling skills
- ☆ Translate data-driven insights into decisions and actions
- ☆ Visual art design
- ☆ R packages like ggplot or lattice
- ☆ Knowledge of any of visualization tools e.g Flare, D3.js, Tableau

Chapter 3: DevOps Framework






Technology Innovations
Time to Market
Team Colloboration
Customer satisfaction
Process Adoption
Cloud Adoption
5
4.5
4
3.5
3
2.5
2
1.5
1
0.5
0
Initial State
Desired State

PROCESS	FOUNDATIONAL	REPEATABLE	RELIABLE	OPTIMISED
TECHNOLOGY	Usage by team member	Usage by a Department	Usage by few Department	Enterprise wide Usage
TIME TO MARKET	Ad-hoc Release	Periodic Release	Frequent Release	Continuous Release
COLLABORATION	Team Isolated	Team Communicative	Team Collaborative	Team Unified
CUSTOMER SATISFACTION	Personal feedback	Service level feedback	Department level feedback	Organisation level feedback
PROCESS ADOPTION	Adhoc Process	Inconsistent Process	Shared Process	Aligned Process Corporate wide
CLOUD ADOPTION	Team working with VM's	Department level	Few Departments	Cloud fully embraced

Development Framework :
Development work delivery (Schedule, Quality)
Initial Maturity Observations:
Initial Maturity Level Rating:
Target Maturity Rating:
Process Improvement Observations::
Process Adoption Benefits:
Best Practices:
Clients Interaction (functional Requirements, Status Reports)
Initial Maturity Observations:
Initial Maturity Level Rating:
Target Maturity Rating:
Process Improvement Observations::
Process Adoption Benefits:
Best Practices:

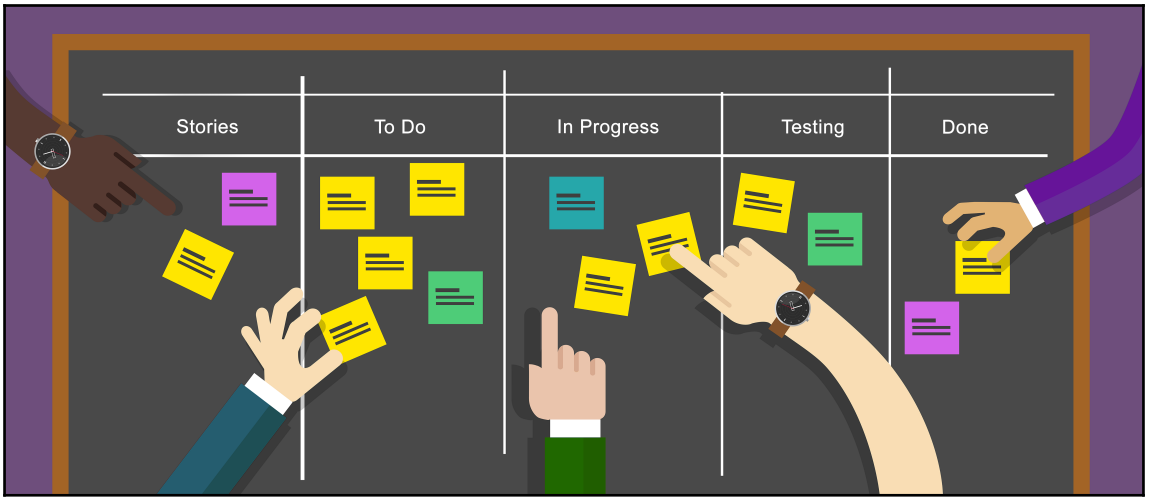
Team Collaboration :
Handshake between departments
Initial Maturity Observations:
Initial Maturity Level Rating:
Target Maturity Rating:
Process Improvement Observations::
Process Adoption Benefits:
Best Practices:
Integration Process Maturity
Initial Maturity Observations:
Initial Maturity Level Rating:
Target Maturity Rating:
Process Improvement Observations::
Process Adoption Benefits:
Best Practices:

Software Performance:
Rework vs. new functionality or value delivery
Initial Maturity Observations:
Initial Maturity Level Rating:
Target Maturity Rating:
Process Improvement Observations::
Process Adoption Benefits:
Best Practices:
Process Flow Framework :
Build Process workflow
Initial Maturity Observations:
Initial Maturity Level Rating:
Target Maturity Rating:
Process Improvement Observations::
Process Adoption Benefits:
Best Practices:
Deployment process Effectiveness
Initial Maturity Observations:
Initial Maturity Level Rating:
Target Maturity Rating:
Process Improvement Observations::
Process Adoption Benefits:
Best Practices:

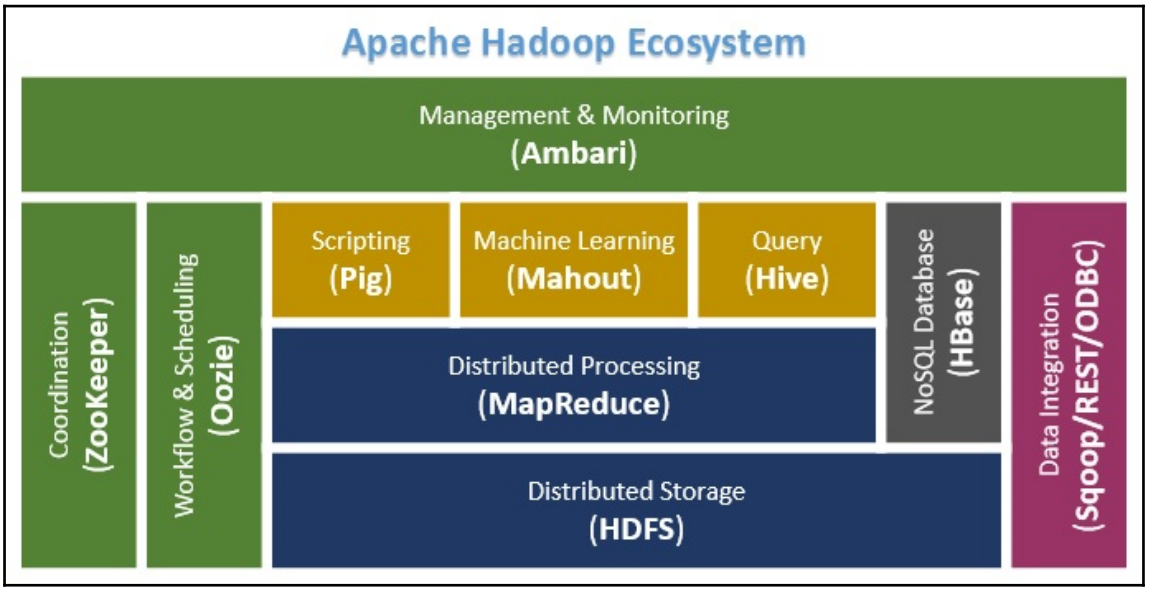
Key Metrics Summary :
Code quality
Initial Maturity Observations:
Initial Maturity Level Rating:
Target Maturity Rating:
Process Improvement Observations::
Process Adoption Benefits:
Best Practices:
Test Cases Automation and Results
Initial Maturity Observations:
Initial Maturity Level Rating:
Target Maturity Rating:
Process Improvement Observations::
Process Adoption Benefits:
Best Practices:
Applications Monitoring- KPI's
Initial Maturity Observations:
Initial Maturity Level Rating:
Target Maturity Rating:
Process Improvement Observations::
Process Adoption Benefits:
Best Practices:

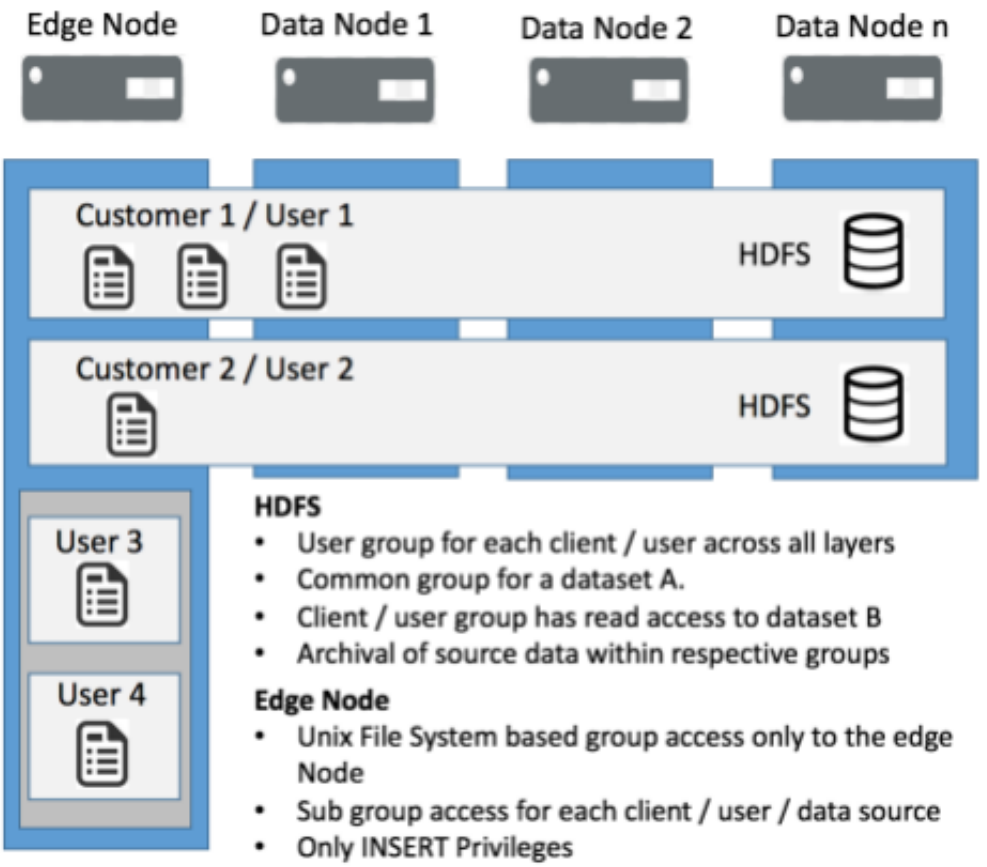
Production Framework :
Identification of defects
Initial Maturity Observations:
Initial Maturity Level Rating:
Target Maturity Rating:
Process Improvement Observations::
Process Adoption Benefits:
Best Practices:
Responsiveness/Performance
Initial Maturity Observations:
Initial Maturity Level Rating:
Target Maturity Rating:
Process Improvement Observations::
Process Adoption Benefits:
Best Practices:
Scalability of systems Architecture
Initial Maturity Observations:
Initial Maturity Level Rating:
Target Maturity Rating:
Process Improvement Observations::
Process Adoption Benefits:
Best Practices:

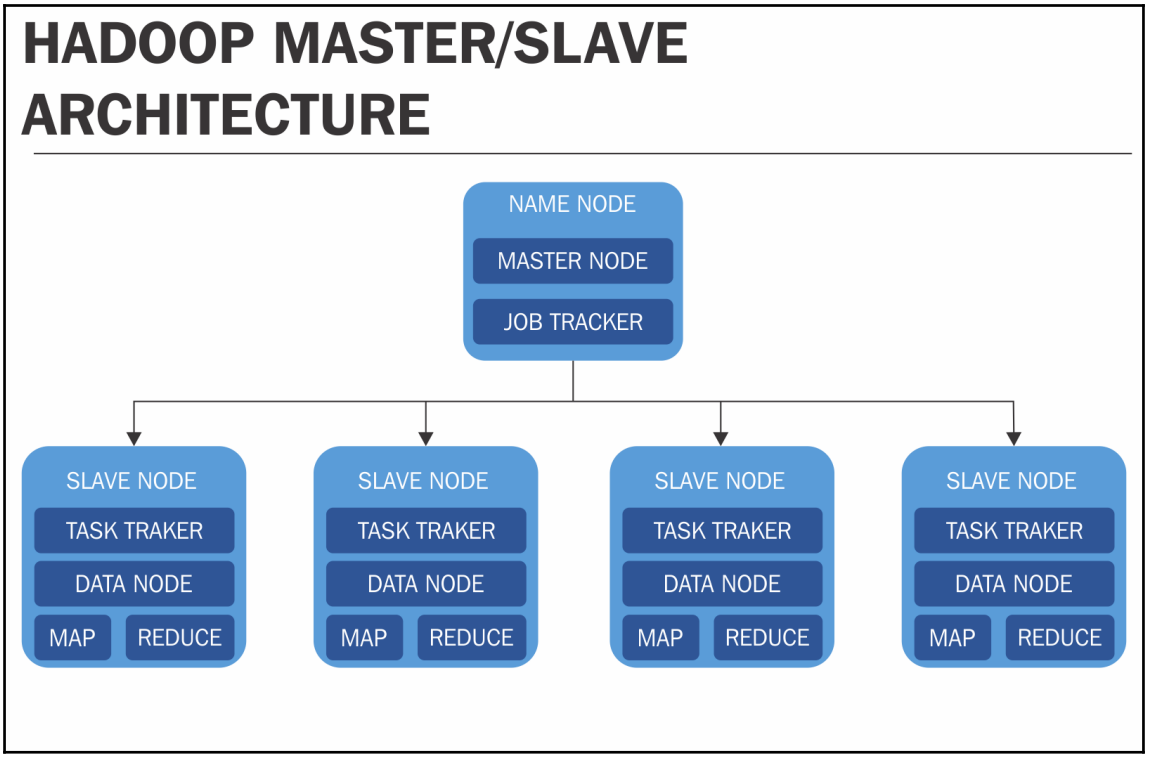
Cloud Technology Adoption Progress:
Initial Maturity Observations:
Initial Maturity Level Rating:
Target Maturity Rating:
Process Improvement Observations::
Process Adoption Benefits:
Best Practices:

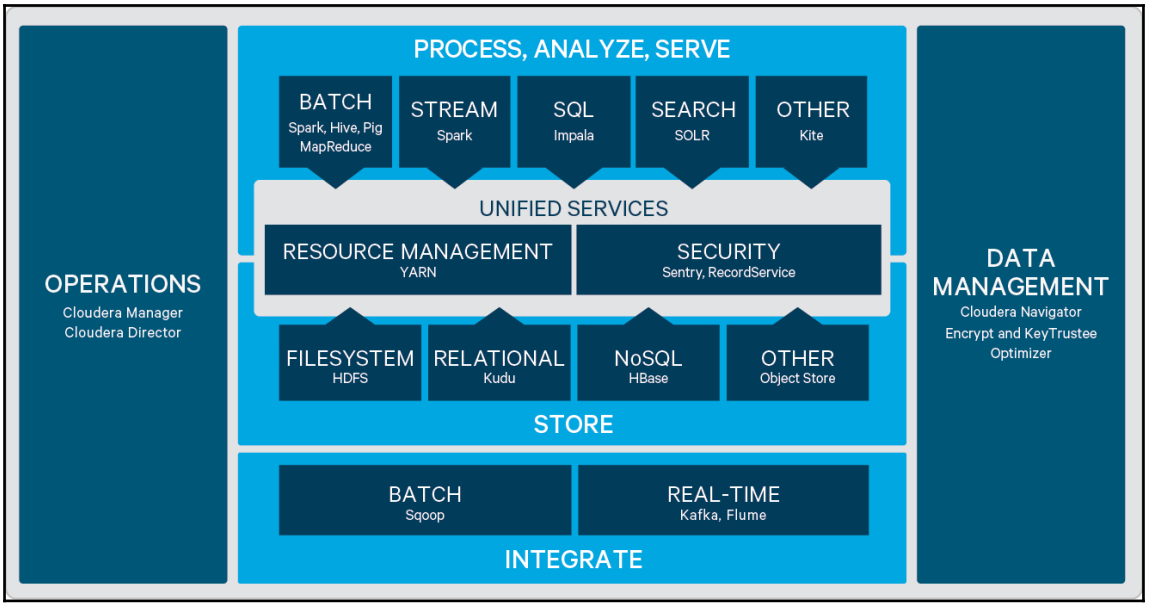

Stories
To Do
In Progress
Testing
Done

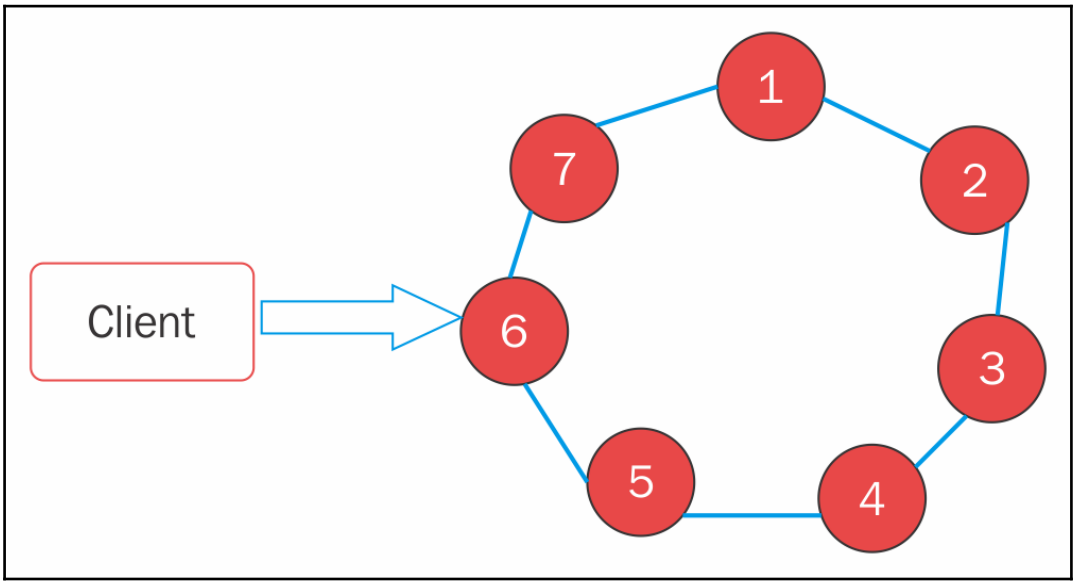
Chapter 4: Big Data Hadoop Ecosystems



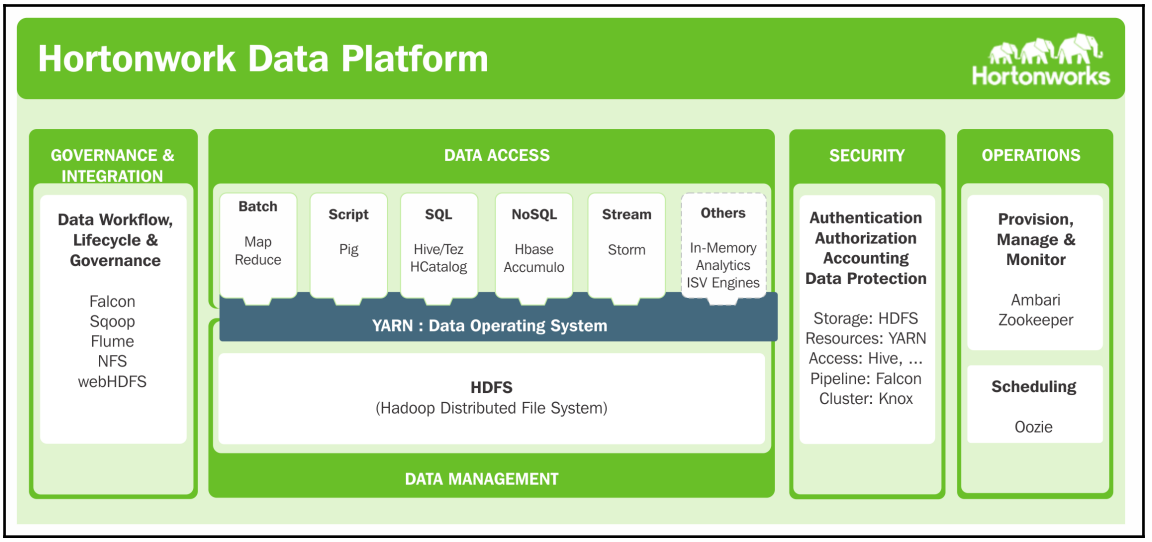

Edge Node
Data Node 1
Data Node 2
Data Node n
Customer 1 / User 1
HDFS
Customer 2 / User 2
HDFS
User 3
User 4
HDFS
• User group for each client / user across all layers
• Common group for a dataset A.
• Client / user group has read access to dataset B
• Archival of source data within respective groups
Edge Node
• Unix File System based group access only to the edge Node
• Sub group access for each client / user / data source
• Only INSERT Privileges

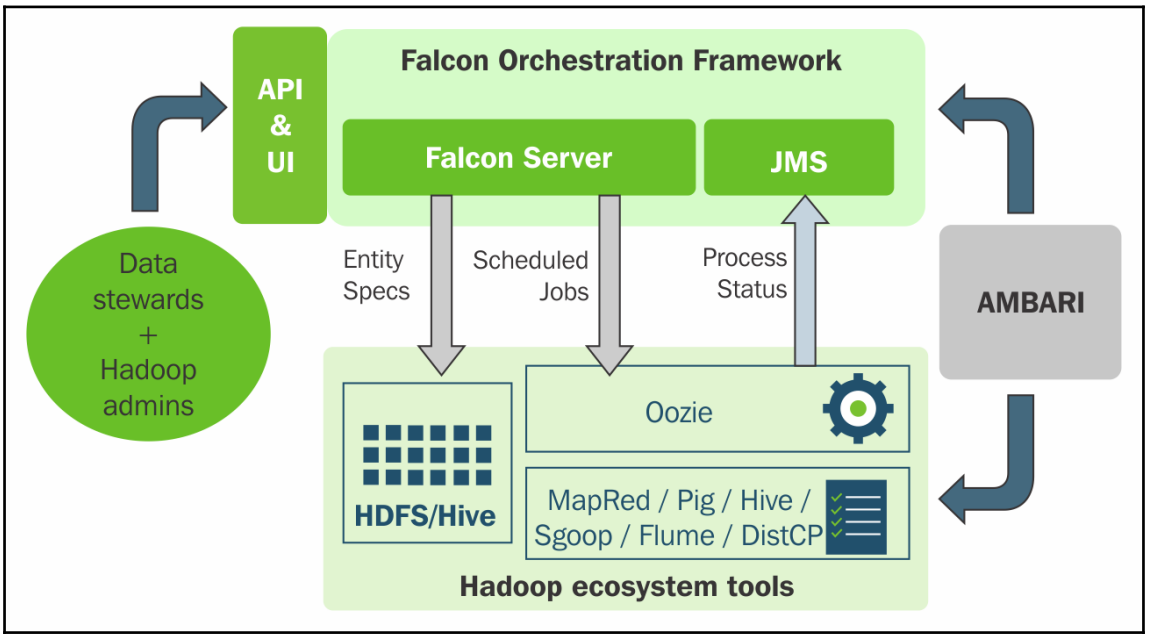

HADOOP MASTER/SLAVE ARCHITECTURE
NAME NODE
MASTER NODE
JOB TRACKER
SLAVE NODE
TASK TRAKER
DATA NODE
MAP
REDUCE
SLAVE NODE
TASK TRAKER
DATA NODE
MAP
REDUCE
SLAVE NODE
TASK TRAKER
DATA NODE
MAP
REDUCE
SLAVE NODE
TASK TRAKER
DATA NODE
MAP
REDUCE

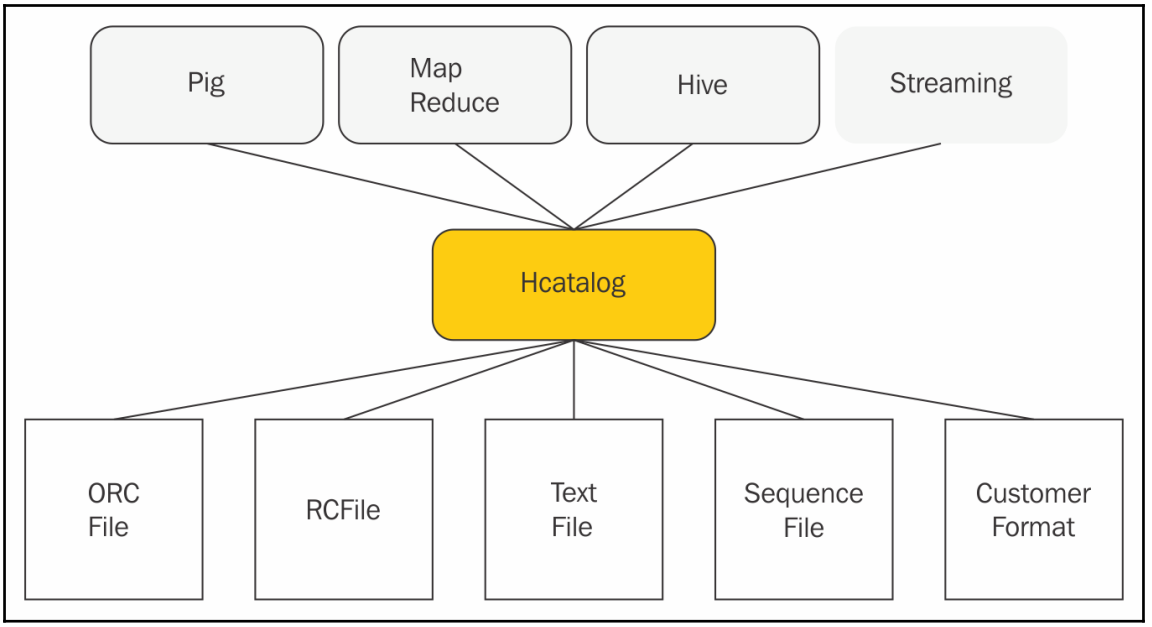

OPERATIONS
Cloudera Manager
Cloudera Director
PROCESS, ANALYZE, SERVE
BATCH
Spark, Hive, Pig
MapReduce
STREAM
Spark
SQL
Impala
SEARCH
SOLR
OTHER
Kite
UNIFIED SERVICES
RESOURCE MANAGEMENT
YARN
SECURITY
Sentry, RecordService
FILESYSTEM
HDFS
RELATIONAL
Kudu
NoSQL
HBase
OTHER
Object Store
STORE
BATCH
Sqoop
REAL-TIME
Kafka, Flume
INTEGRATE
DATA MANAGEMENT
Cloudera Navigator
Encrypt and KeyTrustee
Optimizer

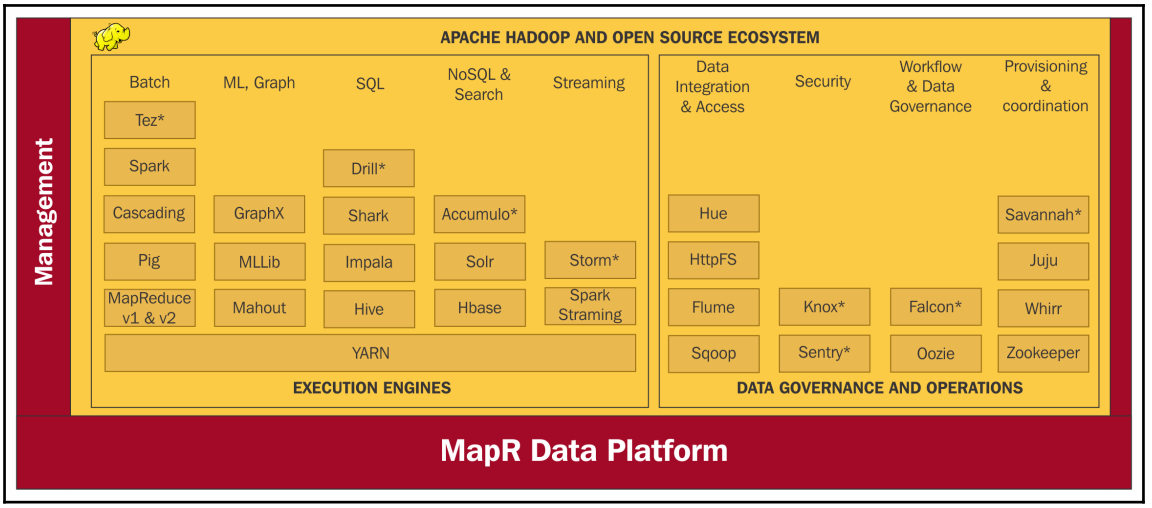

Client
1
2
3
4
5
6
7

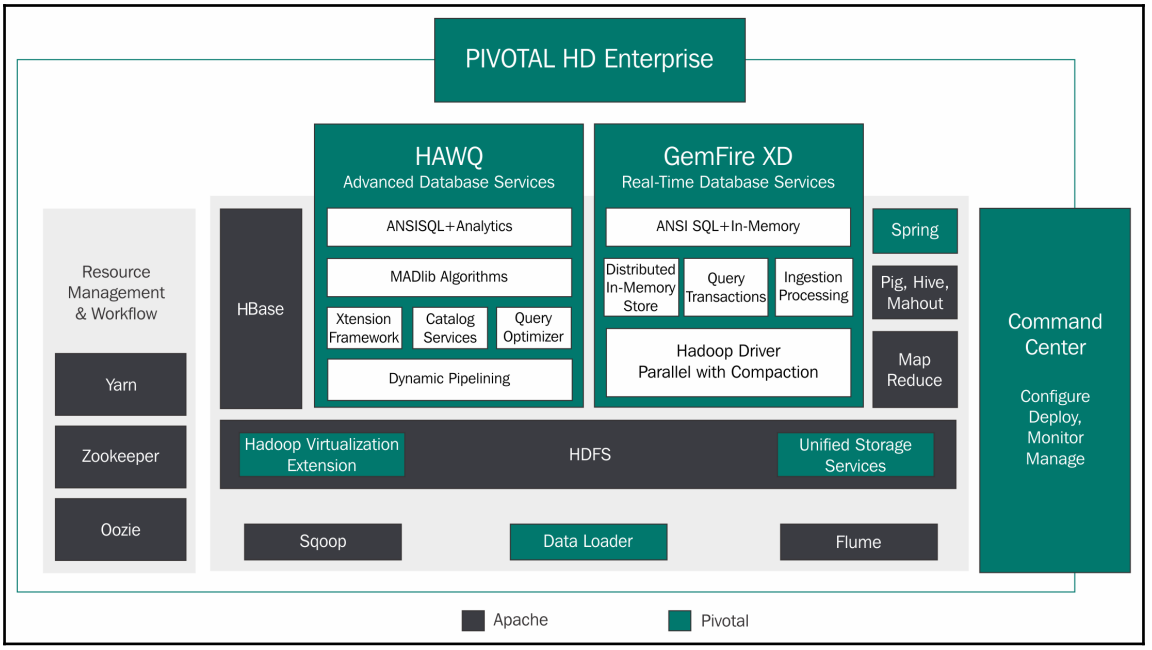
Key Security Requirements	Apache Sentry	Kerberos LDAP	Cloudera Navigator	Custom
Unique User Identification		Yes		
Emergency Access Procedure				Yes
Automatic Logoff				Yes
Encryption and Decryption at Rest			Yes	
Transmission Security- Encryption/Decryption			Yes	
Mechanism to Authenticate	Yes		Yes	
Authenticate. (Role based authorization)	Yes	Yes	Yes	
Transmission Security - Integrity Controls	Yes			
Audit, lineage			Yes	

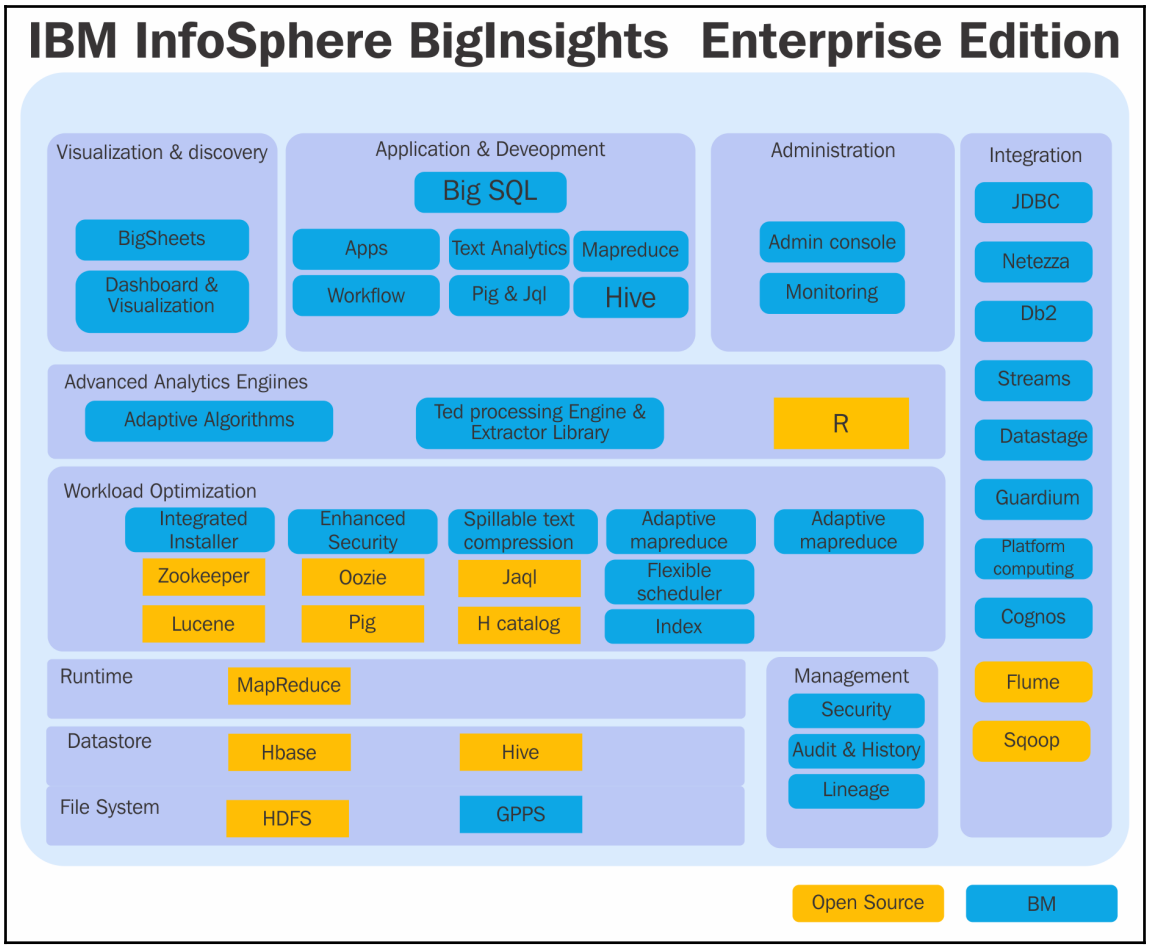

Hortonwork Data Platform
Hortonworks
GOVERNANCE & INTEGRATION
Data Workflow, Lifecycle & Governance
Falcon
Sqoop
Flume
NFS
webHDFS
DATA ACCESS
Batch
Map Reduce
Script
Pig
SQL
Hive/Tez HCatalog
NoSQL
Hbase Accumulo
Stream
Storm
Others
In-Memory Analytics ISV Engines
YARN : Data Operating System
HDFS
(Hadoop Distributed File System)
DATA MANAGEMENT
SECURITY
Authentication Authorization Accounting Data Protection
Storage: HDFS
Resources: YARN
Access: Hive, ...
Pipeline: Falcon
Cluster: Knox
OPERATIONS
Provision, Manage & Monitor
Ambari
Zookeeper
Scheduling
Oozie

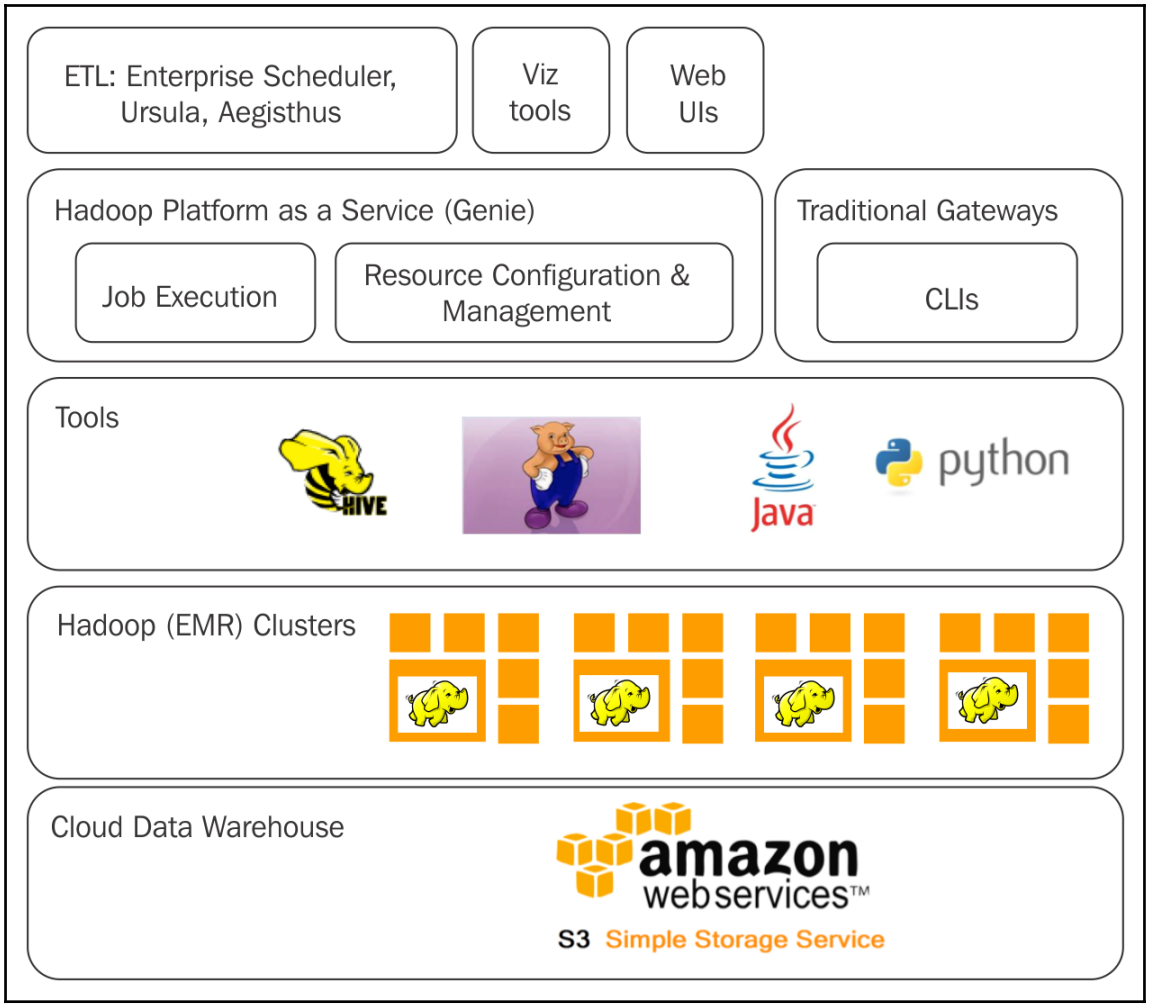

API & UI
Falcon Orchestration Framework
Falcon Server
JMS
Data stewards + Hadoop admins
Entity Specs
Scheduled Jobs
Process Status
AMBARI
HDFS/Hive
Oozie
MapRed / Pig / Hive / Sgoop / Flume / DistCP
Hadoop ecosystem tools

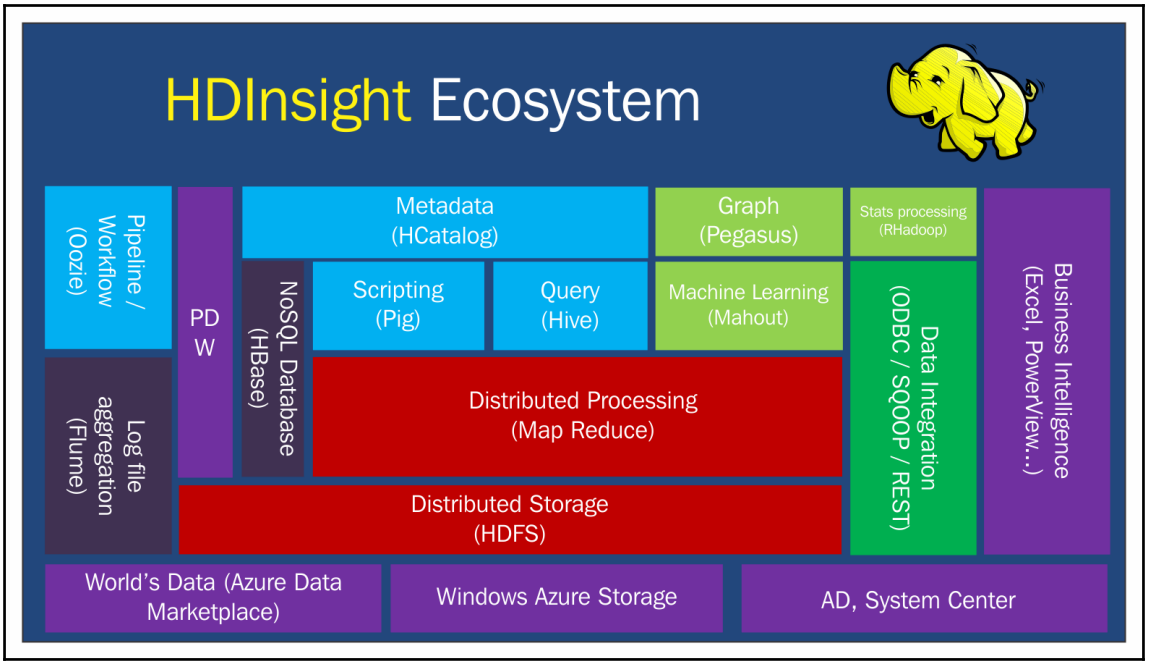

Pig
Map Reduce
Hive
Streaming
Hcatalog
ORC File
RCFile
Text File
Sequence File
Customer Format

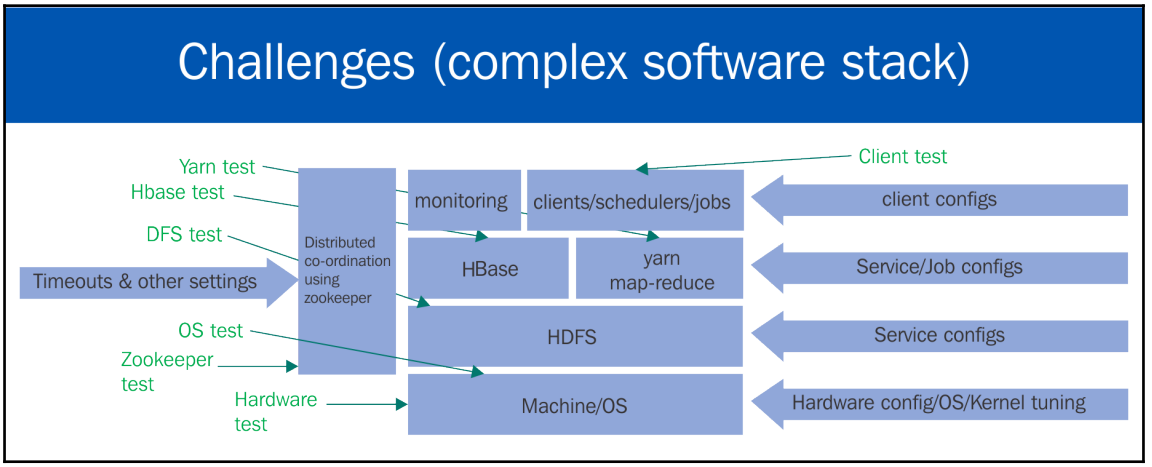

APACHE HADOOP AND OPEN SOURCE ECOSYSTEM
Management
Batch
ML, Graph
SQL
NoSQL & Search
Streaming
Tez*
Spark
Drill*
Cascading
GraphX
Shark
Accumulo*
Pig
MLLib
Impala
Solr
Storm*
MapReduce v1 & v2
Mahout
Hive
Hbase
Spark Streaming
YARN
EXECUTION ENGINES
Data Integration & Access
Security
Workflow & Data Governance
Provisioning & coordination
Hue
Savannah*
HttpFS
Juju
Flume
Knox*
Falcon*
Whirr
Sqoop
Sentry*
Oozie
Zookeeper
DATA GOVERNANCE AND OPERATIONS
MapR Data Platform


PIVOTAL HD Enterprise
HAWQ
Advanced Database Services
ANSISQL+Analytics
MADlib Algorithms
Xtension Framework
Catalog Services
Query Optimizer
Dynamic Pipelining
GemFire XD
Real-Time Database Services
ANSI SQL+In-Memory
Distributed In-Memory Store
Query Transactions
Ingestion Processing
Hadoop Driver Parallel with Compaction
Spring
Pig, Hive, Mahout
Map Reduce
Command Center
Configure Deploy, Monitor Manage
Resource Management & Workflow
Yarn
Zookeeper
Oozie
HBase
Hadoop Virtualization Extension
HDFS
Unified Storage Services
Sqoop
Data Loader
Flume
Apache
Pivotal

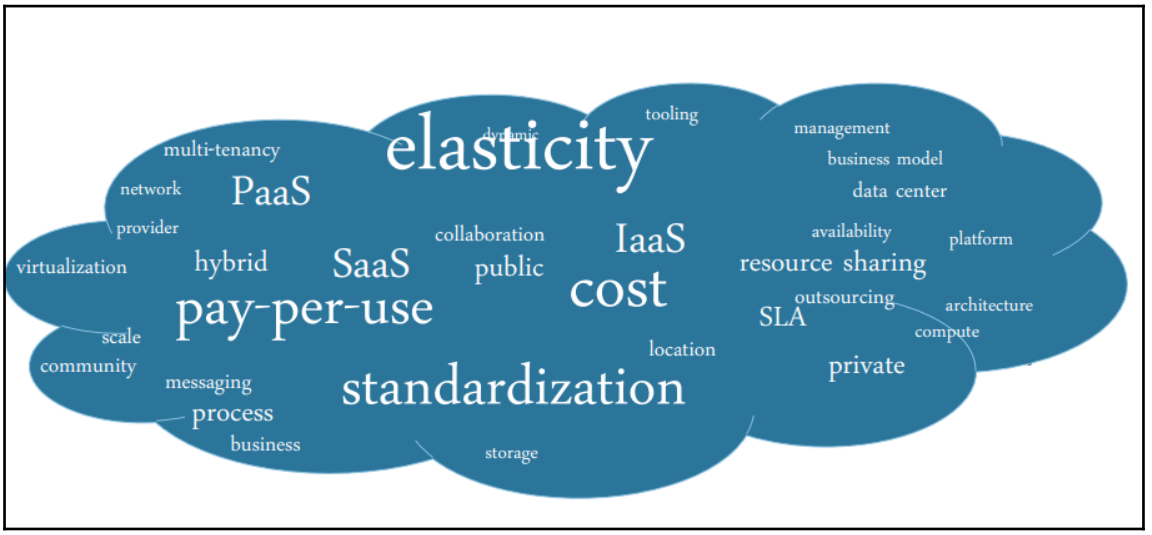

IBM InfoSphere BigInsights Enterprise Edition
Visualization & discovery
BigSheets
Dashboard & Visualization
Application & Deveopment
Big SQL
Apps
Text Analytics
Mapreduce
Workflow
Pig & Jql
Hive
Administration
Admin console
Monitoring
Integration
JDBC
Netezza
Db2
Streams
Datastage
Guardium
Platform computing
Cognos
Flume
Sqoop
Advanced Analytics Engiines
Adaptive Algorithms
Ted processing Engine & Extractor Library
R
Workload Optimization
Integrated Installer
Enhanced Security
Spillable text compression
Adaptive mapreduce
Adaptive mapreduce
Zookeeper
Oozie
Jaql
Flexible scheduler
Lucene
Pig
H catalog
Index
Runtime
MapReduce
Datastore
Hbase
Hive
File System
HDFS
GPPS
Management
Security
Audit & History
Lineage
Open Source
BM

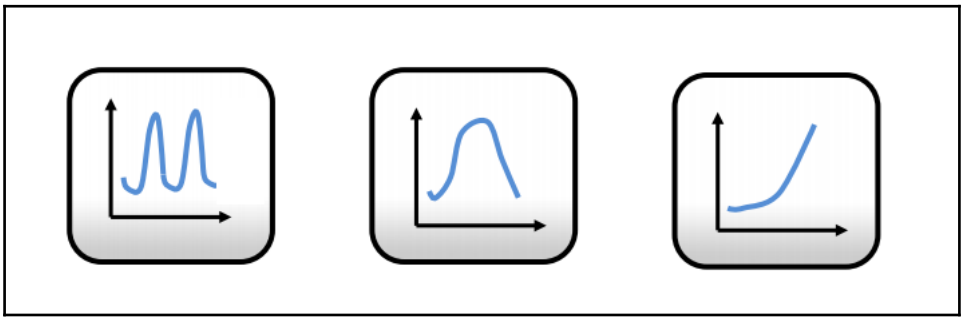

ETL: Enterprise Scheduler, Ursula, Aegisthus
Viz tools
Web UIs
Hadoop Platform as a Service (Genie)
Job Execution
Resource Configuration & Management
Traditional Gateways
CLIs
Tools
HIVE
Java
python
Hadoop (EMR) Clusters
Cloud Data Warehouse
amazon web services™
S3 Simple Storage Service

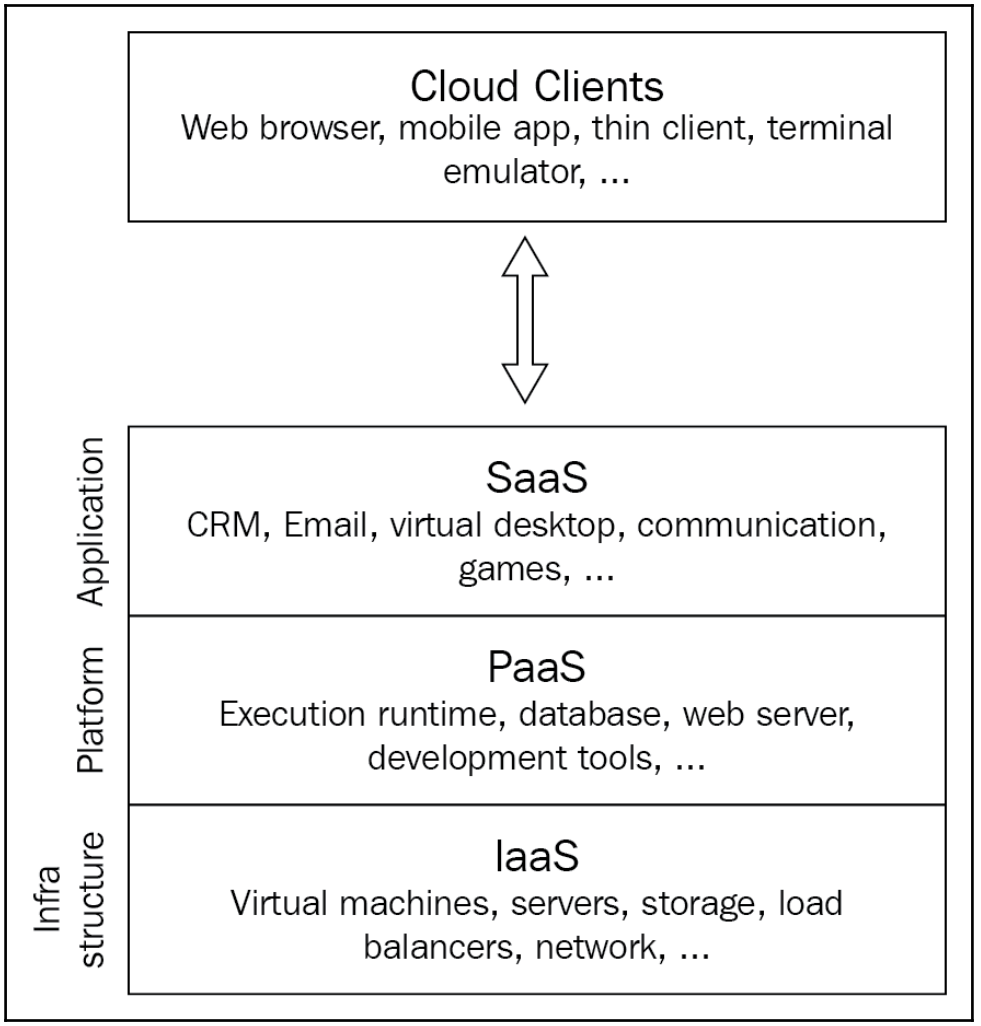

HDInsight Ecosystem
Pipeline / Workflow (Oozie)
Log file aggregation (Flume)
PD W
NoSQL Database (HBase)
Metadata (HCatalog)
Scripting (Pig)
Query (Hive)
Graph (Pegasus)
Stats processing (RHadoop)
Machine Learning (Mahout)
Distributed Processing (Map Reduce)
Distributed Storage (HDFS)
Data Integration (ODBC / SQOOP / REST)
Business Intelligence (Excel, PowerView...)
World's Data (Azure Data Marketplace)
Windows Azure Storage
AD, System Center

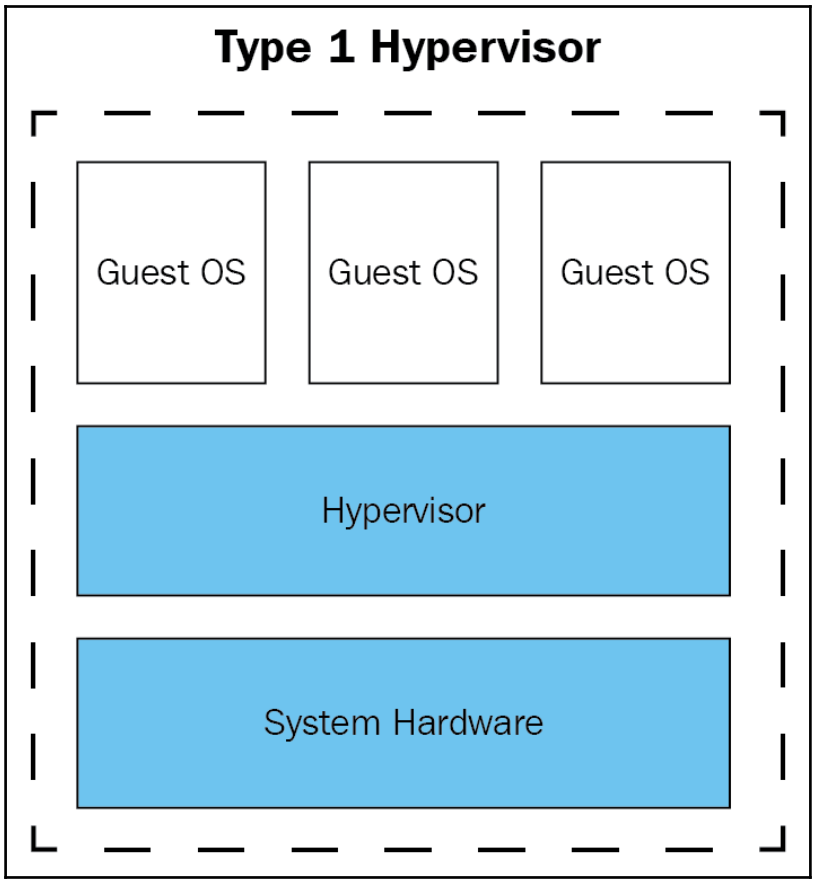

Challenges (complex software stack)
Yarn test
Hbase test
DFS test
Timeouts & other settings
OS test
Zookeeper test
Hardware test
Distributed co-ordination using zookeeper
monitoring
clients/schedulers/jobs
HBase
yarn map-reduce
HDFS
Machine/OS
Client test
client configs
Service/Job configs
Service configs
Hardware config/OS/Kernel tuning

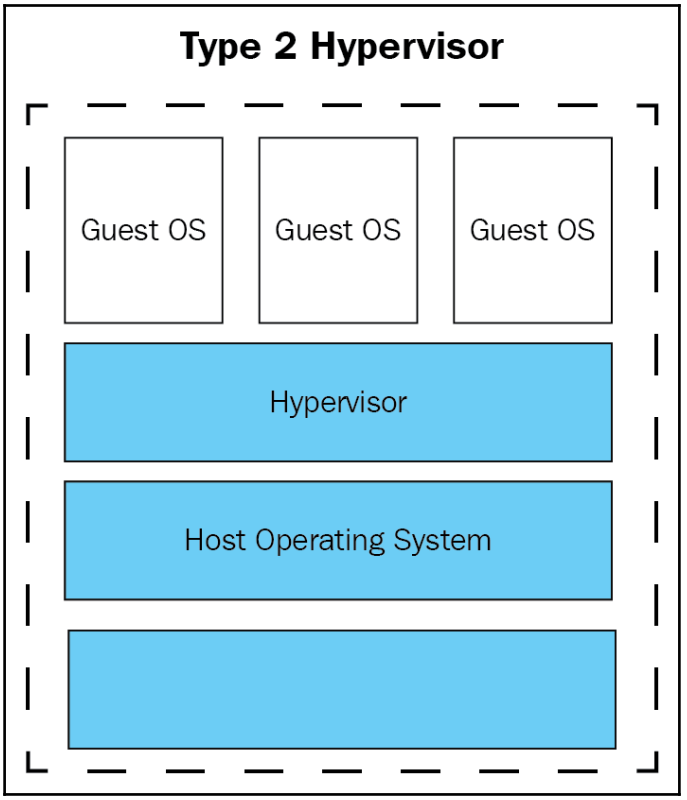
Chapter 5: Cloud Computing

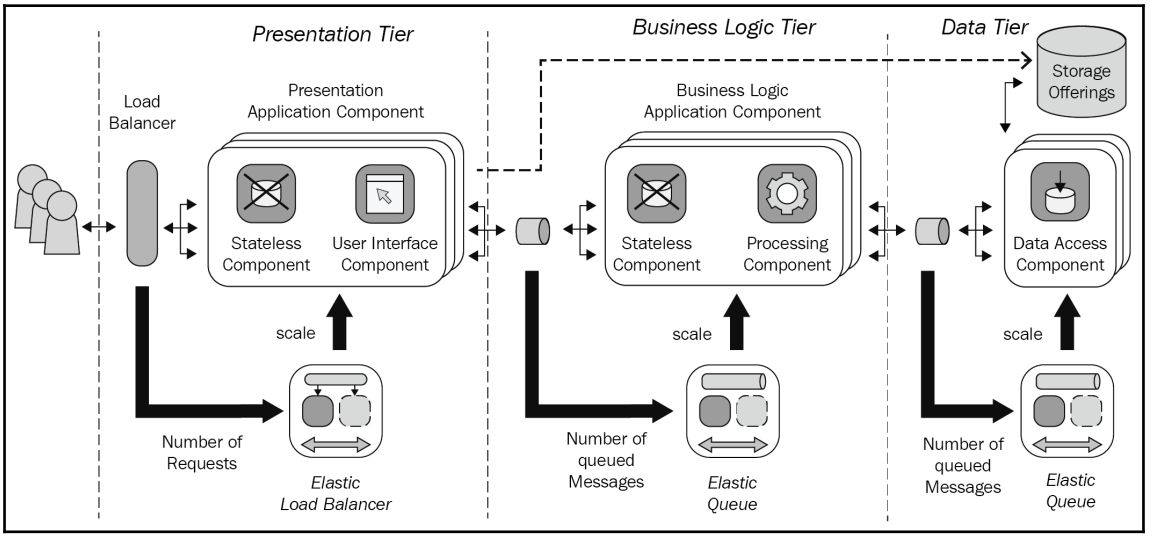


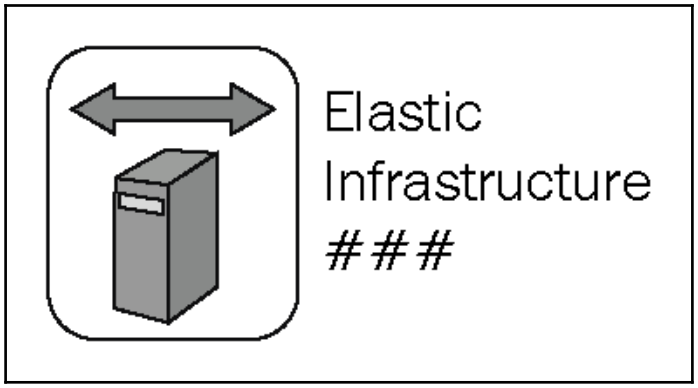


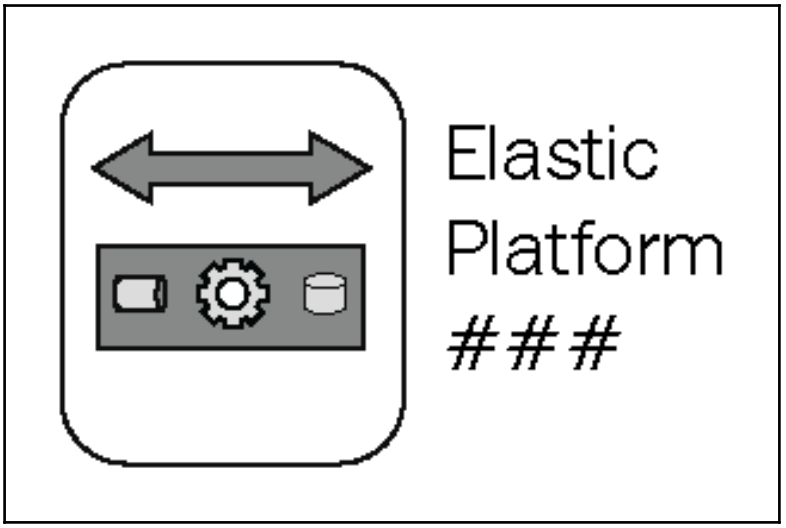

Cloud Clients
Web browser, mobile app, thin client, terminal emulator, ...
Application
SaaS
CRM, Email, virtual desktop, communication, games, ...
Platform
PaaS
Execution runtime, database, web server, development tools, ...
Infra structure
IaaS
Virtual machines, servers, storage, load balancers, network, ...

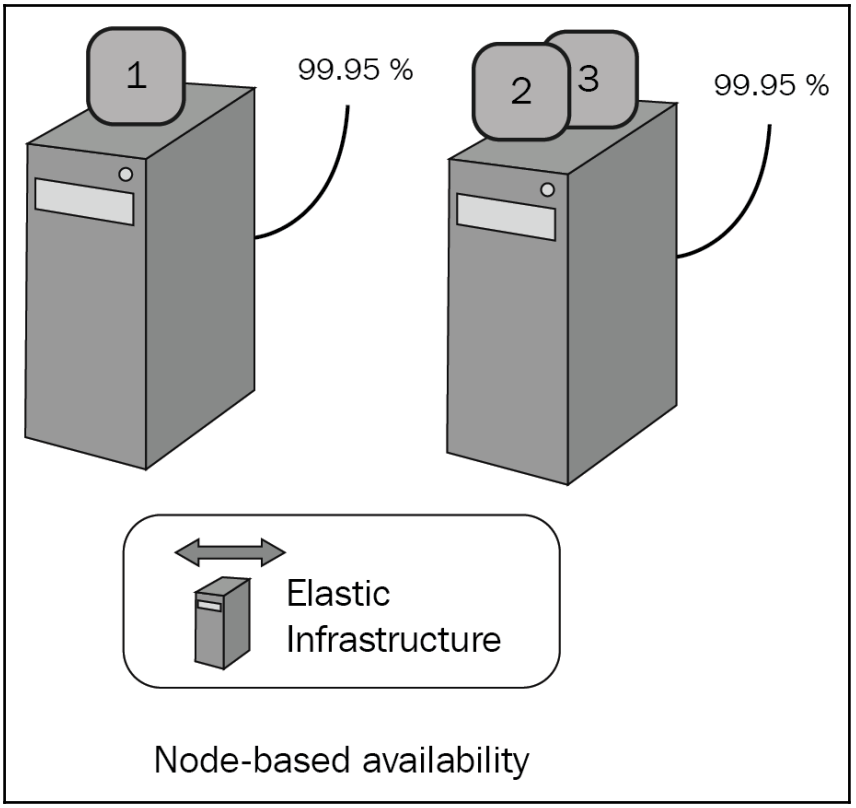

Type 1 Hypervisor
Guest OS
Guest OS
Guest OS
Hypervisor
System Hardware

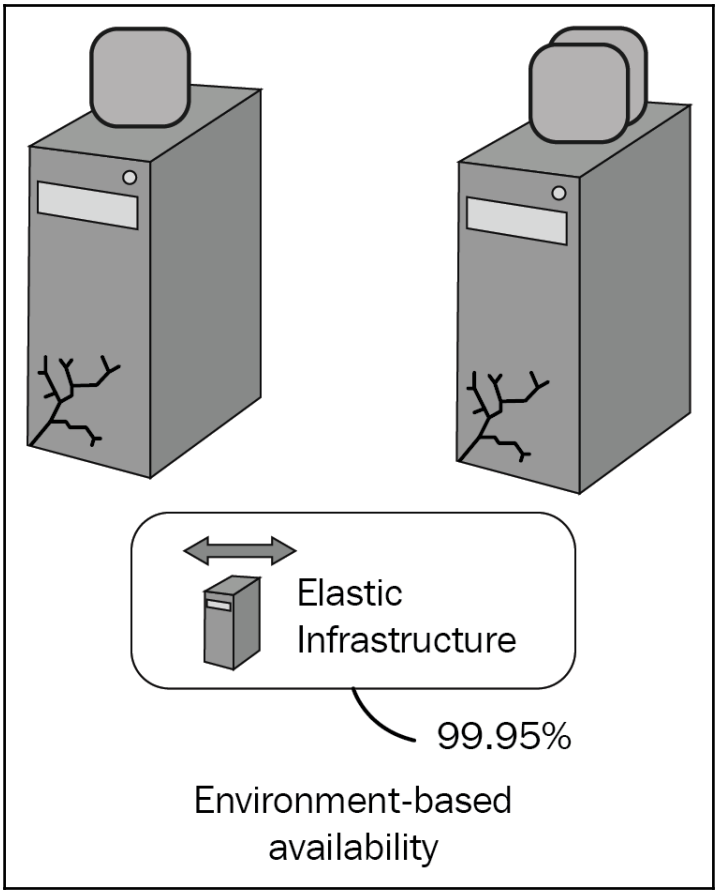

Type 2 Hypervisor
Guest OS
Guest OS
Guest OS
Hypervisor
Host Operating System

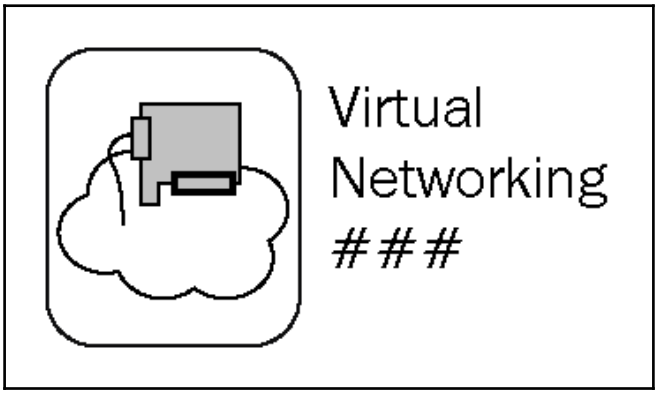

Presentation Tier
Business Logic Tier
Data Tier
Load Balancer
Presentation Application Component
Business Logic Application Component
Storage Offerings
Stateless Component
User Interface Component
Stateless Component
Processing Component
Data Access Component
scale
scale
scale
Number of Requests
Elastic Load Balancer
Number of queued Messages
Elastic Queue
Number of queued Messages
Elastic Queue

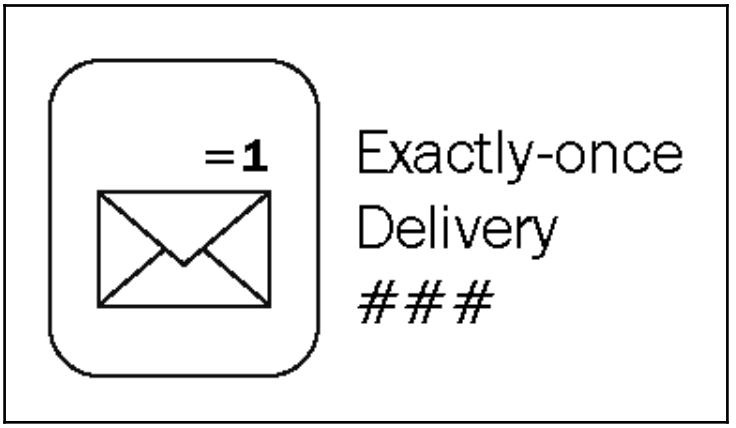

Elastic
Infrastructure
###

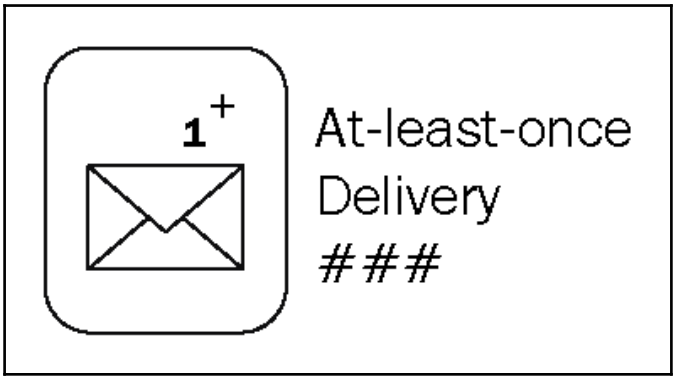

Elastic
Platform
###

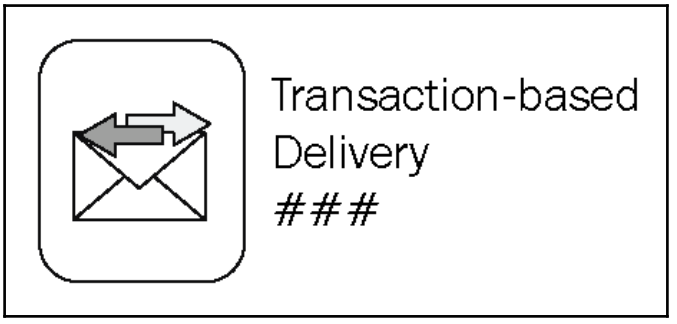

1
99.95 %
2
3
99.95 %
Elastic
Infrastructure
Node-based availability

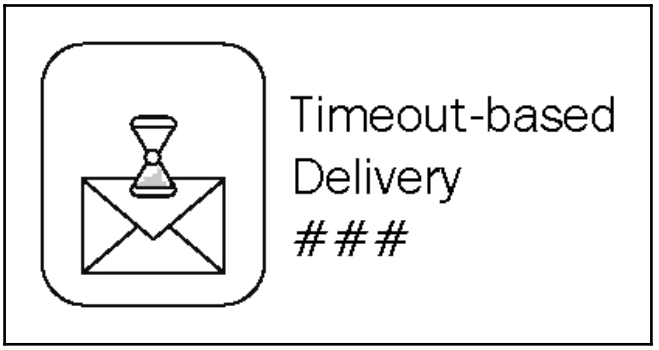

Elastic
Infrastructure
99.95%
Environment-based
availability

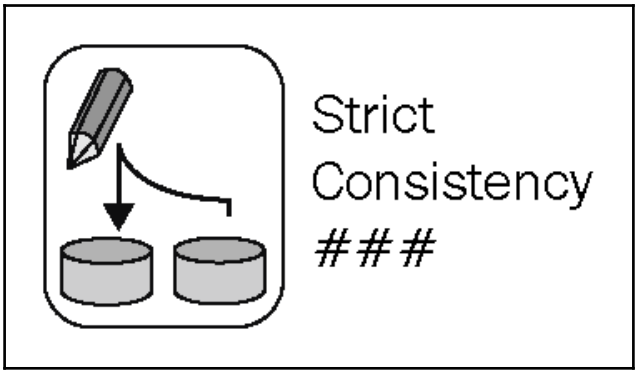

Virtual
Networking
###

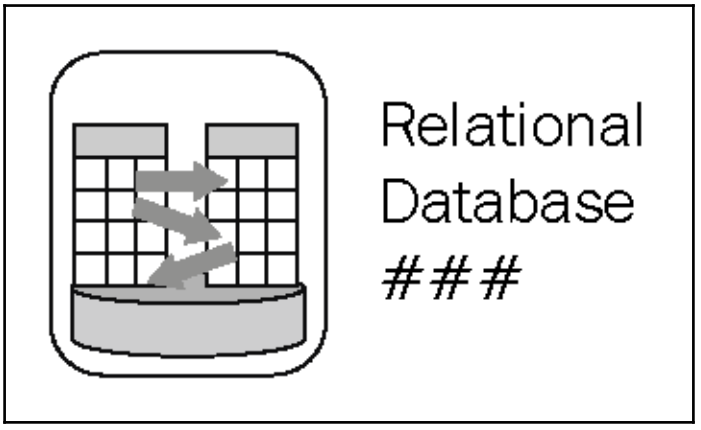

=1
Exactly-once
Delivery
###

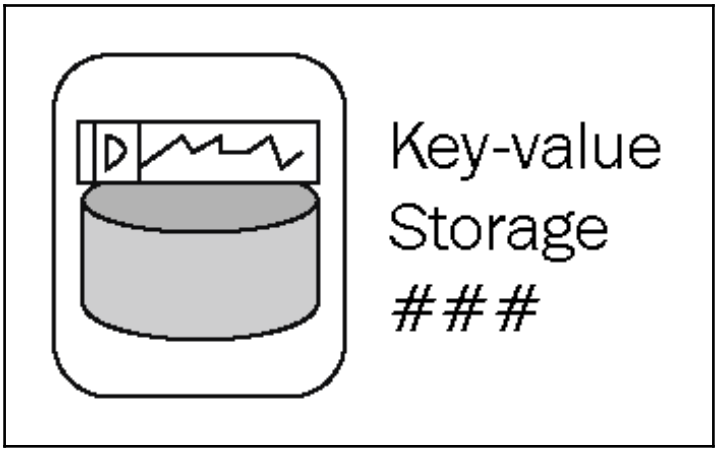

1+
At-least-once
Delivery
###

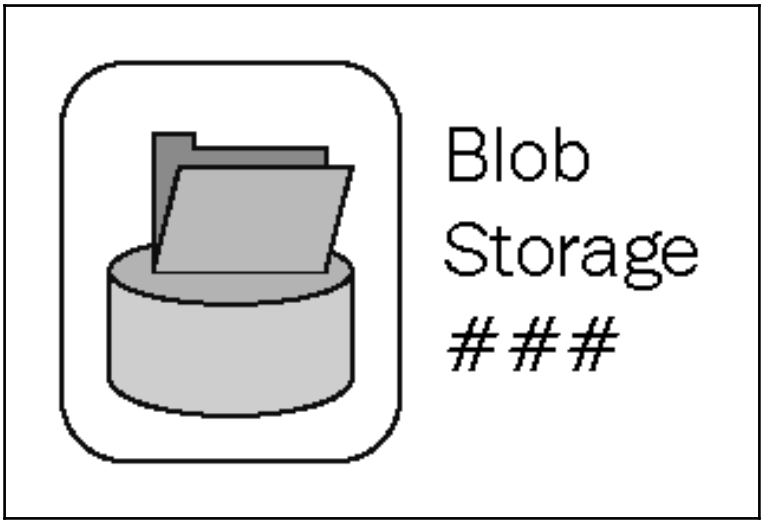

Transaction-based
Delivery
###

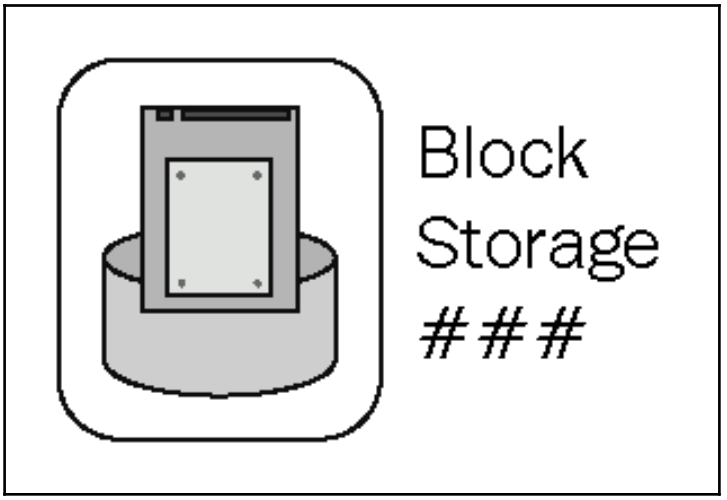

Timeout-based
Delivery
###

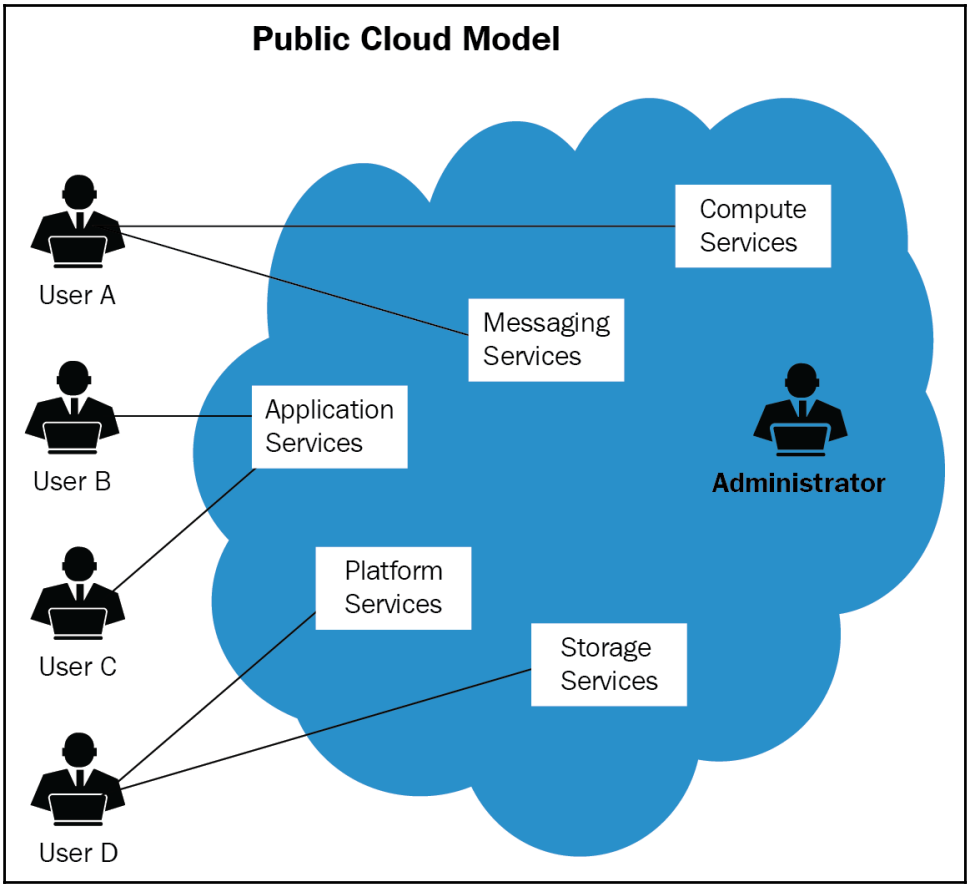

Strict
Consistency
###

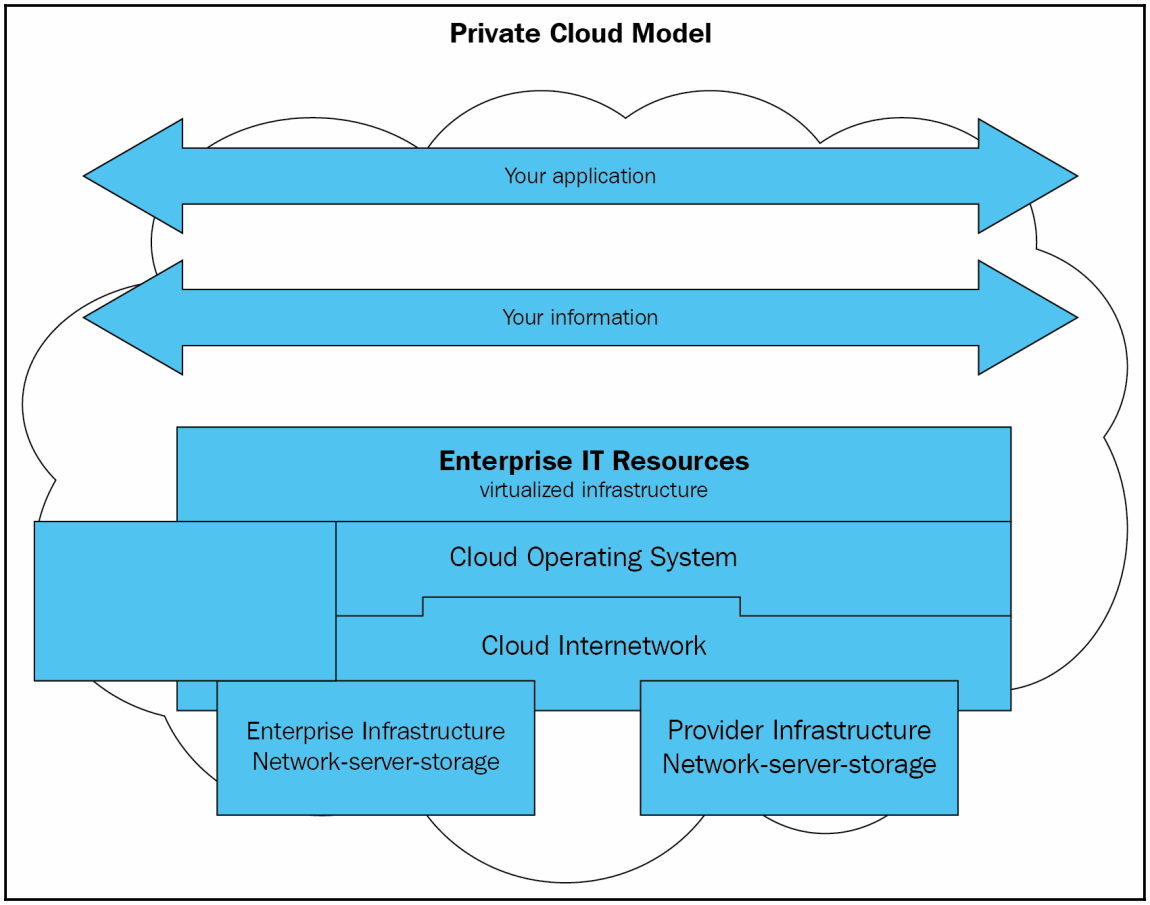

Relational
Database
###

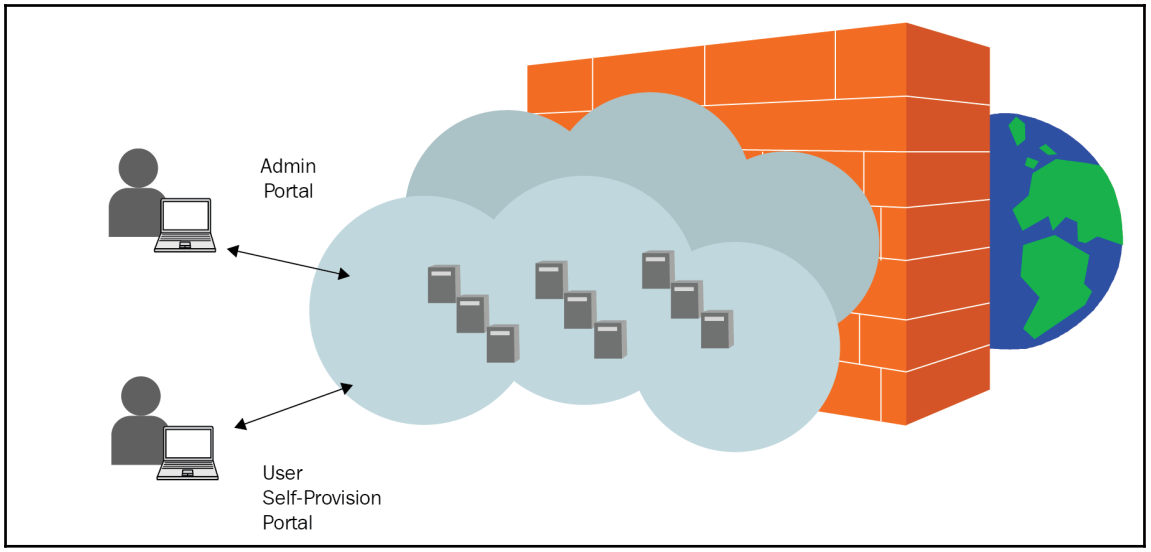

Key-value
Storage
###

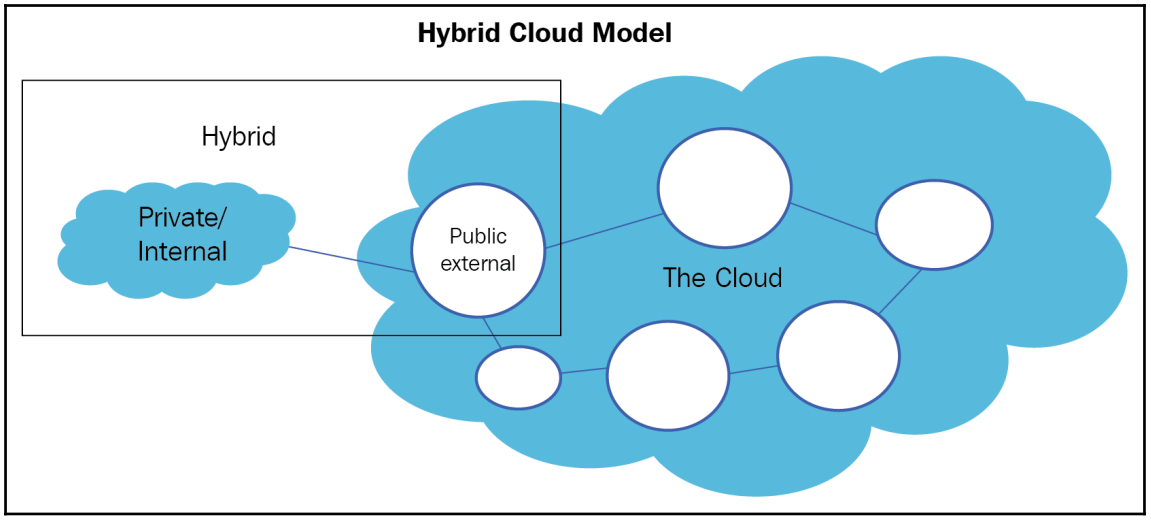

Blob
Storage
###

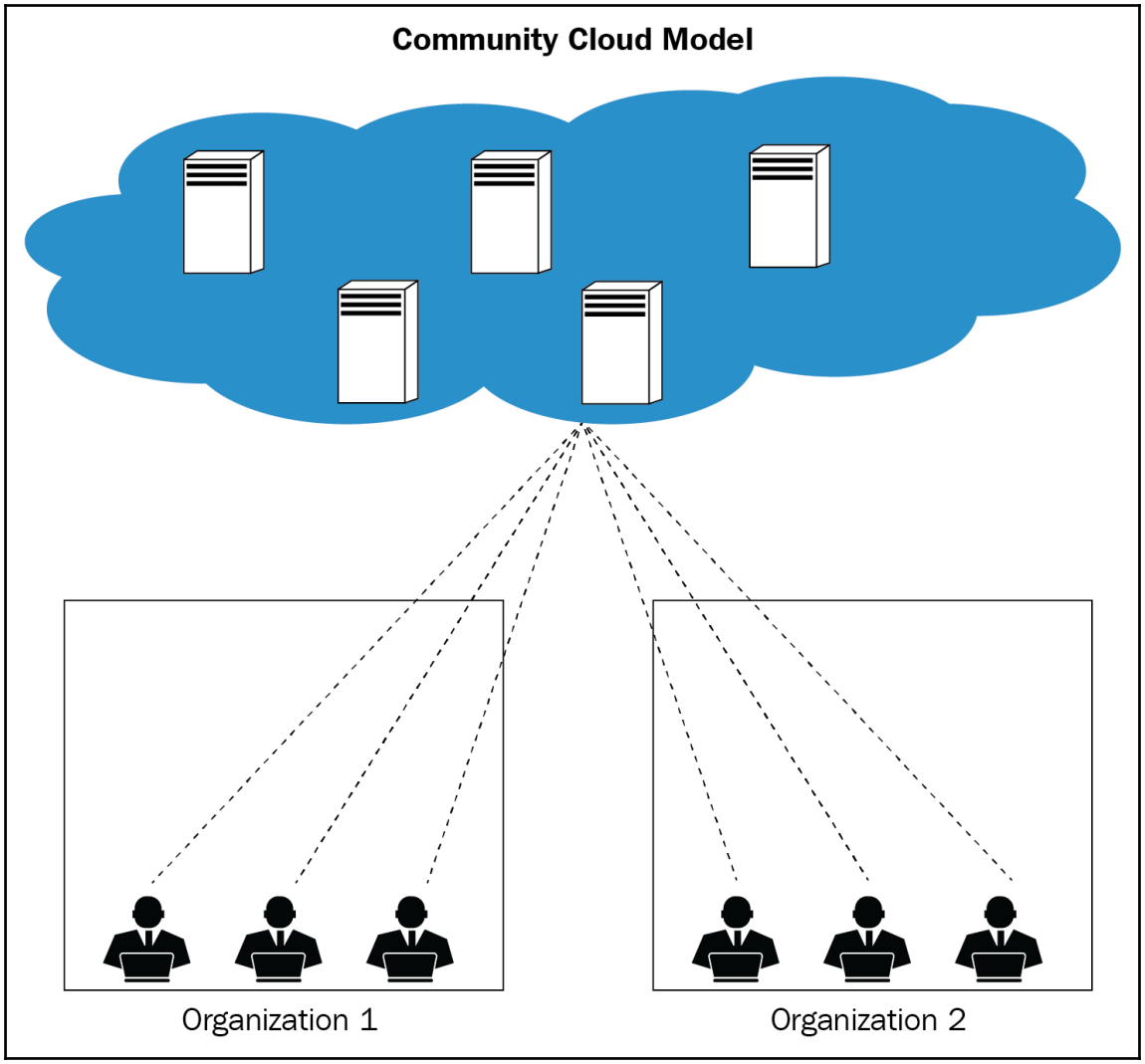

Block
Storage
###

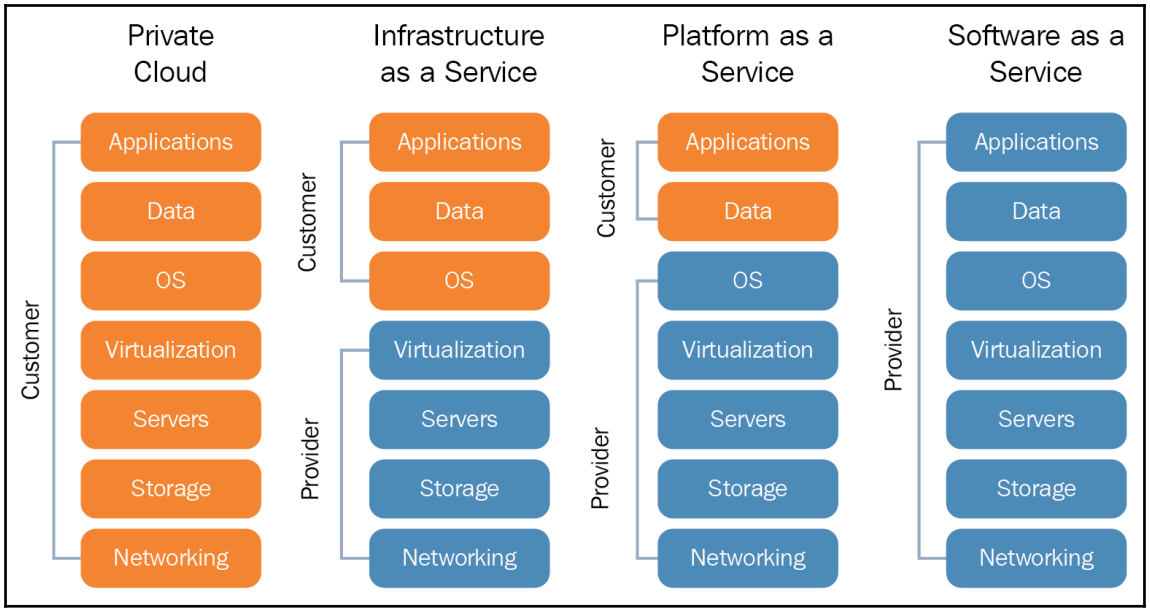

Public Cloud Model
User A
User B
User C
User D
Compute Services
Messaging Services
Application Services
Platform Services
Storage Services
Administrator

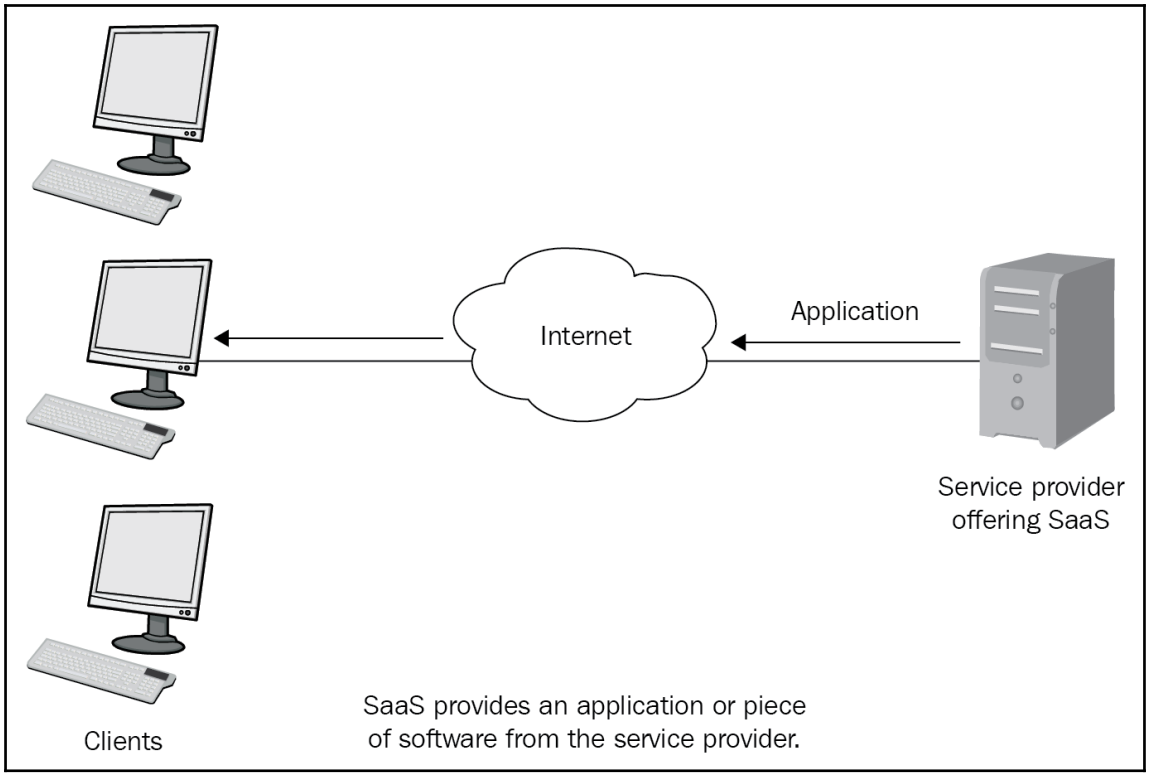

Private Cloud Model
Your application
Your information
Enterprise IT Resources
virtualized infrastructure
Cloud Operating System
Cloud Internetwork
Enterprise Infrastructure
Network-server-storage
Provider Infrastructure
Network-server-storage

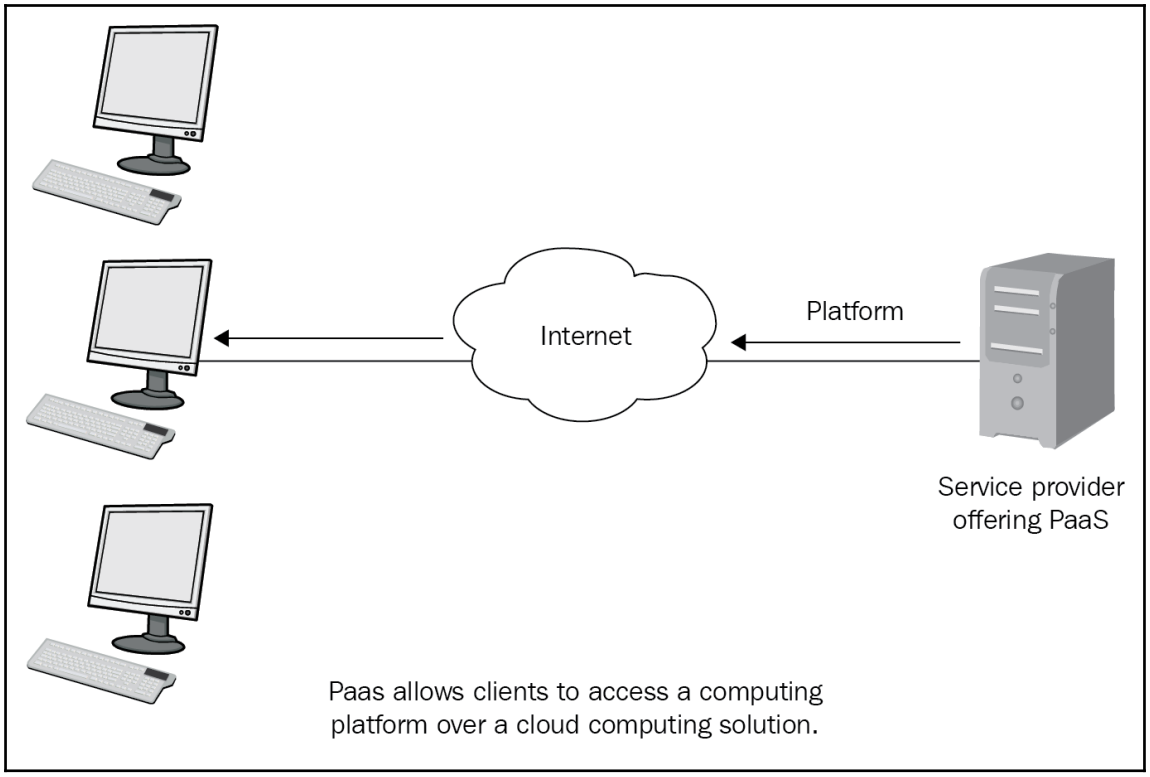

Admin
Portal
User
Self-Provision
Portal

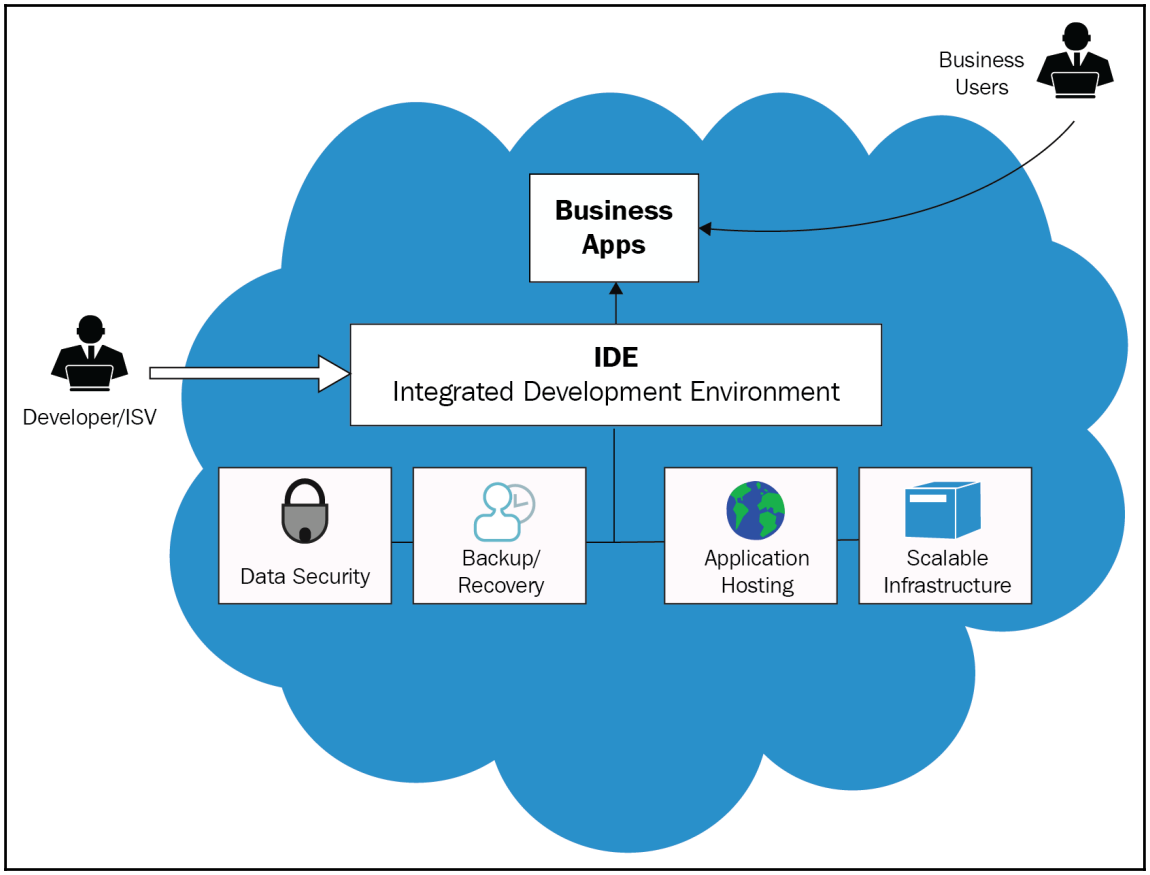

Hybrid Cloud Model
Hybrid
Private/
Internal
Public
external
The Cloud

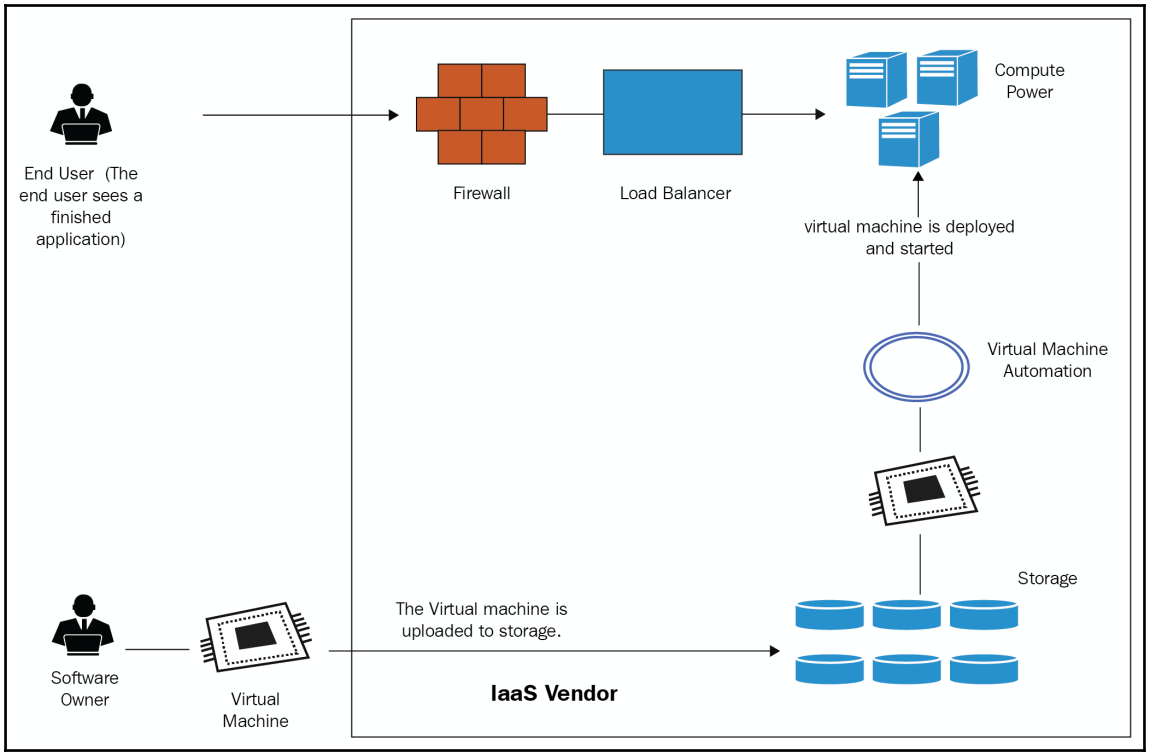

Community Cloud Model
Organization 1
Organization 2

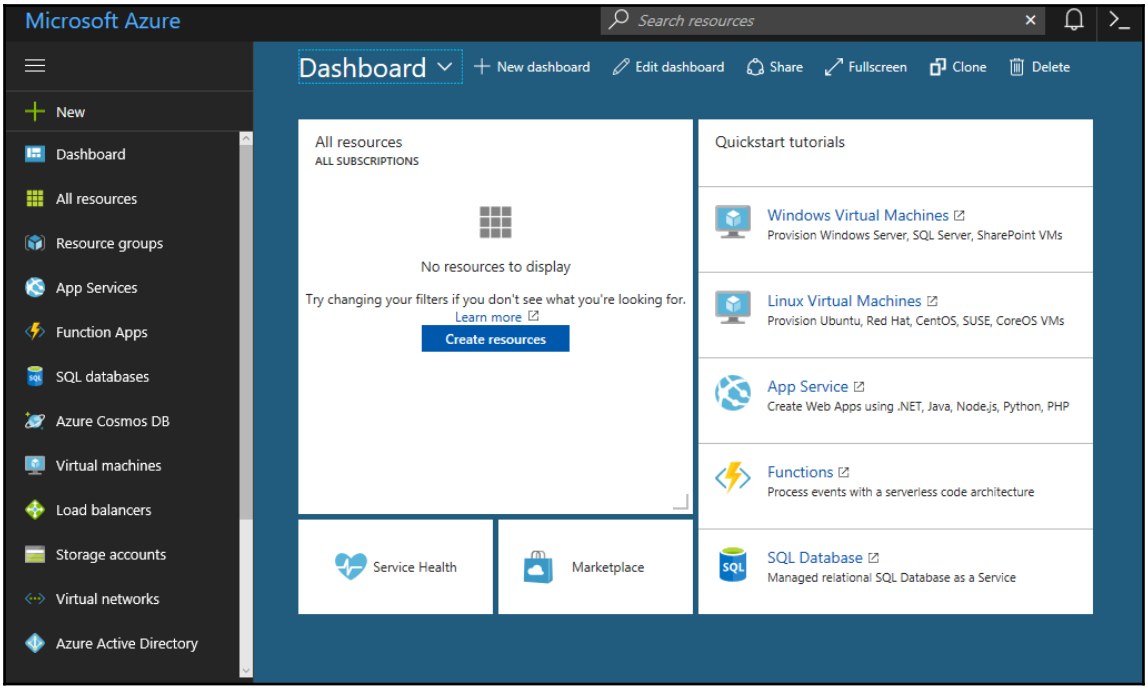

Private Cloud
Infrastructure as a Service
Platform as a Service
Software as a Service
Customer
Provider
Applications
Data
OS
Virtualization
Servers
Storage
Networking

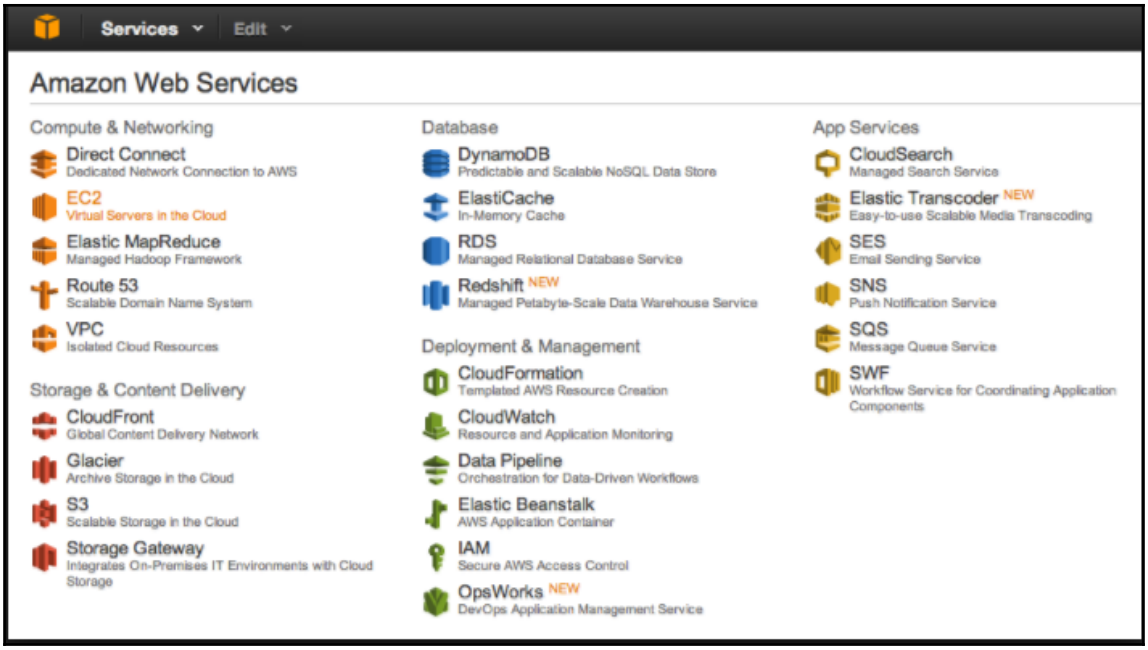

Internet
Application
Service provider
offering SaaS
Clients
SaaS provides an application or piece
of software from the service provider.

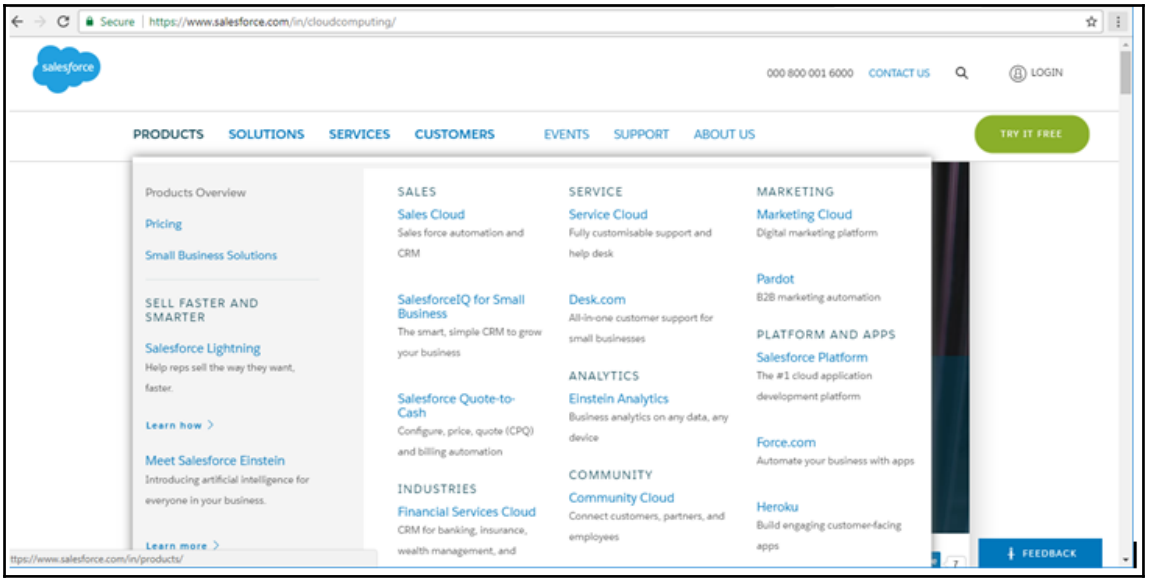

Internet
Platform
Service provider
offering PaaS
Paas allows clients to access a computing
platform over a cloud computing solution.

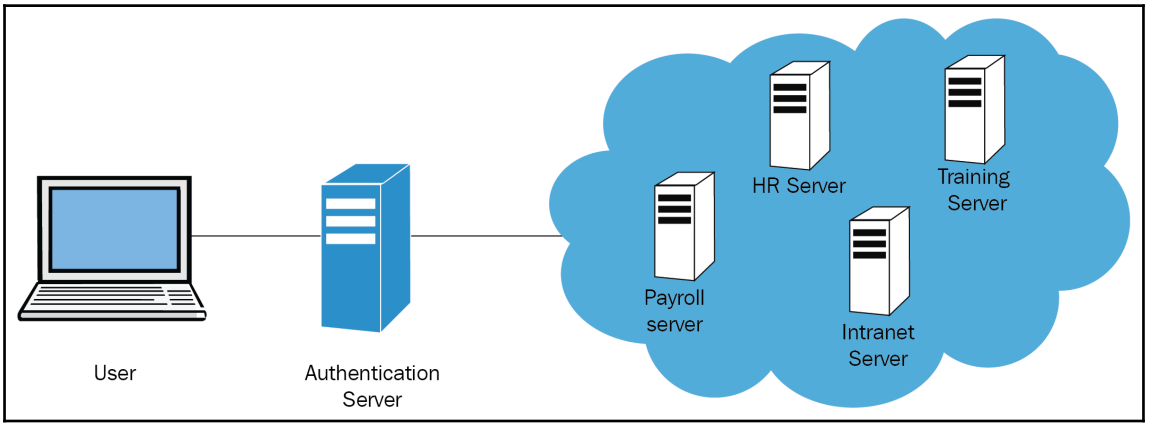

Business
Users
Business
Apps
IDE
Integrated Development Environment
Developer/ISV
Data Security
Backup/
Recovery
Application
Hosting
Scalable
Infrastructure

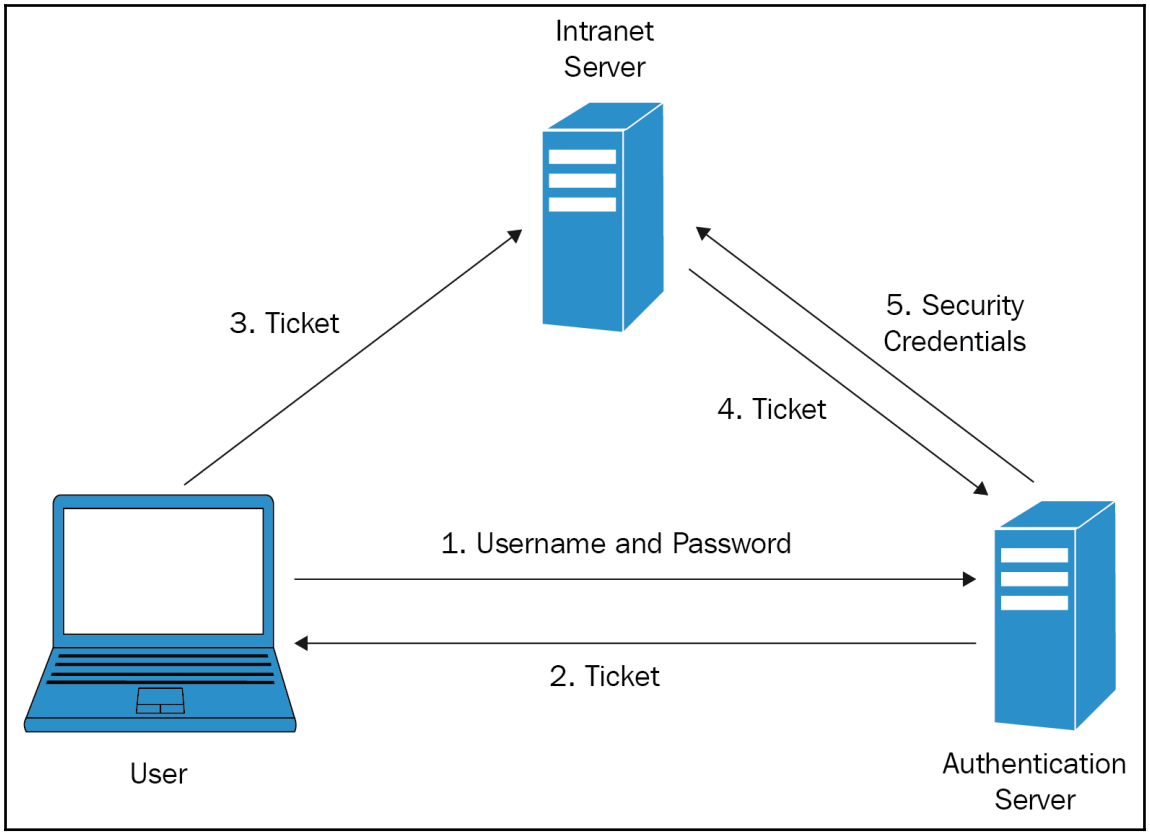

End User (The end user sees a finished application)
Firewall
Load Balancer
Compute Power
virtual machine is deployed and started
Virtual Machine Automation
Storage
Software Owner
Virtual Machine
The Virtual machine is uploaded to storage.
IaaS Vendor

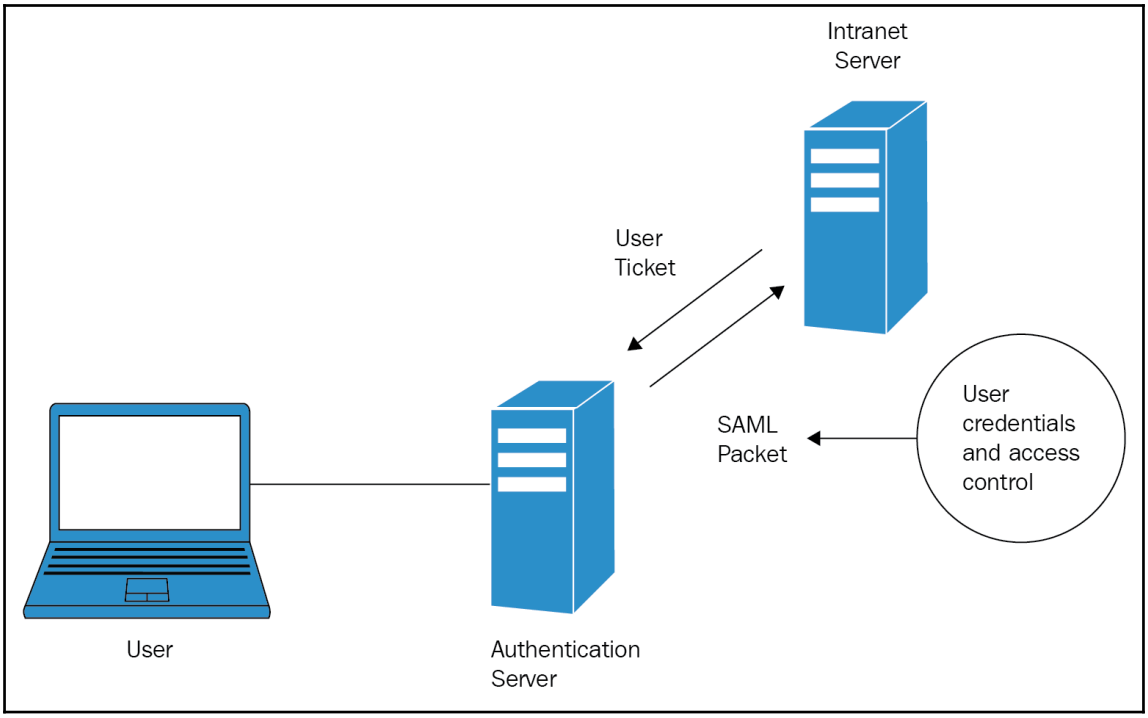

Microsoft Azure
Search resources
New
Dashboard
All resources
Resource groups
App Services
Function Apps
SQL databases
Azure Cosmos DB
Virtual machines
Load balancers
Storage accounts
Virtual networks
Azure Active Directory
Dashboard
New dashboard
Edit dashboard
Share
Fullscreen
Clone
Delete
All resources
ALL SUBSCRIPTIONS
No resources to display
Try changing your filters if you don't see what you're looking for.
Learn more
Create resources
Quickstart tutorials
Windows Virtual Machines
Provision Windows Server, SQL Server, SharePoint VMs
Linux Virtual Machines
Provision Ubuntu, Red Hat, CentOS, SUSE, CoreOS VMs
App Service
Create Web Apps using .NET, Java, Node.js, Python, PHP
Functions
Process events with a serverless code architecture
SQL Database
Managed relational SQL Database as a Service
Service Health
Marketplace

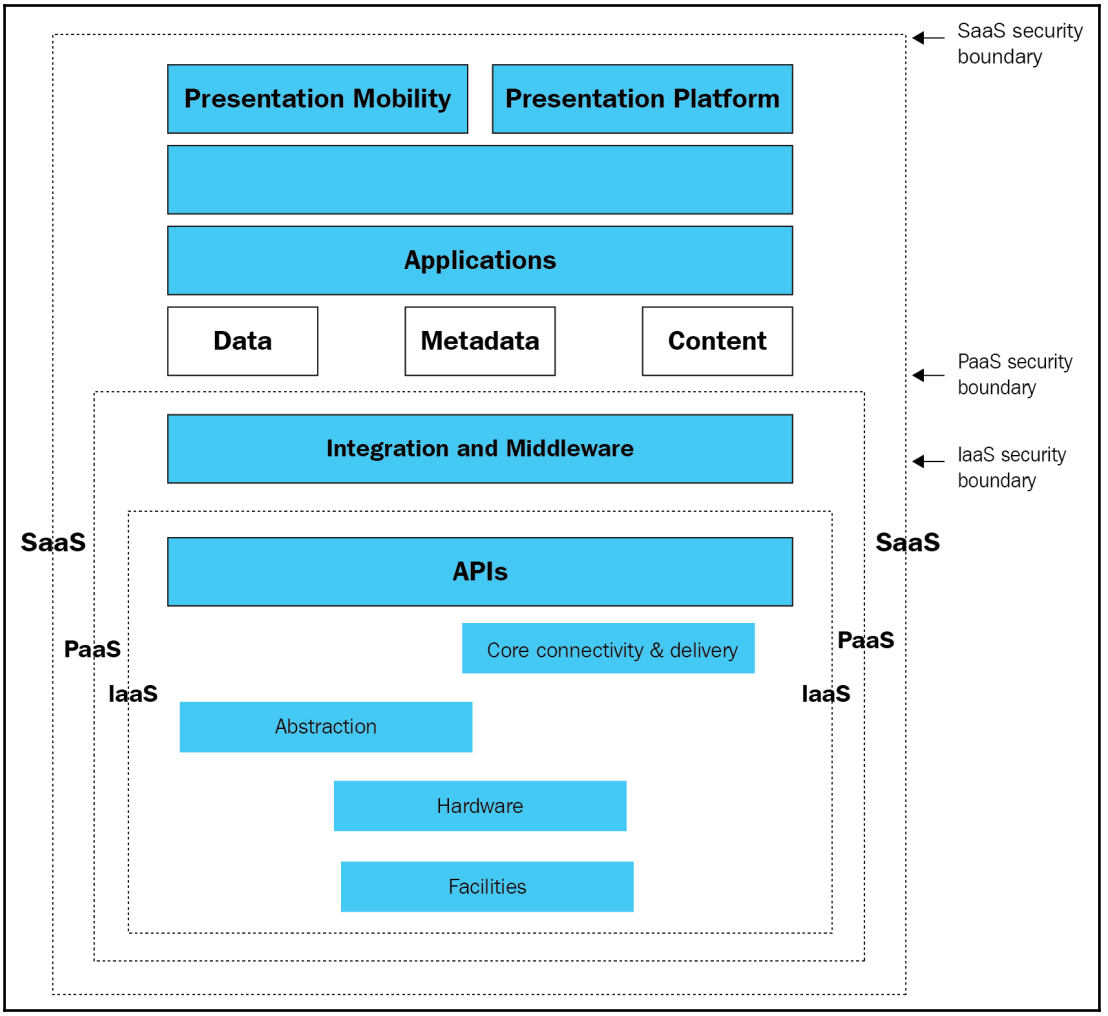

Services
Edit
Amazon Web Services
Compute & Networking
Direct Connect
Dedicated Network Connection to AWS
EC2
Virtual Servers in the Cloud
Elastic MapReduce
Managed Hadoop Framework
Route 53
Scalable Domain Name System
VPC
Isolated Cloud Resources
Storage & Content Delivery
CloudFront
Global Content Delivery Network
Glacier
Archive Storage in the Cloud
S3
Scalable Storage in the Cloud
Storage Gateway
Integrates On-Premises IT Environments with Cloud Storage
Database
DynamoDB
Predictable and Scalable NoSQL Data Store
ElastiCache
In-Memory Cache
RDS
Managed Relational Database Service
Redshift NEW
Managed Petabyte-Scale Data Warehouse Service
Deployment & Management
CloudFormation
Templated AWS Resource Creation
CloudWatch
Resource and Application Monitoring
Data Pipeline
Orchestration for Data-Driven Workflows
Elastic Beanstalk
AWS Application Container
IAM
Secure AWS Access Control
OpsWorks NEW
DevOps Application Management Service
App Services
CloudSearch
Managed Search Service
Elastic Transcoder NEW
Easy-to-use Scalable Media Transcoding
SES
Email Sending Service
SNS
Push Notification Service
SQS
Message Queue Service
SWF
Workflow Service for Coordinating Application Components

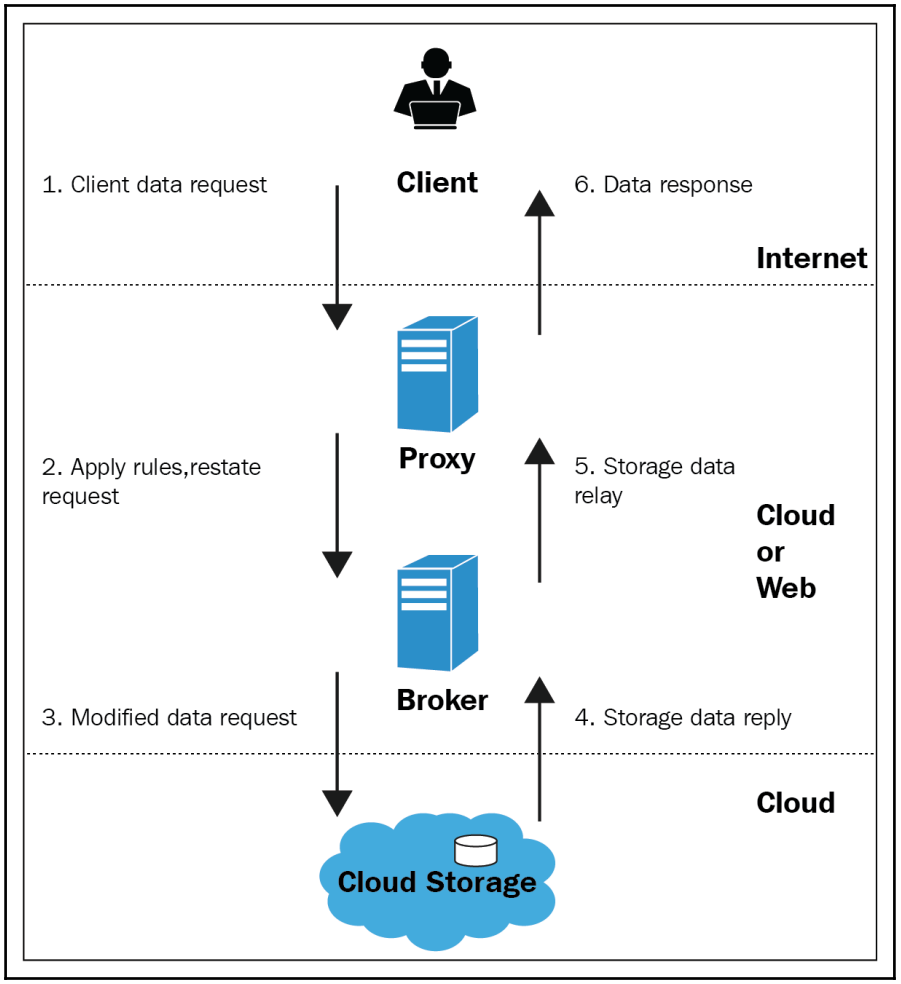

Secure | https://www.salesforce.com/in/cloudcomputing/
salesforce
000 800 001 6000
CONTACT US
LOGIN
PRODUCTS
SOLUTIONS
SERVICES
CUSTOMERS
EVENTS
SUPPORT
ABOUT US
TRY IT FREE
Products Overview
Pricing
Small Business Solutions
SELL FASTER AND SMARTER
Salesforce Lightning
Help reps sell the way they want, faster.
Learn how >
Meet Salesforce Einstein
Introducing artificial intelligence for everyone in your business.
Learn more >
SALES
Sales Cloud
Sales force automation and CRM
SalesforceIQ for Small Business
The smart, simple CRM to grow your business
Salesforce Quote-to-Cash
Configure, price, quote (CPQ) and billing automation
INDUSTRIES
Financial Services Cloud
CRM for banking, insurance, wealth management, and
SERVICE
Service Cloud
Fully customisable support and help desk
Desk.com
All-in-one customer support for small businesses
ANALYTICS
Einstein Analytics
Business analytics on any data, any device
COMMUNITY
Community Cloud
Connect customers, partners, and employees
MARKETING
Marketing Cloud
Digital marketing platform
Pardot
B2B marketing automation
PLATFORM AND APPS
Salesforce Platform
The #1 cloud application development platform
Force.com
Automate your business with apps
Heroku
Build engaging customer-facing apps
FEEDBACK
https://www.salesforce.com/in/products/

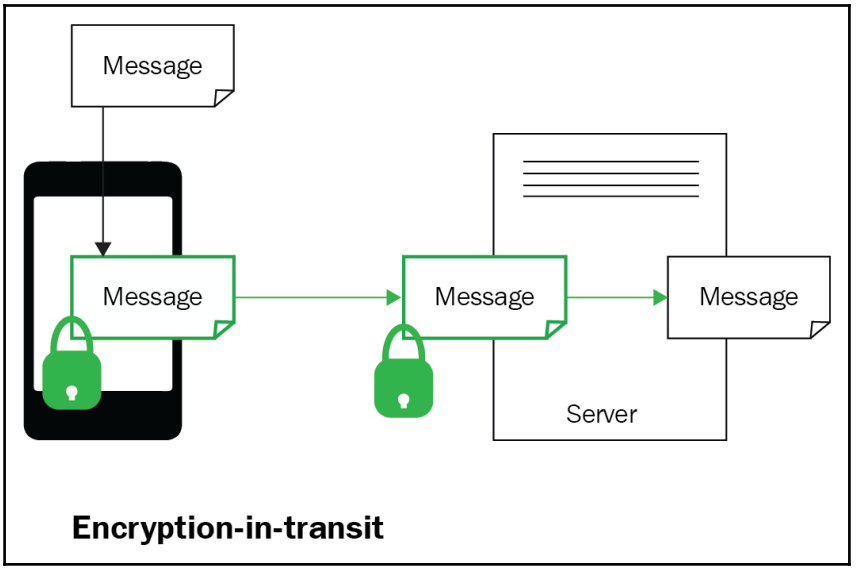

User
Authentication Server
HR Server
Training Server
Payroll server
Intranet Server

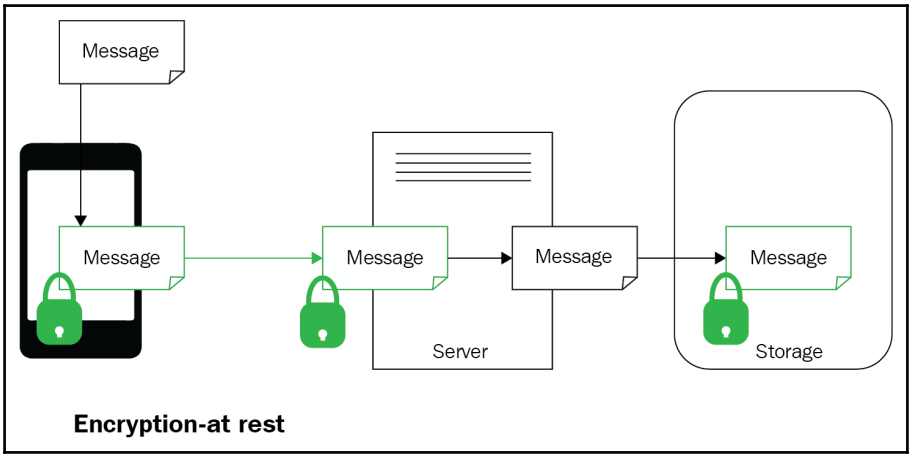

Intranet
Server
3. Ticket
5. Security
Credentials
4. Ticket
1. Username and Password
2. Ticket
User
Authentication
Server

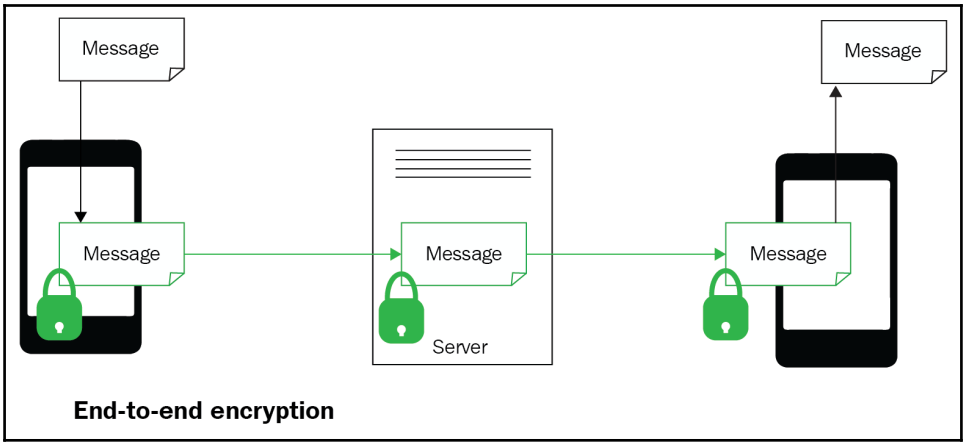

Intranet
Server
User
Ticket
SAML
Packet
User
credentials
and access
control
User
Authentication
Server

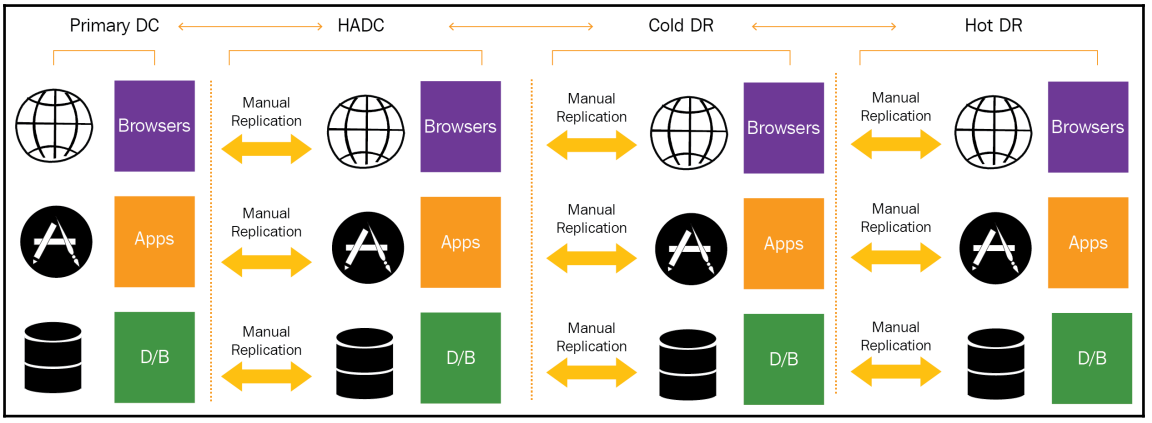

SaaS security boundary
Presentation Mobility
Presentation Platform
Applications
Data
Metadata
Content
PaaS security boundary
Integration and Middleware
IaaS security boundary
SaaS
SaaS
APIs
PaaS
Core connectivity & delivery
PaaS
IaaS
IaaS
Abstraction
Hardware
Facilities


Client
1. Client data request
6. Data response
Internet
Proxy
2. Apply rules,restate request
5. Storage data relay
Cloud or Web
Broker
3. Modified data request
4. Storage data reply
Cloud
Cloud Storage

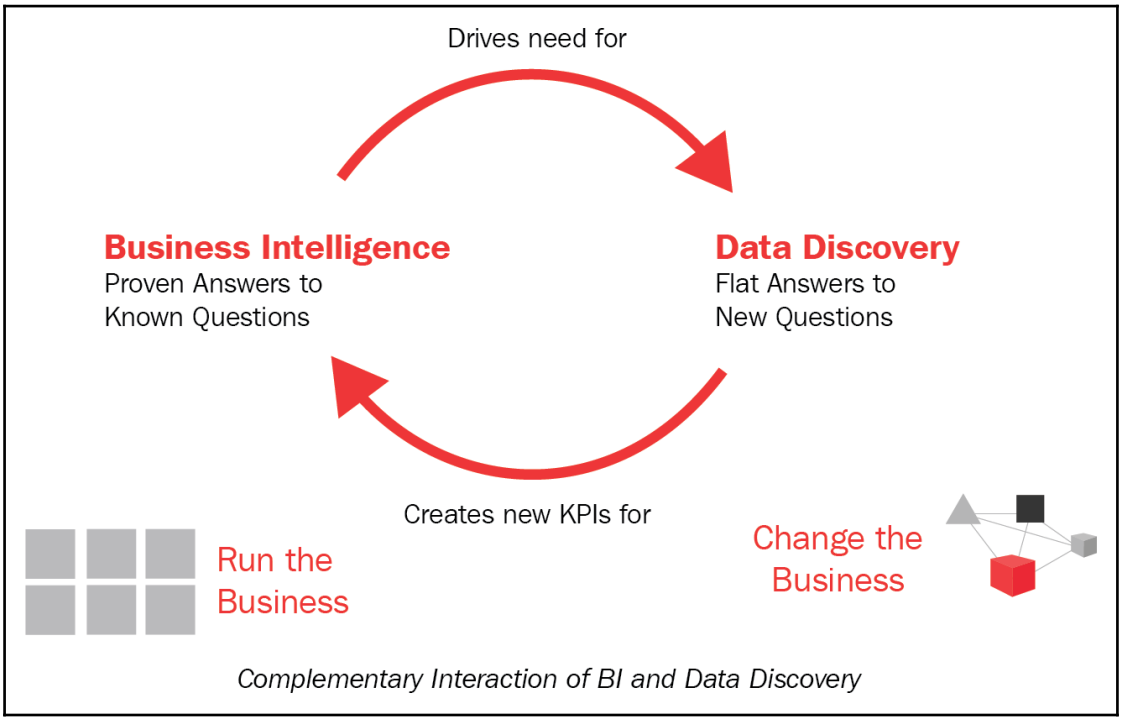

Message
Message
Message
Message
Server
Encryption-in-transit


Message
Message
Message
Message
Message
Server
Message
Storage
Encryption-at rest

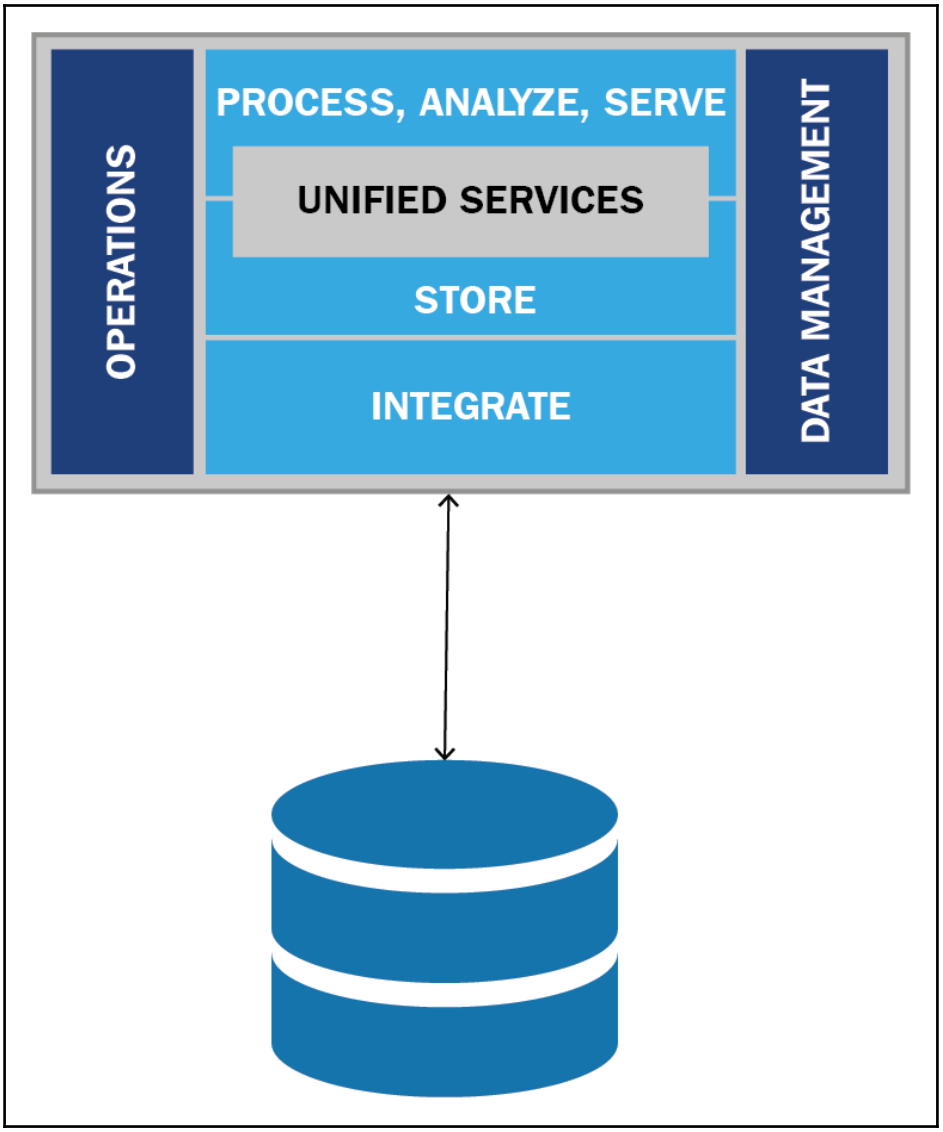

Message
Message
Message
Message
Message
Server
End-to-end encryption

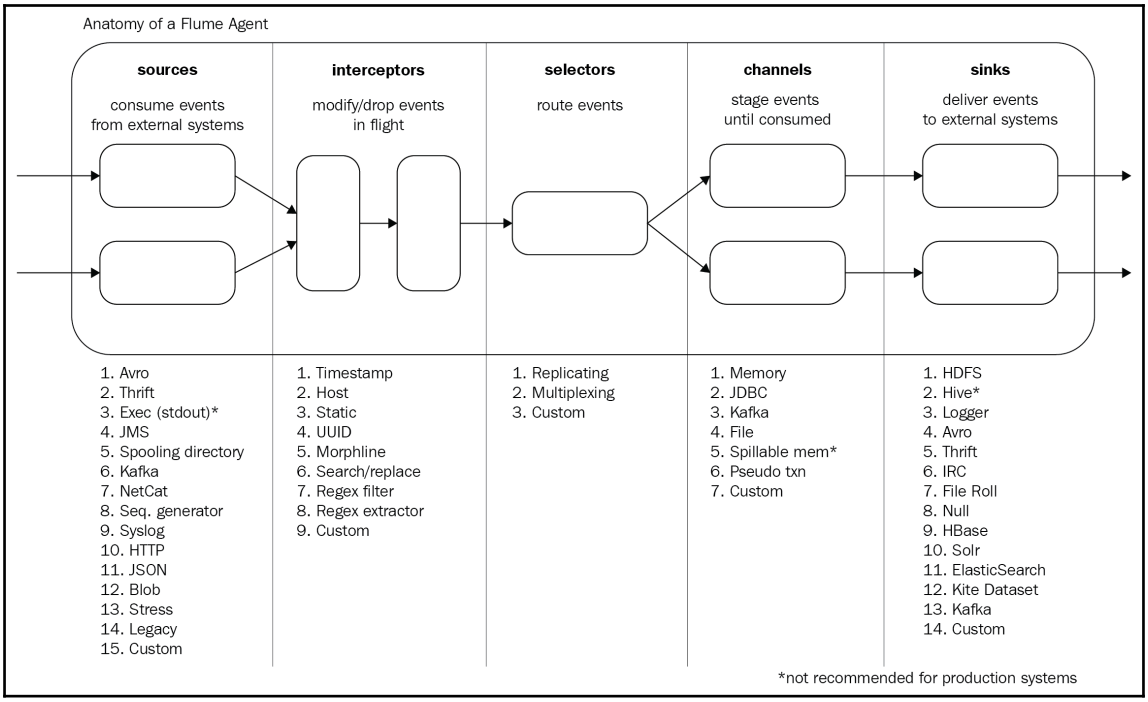

Primary DC
HADC
Cold DR
Hot DR
Browsers
Apps
D/B
Manual Replication

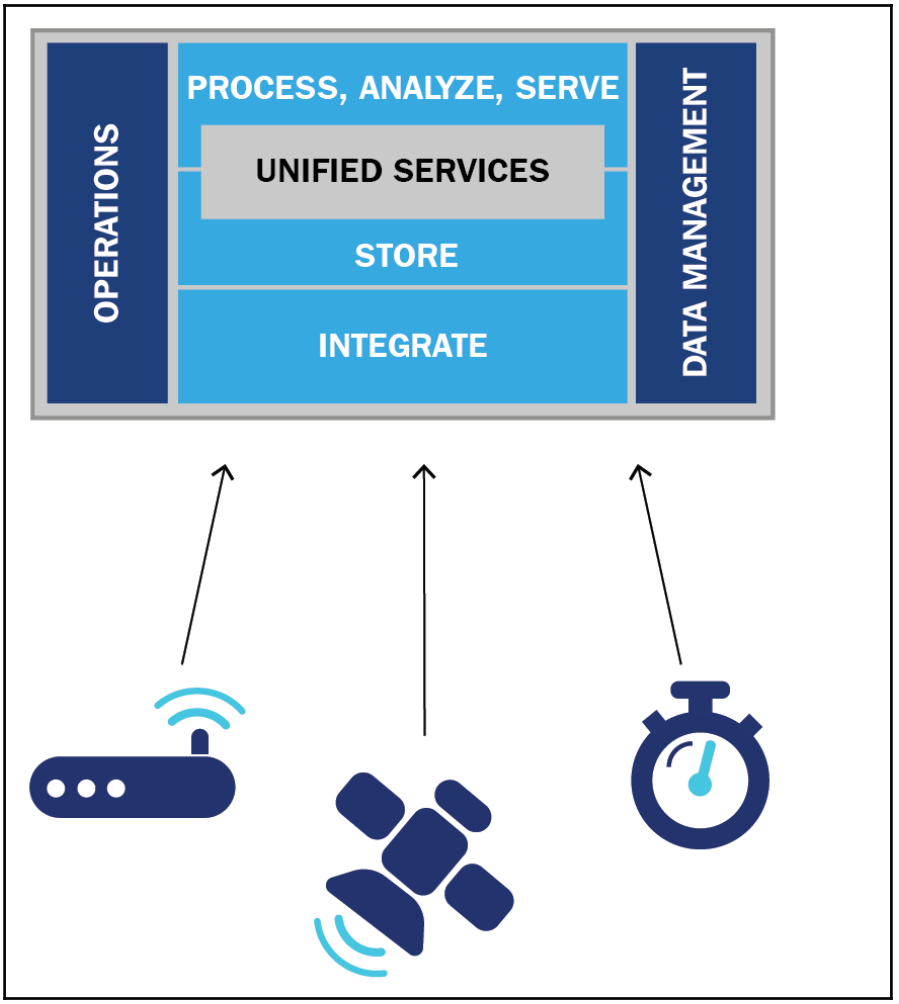
Chapter 6: Building Big Data Applications

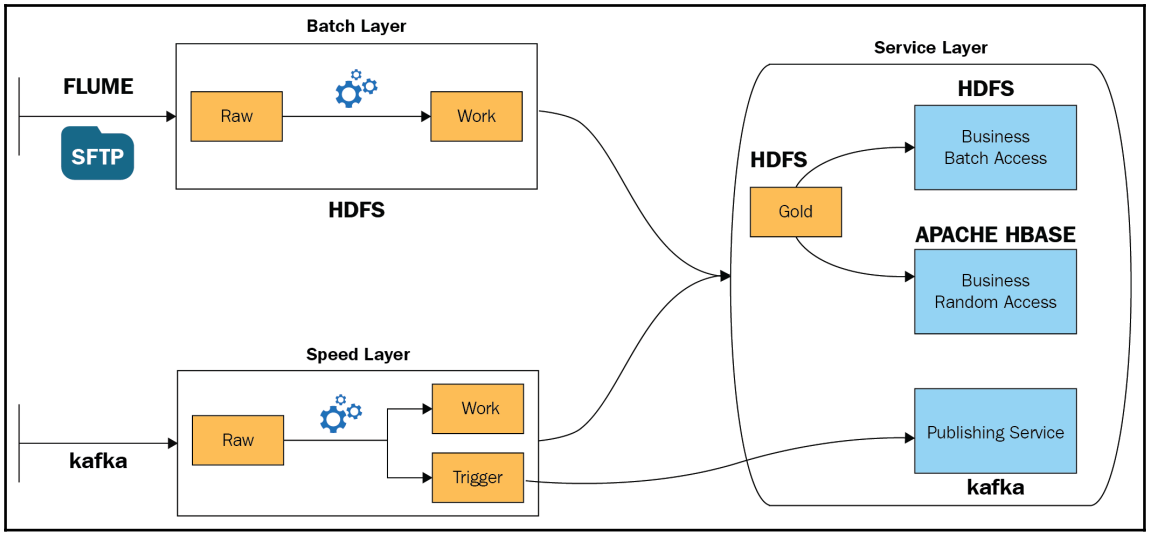


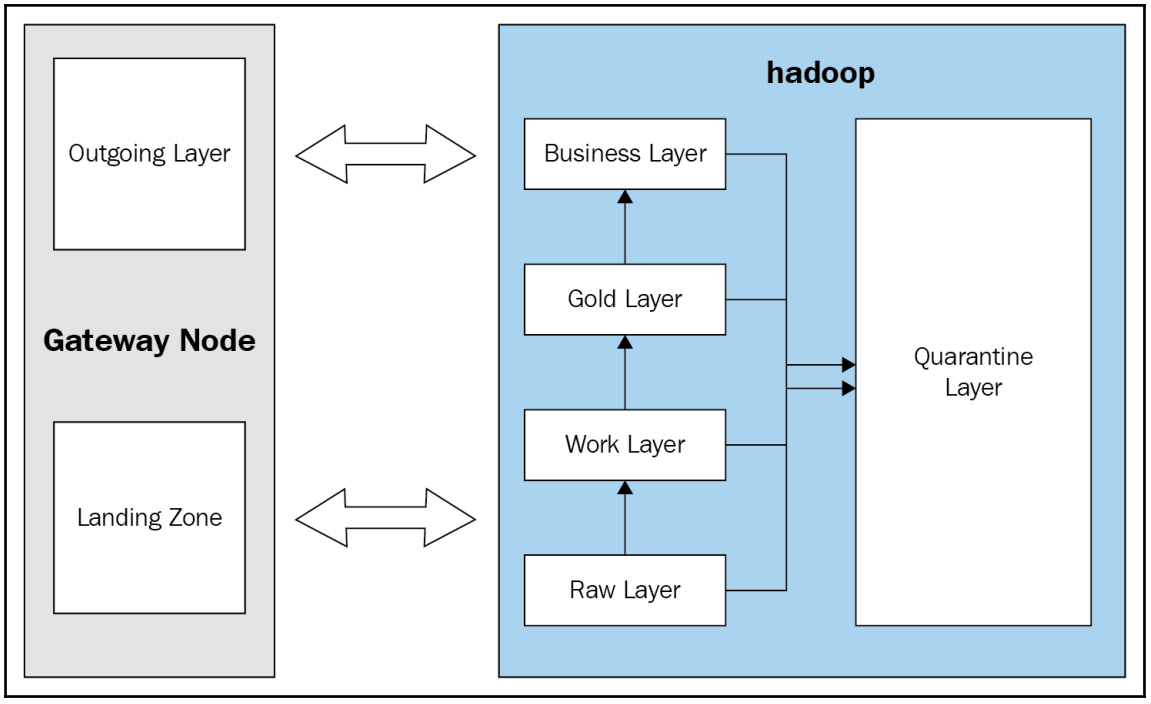
Complementary Interaction of BI and Data Discovery

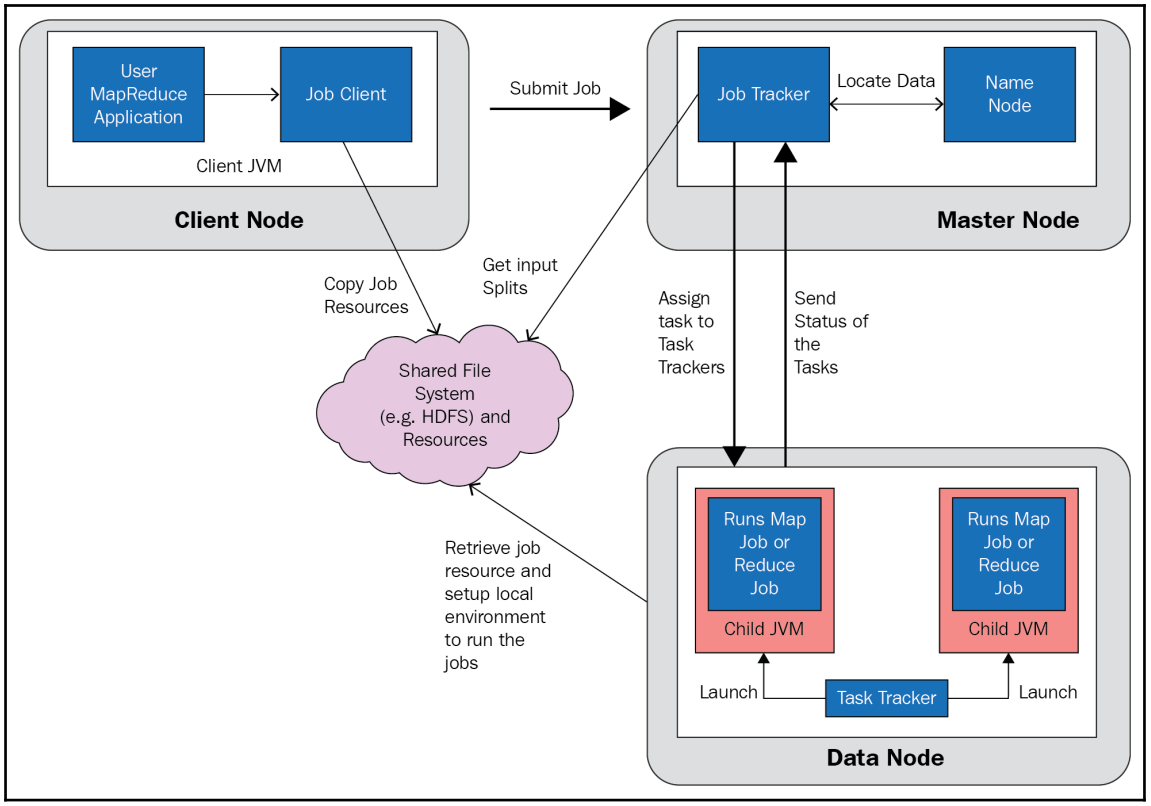

OPERATIONS
PROCESS, ANALYZE, SERVE
UNIFIED SERVICES
STORE
INTEGRATE
DATA MANAGEMENT

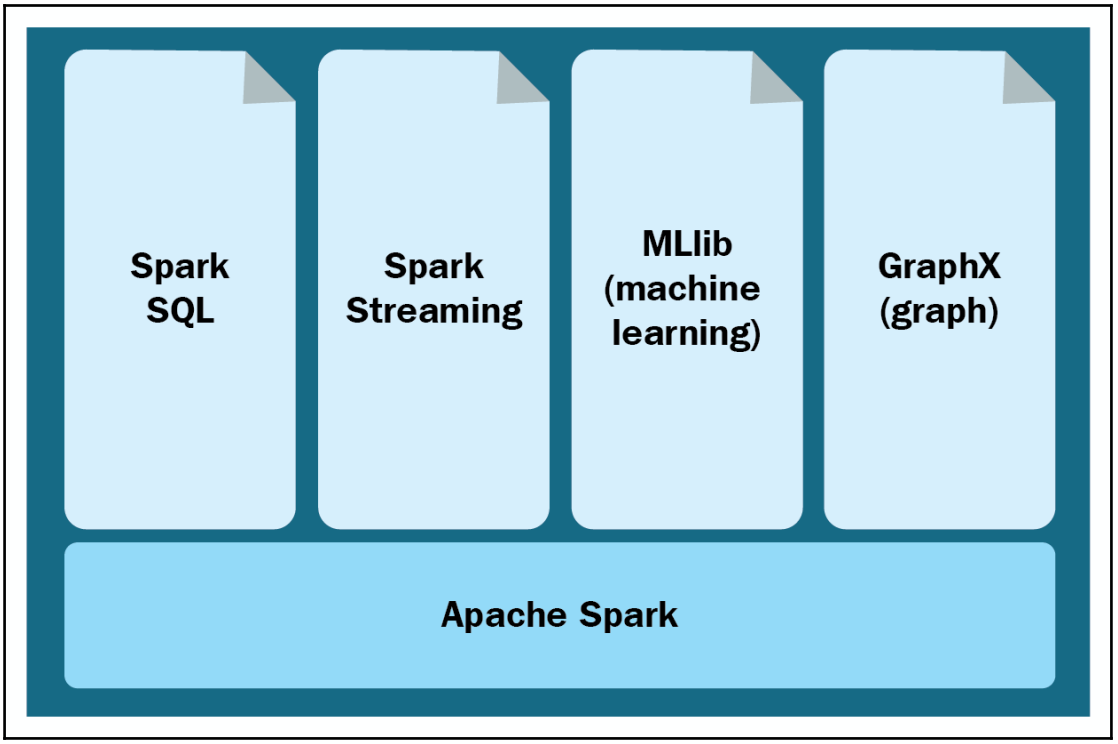

Anatomy of a Flume Agent
sources
consume events from external systems
interceptors
modify/drop events in flight
selectors
route events
channels
stage events until consumed
sinks
deliver events to external systems
1. Avro
2. Thrift
3. Exec (stdout)*
4. JMS
5. Spooling directory
6. Kafka
7. NetCat
8. Seq. generator
9. Syslog
10. HTTP
11. JSON
12. Blob
13. Stress
14. Legacy
15. Custom
1. Timestamp
2. Host
3. Static
4. UUID
5. Morphline
6. Search/replace
7. Regex filter
8. Regex extractor
9. Custom
1. Replicating
2. Multiplexing
3. Custom
1. Memory
2. JDBC
3. Kafka
4. File
5. Spillable mem*
6. Pseudo txn
7. Custom
1. HDFS
2. Hive*
3. Logger
4. Avro
5. Thrift
6. IRC
7. File Roll
8. Null
9. HBase
10. Solr
11. ElasticSearch
12. Kite Dataset
13. Kafka
14. Custom
*not recommended for production systems

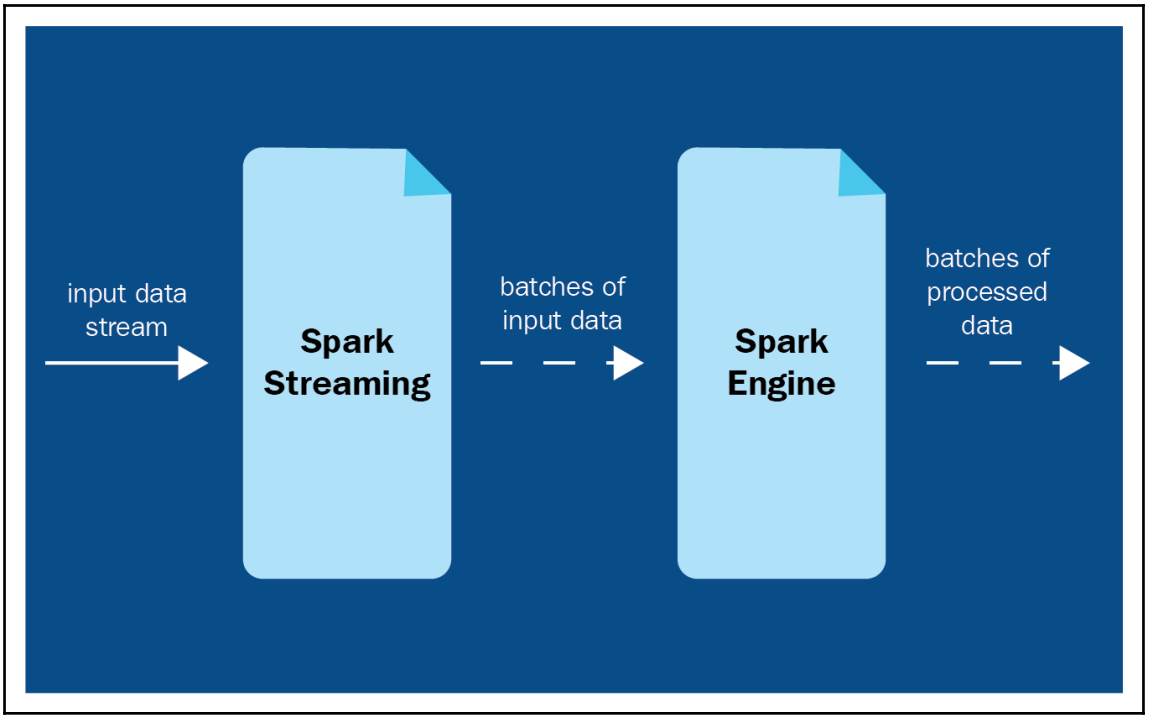

OPERATIONS
PROCESS, ANALYZE, SERVE
UNIFIED SERVICES
STORE
INTEGRATE
DATA MANAGEMENT

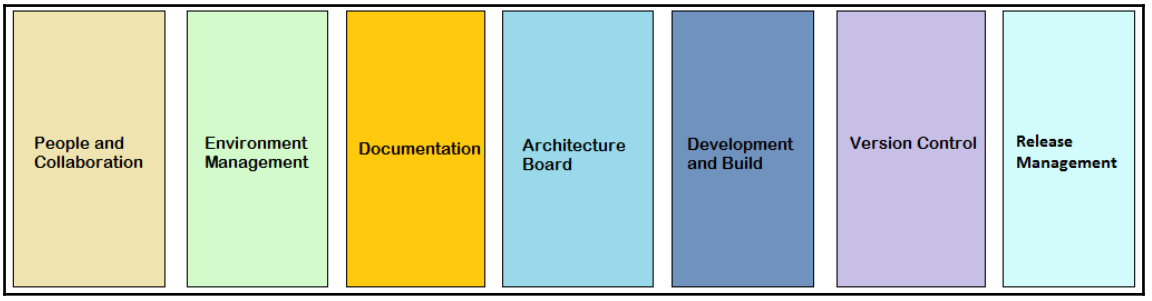

Batch Layer
FLUME
SFTP
Raw
Work
HDFS
Service Layer
HDFS
Business Batch Access
HDFS
Gold
APACHE HBASE
Business Random Access
Speed Layer
kafka
Raw
Work
Trigger
Publishing Service
kafka

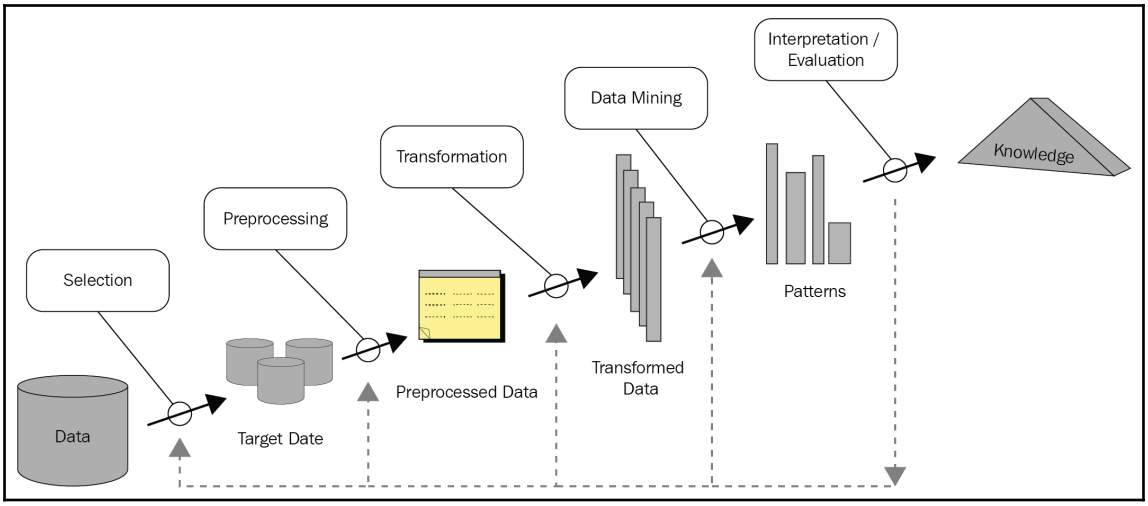

Outgoing Layer
Gateway Node
Landing Zone
hadoop
Business Layer
Gold Layer
Work Layer
Raw Layer
Quarantine Layer

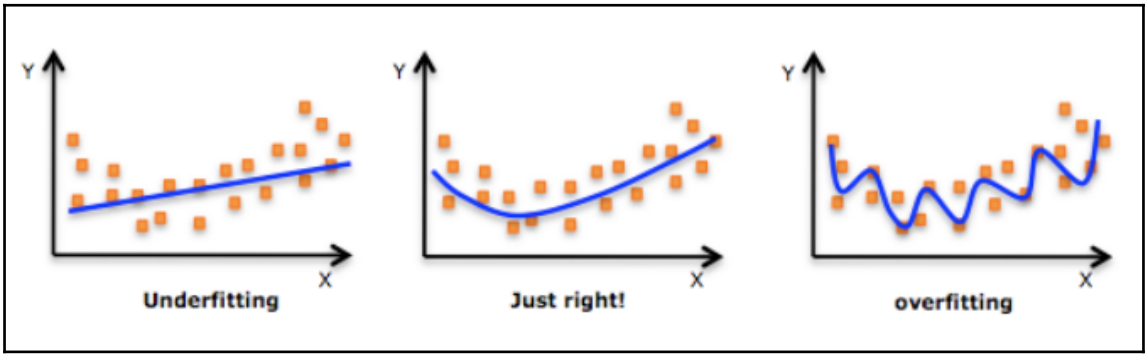

User MapReduce Application
Job Client
Client JVM
Client Node
Submit Job
Job Tracker
Locate Data
Name Node
Master Node
Copy Job Resources
Get input Splits
Assign task to Task Trackers
Send Status of the Tasks
Shared File System (e.g. HDFS) and Resources
Retrieve job resource and setup local environment to run the jobs
Runs Map Job or Reduce Job
Child JVM
Runs Map Job or Reduce Job
Child JVM
Launch
Task Tracker
Launch
Data Node

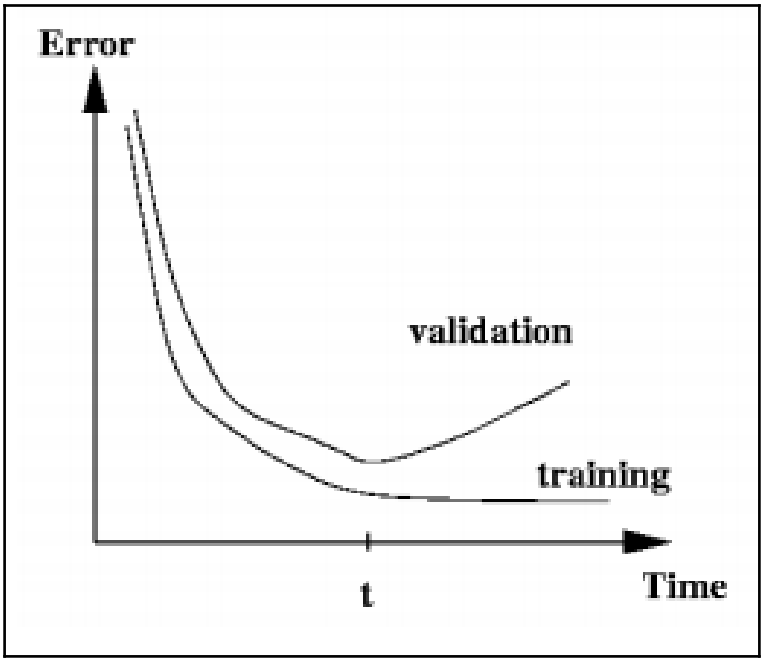

Spark SQL
Spark Streaming
MLlib (machine learning)
GraphX (graph)
Apache Spark

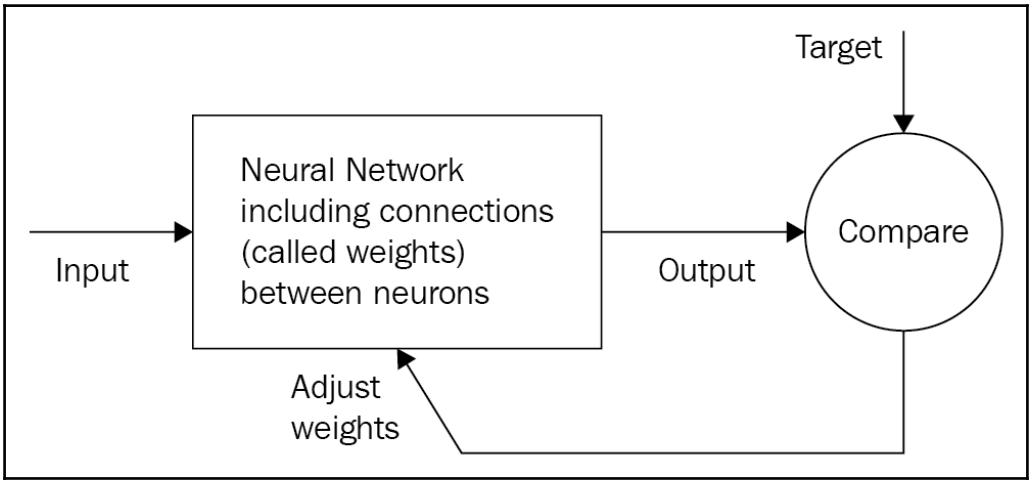

input data stream
Spark Streaming
batches of input data
Spark Engine
batches of processed data

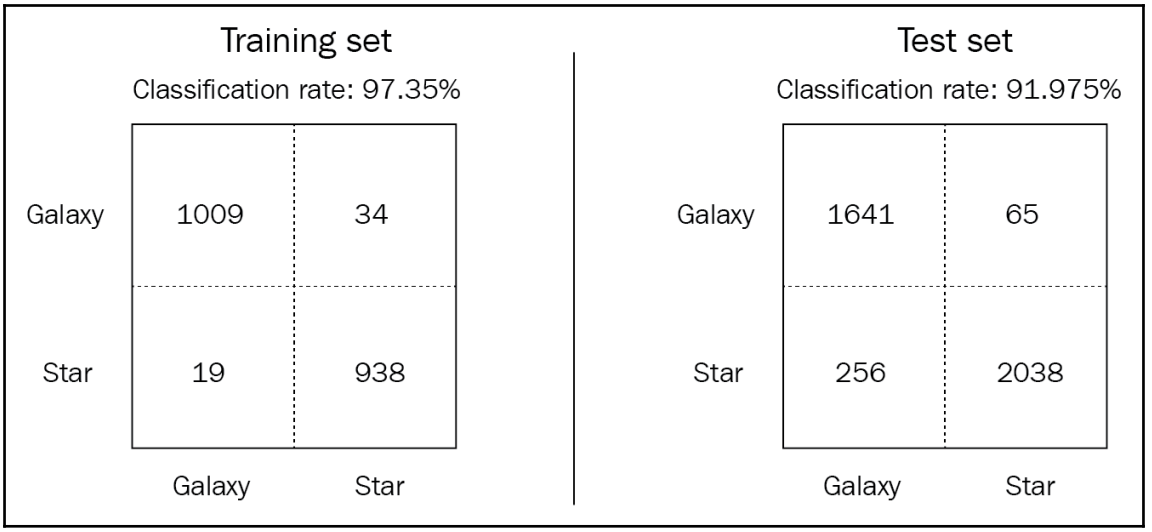

People and Collaboration
Environment Management
Documentation
Architecture Board
Development and Build
Version Control
Release Management

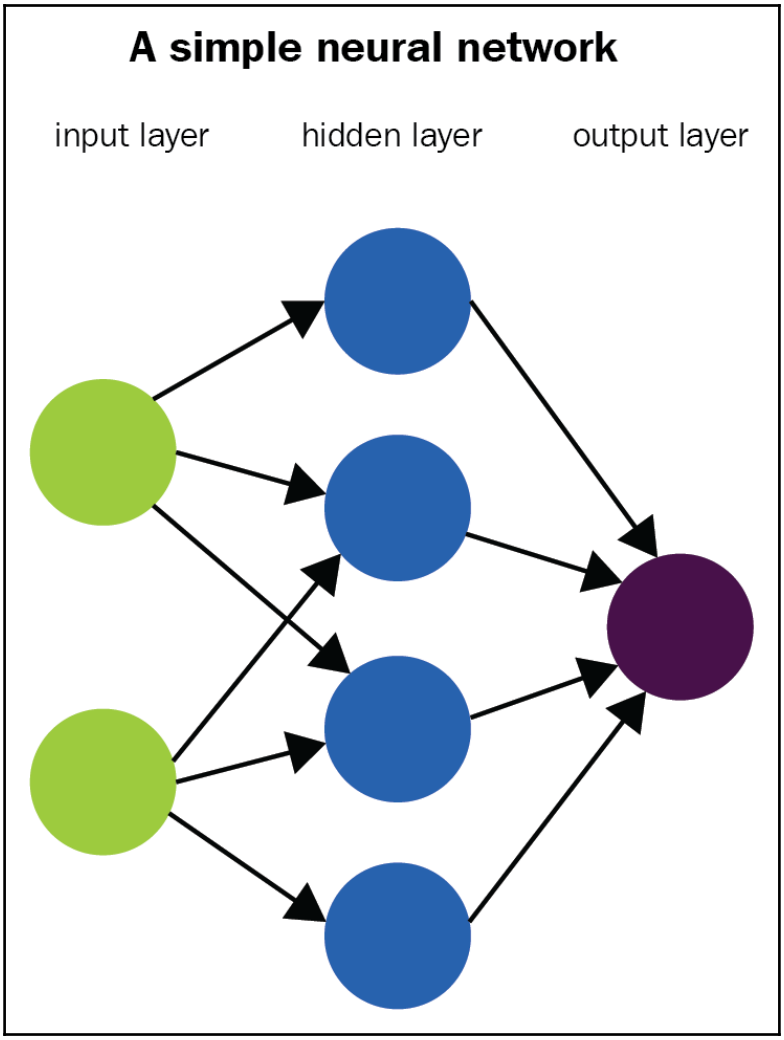

Interpretation / Evaluation
Data Mining
Transformation
Preprocessing
Selection
Knowledge
Patterns
Transformed Data
Preprocessed Data
Target Date
Data

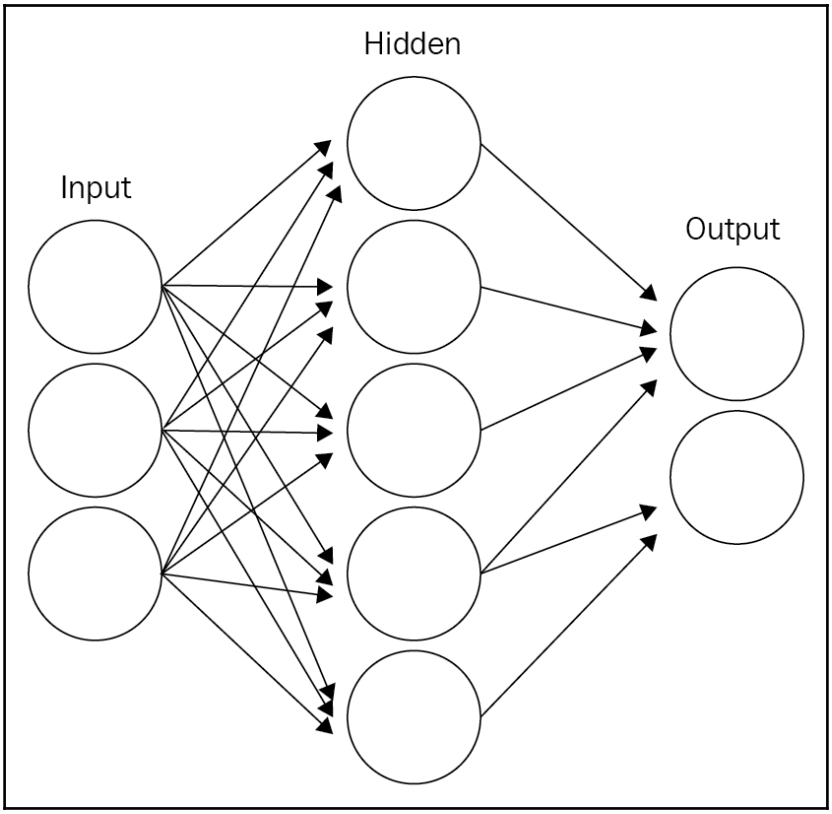

Y
X
Underfitting
Y
X
Just right!
Y
X
overfitting

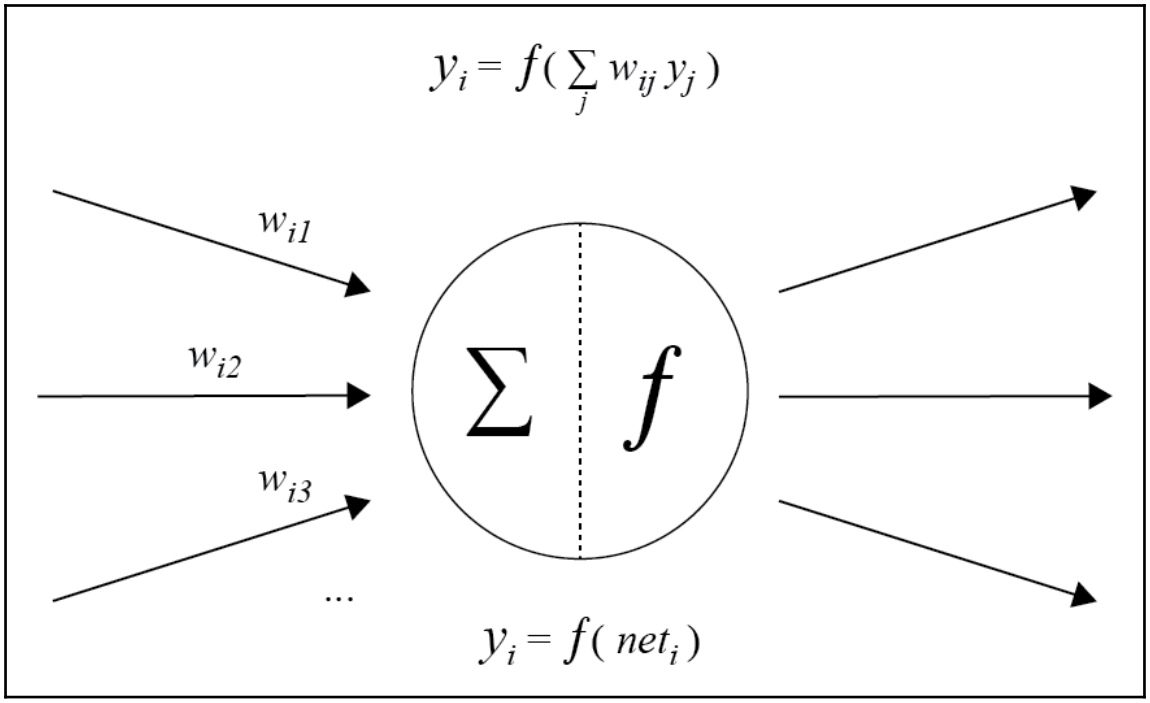

Error
validation
training
t
Time

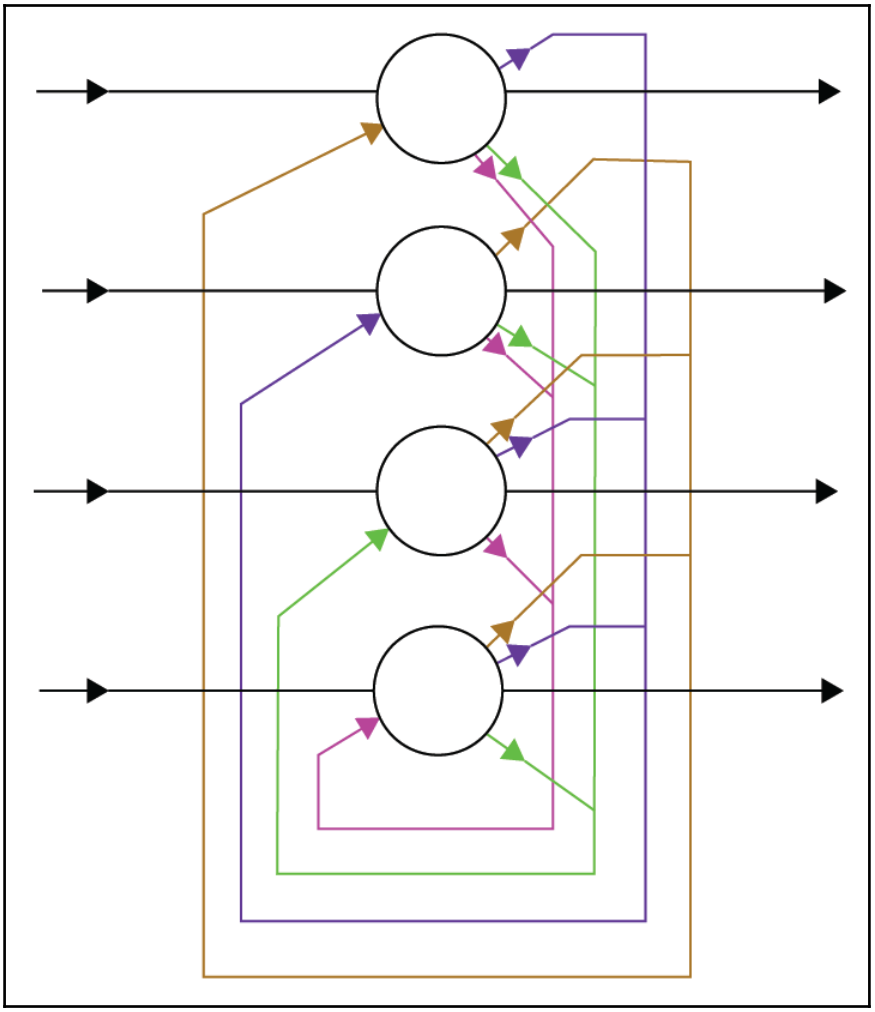

Target
Neural Network
including connections
(called weights)
between neurons
Input
Output
Compare
Adjust
weights

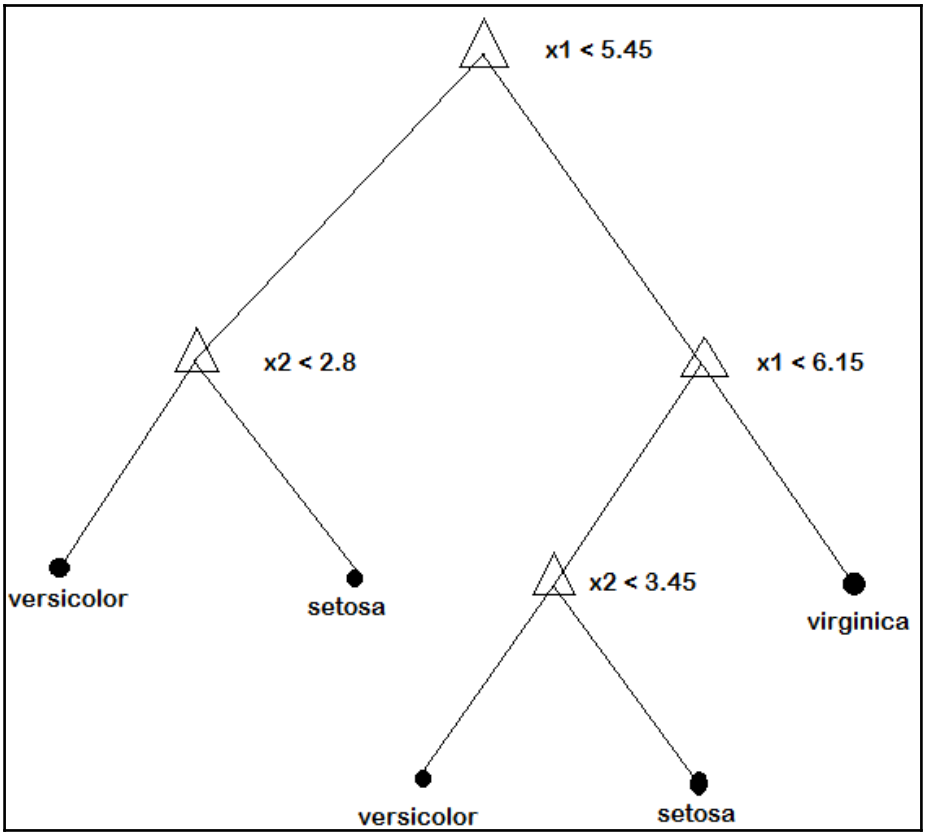

Training set
Classification rate: 97.35%
Galaxy
Star
1009
34
19
938
Galaxy
Star
Test set
Classification rate: 91.975%
Galaxy
Star
1641
65
256
2038
Galaxy
Star


A simple neural network
input layer
hidden layer
output layer

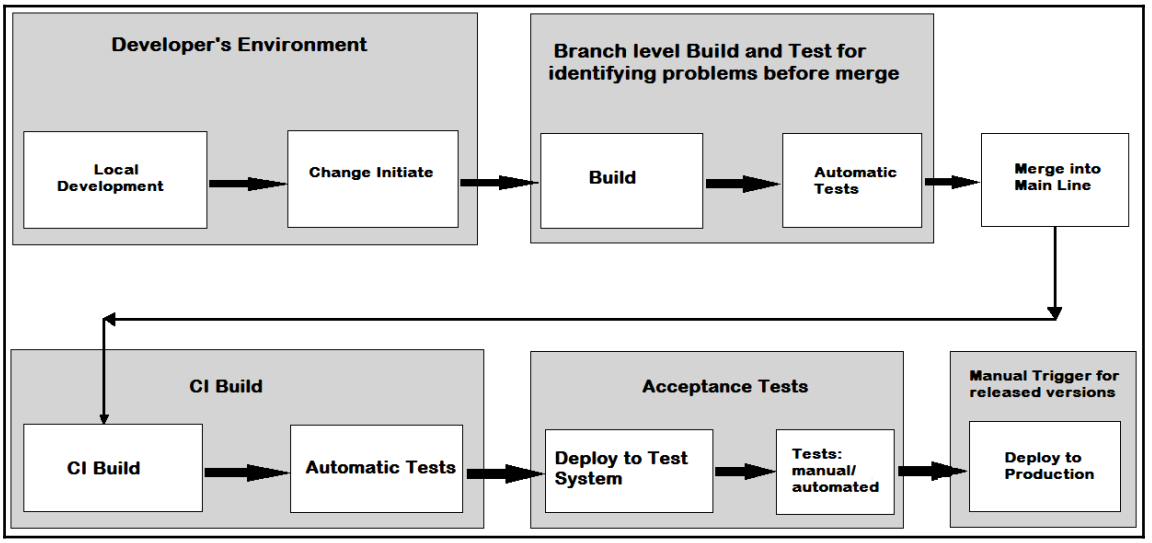

Hidden
Input
Output

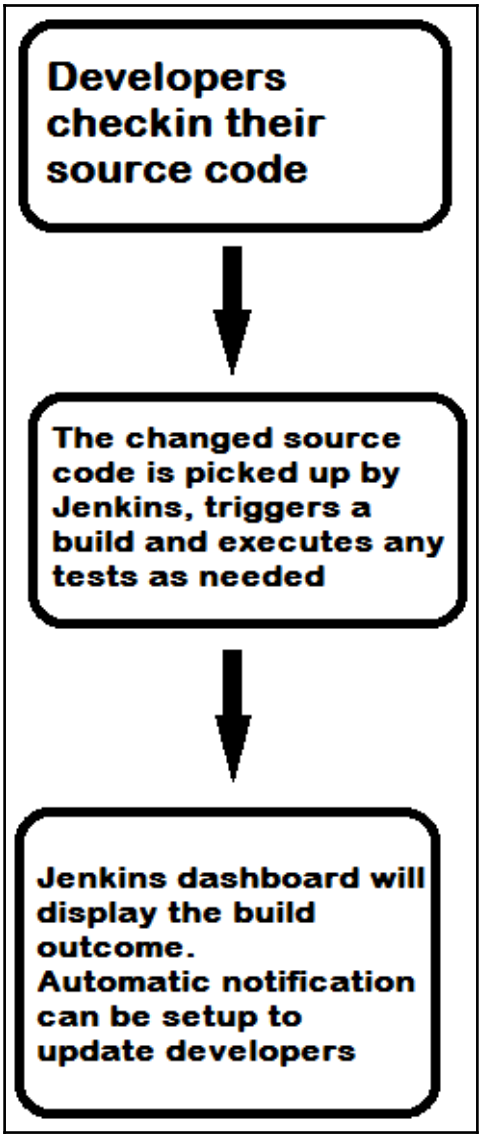

$y_i = f(\sum_j w_{ij} y_j)$
w_{i1}
w_{i2}
w_{i3}
...
$\sum$
f
$y_i = f(net_i)$



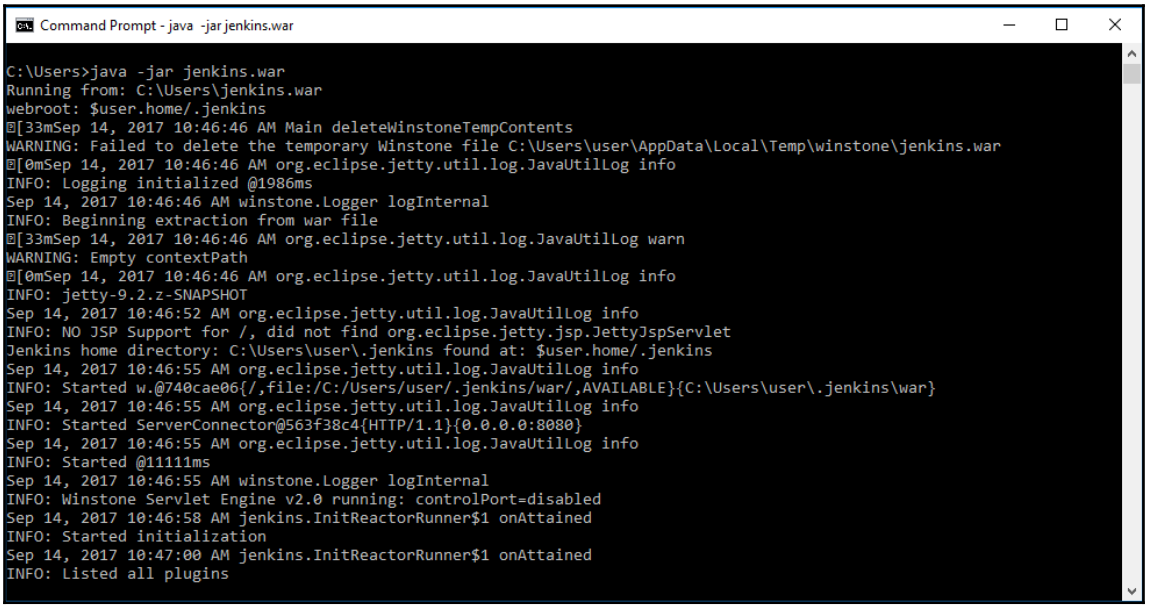

x1 < 5.45
x2 < 2.8
x1 < 6.15
versicolor
setosa
x2 < 3.45
virginica
versicolor
setosa

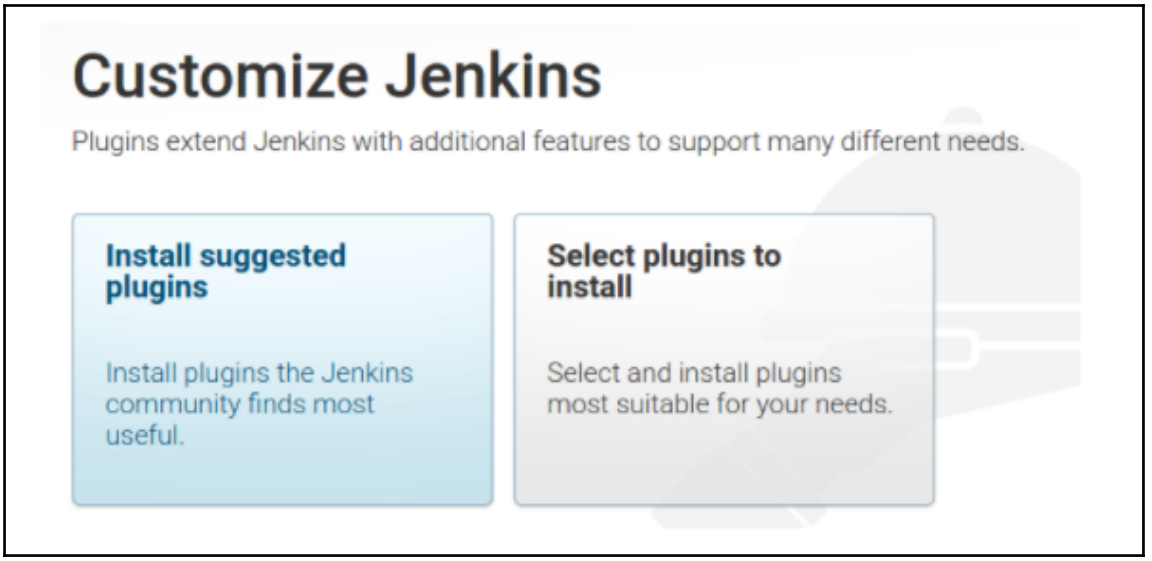
Chapter 7: DevOps - Continuous Integration and Delivery

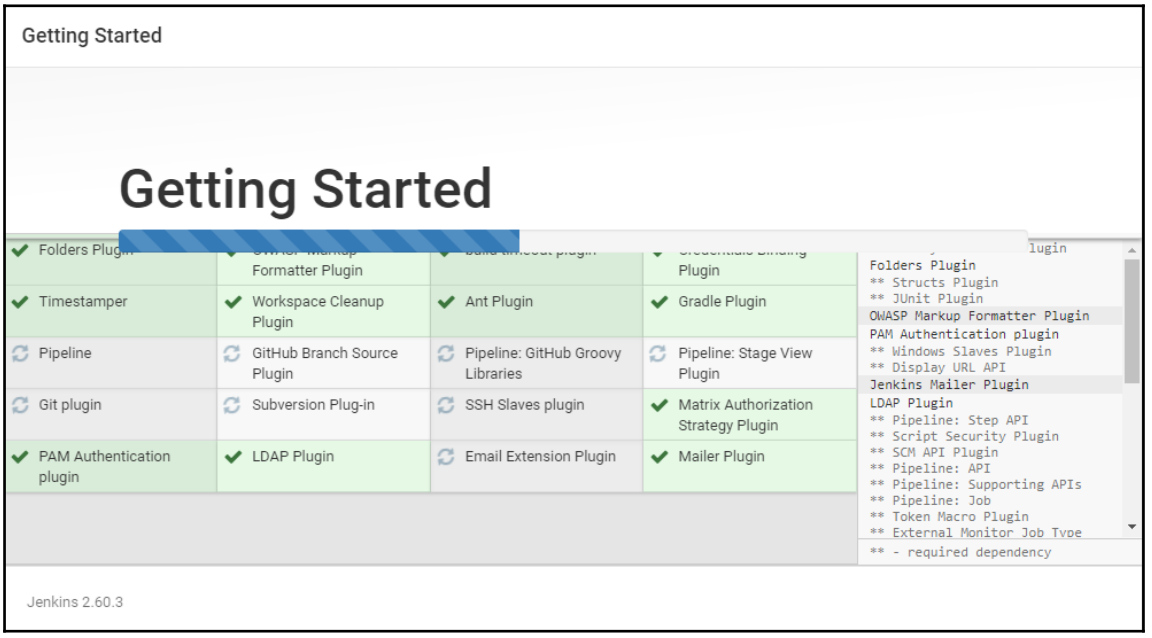


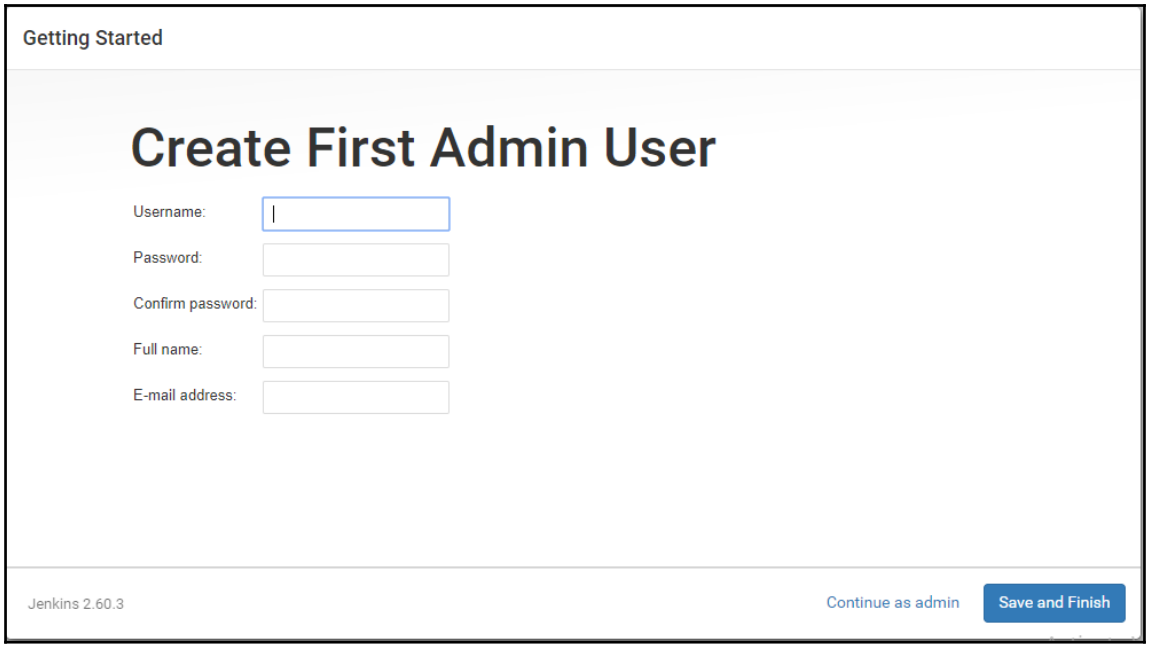

Developers checkin their source code
The changed source code is picked up by Jenkins, triggers a build and executes any tests as needed
Jenkins dashboard will display the build outcome.
Automatic notification can be setup to update developers

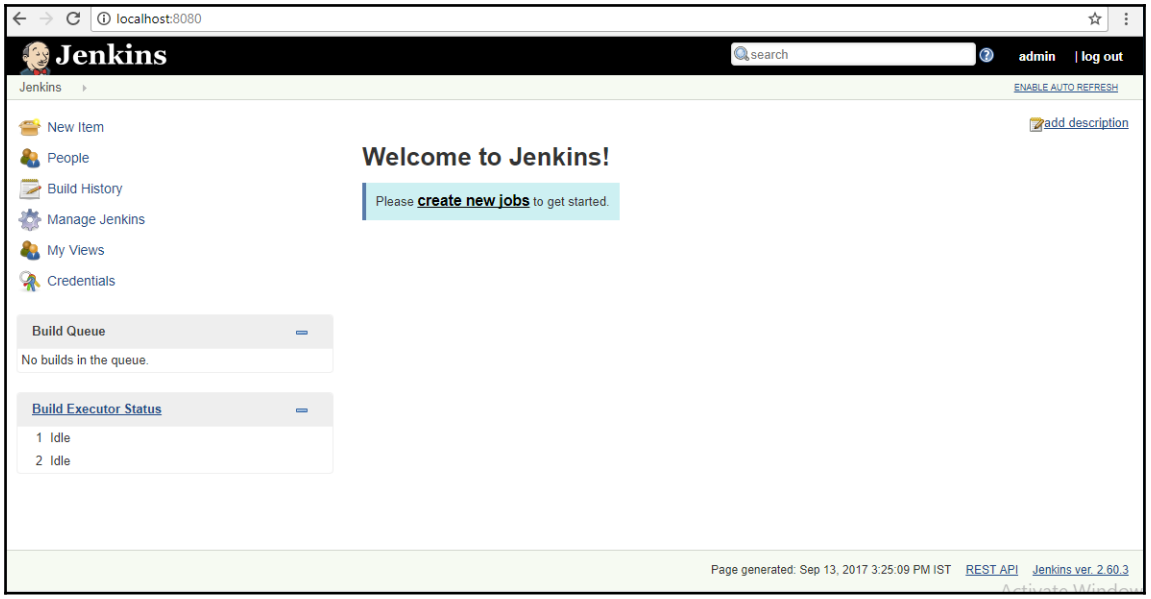

Secure | https://jenkins.io/index.html
Jenkins
Blog
Documentation
Plugins
Use-cases
Participate
Sub-projects
Resources
About
Download
Jenkins
Build great things at any scale
The leading open source automation server, Jenkins provides hundreds of plugins to support building, deploying and automating any project.
Documentation
Download
Say “hello” to Blue Ocean
Blue Ocean is a new user experience that puts Continuous Delivery in reach of any team — without sacrificing the power and sophistication of Jenkins.
dropspace / whimsy #5
Pipeline
Changes
Tests
Artifacts

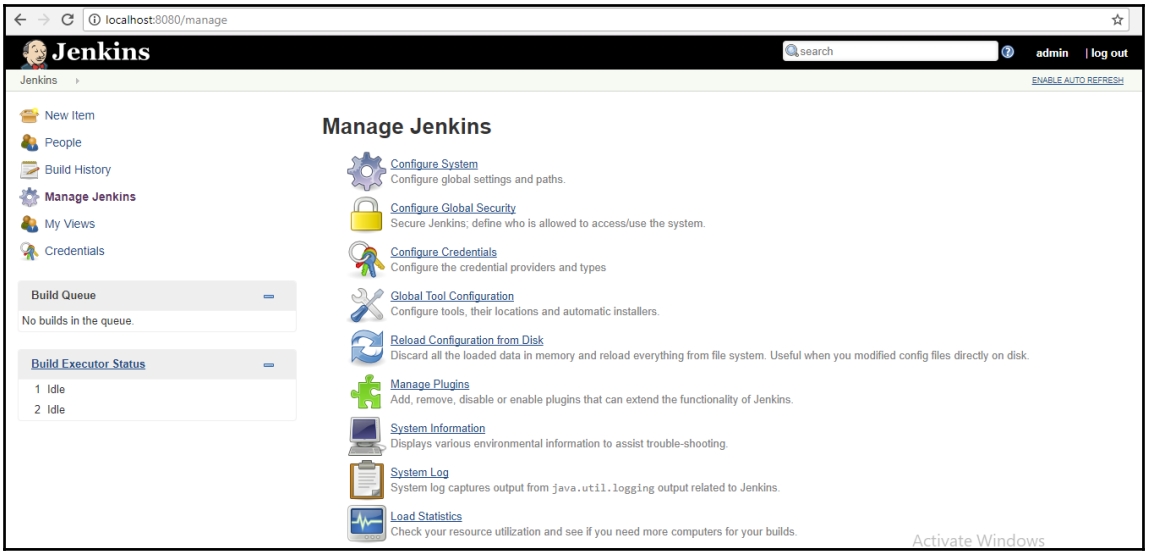

Command Prompt - java -jar jenkins.war
C:\Users>java -jar jenkins.war
Running from: C:\Users\jenkins.war
webroot: $user.home/.jenkins
[33mSep 14, 2017 10:46:46 AM Main deleteWinstoneTempContents
WARNING: Failed to delete the temporary Winstone file C:\Users\user\AppData\Local\Temp\winstone\jenkins.war
[0mSep 14, 2017 10:46:46 AM org.eclipse.jetty.util.log.JavaUtilLog info
INFO: Logging initialized @1986ms
Sep 14, 2017 10:46:46 AM winstone.Logger logInternal
INFO: Beginning extraction from war file
[33mSep 14, 2017 10:46:46 AM org.eclipse.jetty.util.log.JavaUtilLog warn
WARNING: Empty contextPath
[0mSep 14, 2017 10:46:46 AM org.eclipse.jetty.util.log.JavaUtilLog info
INFO: jetty-9.2.z-SNAPSHOT
Sep 14, 2017 10:46:52 AM org.eclipse.jetty.util.log.JavaUtilLog info
INFO: NO JSP Support for /, did not find org.eclipse.jetty.jsp.JettyJspServlet
Jenkins home directory: C:\Users\user\.jenkins found at: $user.home/.jenkins
Sep 14, 2017 10:46:55 AM org.eclipse.jetty.util.log.JavaUtilLog info
INFO: Started w.@740cae06{/,file:/C:/Users/user/.jenkins/war/,AVAILABLE}{C:\Users\user\.jenkins\war}
Sep 14, 2017 10:46:55 AM org.eclipse.jetty.util.log.JavaUtilLog info
INFO: Started ServerConnector@563f38c4{HTTP/1.1}{0.0.0.0:8080}
Sep 14, 2017 10:46:55 AM org.eclipse.jetty.util.log.JavaUtilLog info
INFO: Started @11111ms
Sep 14, 2017 10:46:55 AM winstone.Logger logInternal
INFO: Winstone Servlet Engine v2.0 running: controlPort=disabled
Sep 14, 2017 10:46:58 AM jenkins.InitReactorRunner$1 onAttained
INFO: Started initialization
Sep 14, 2017 10:47:00 AM jenkins.InitReactorRunner$1 onAttained
INFO: Listed all plugins

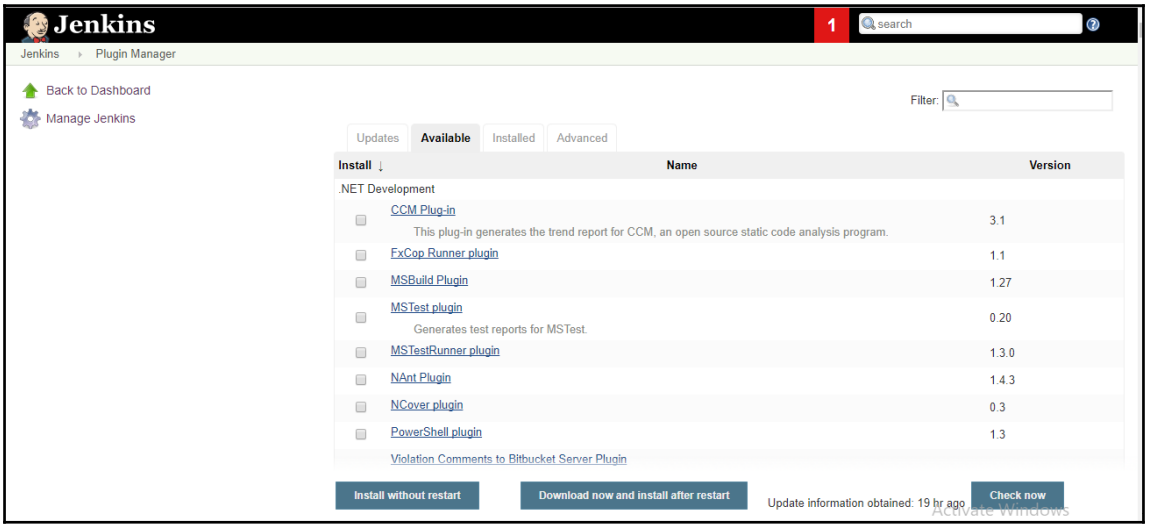

Customize Jenkins
Plugins extend Jenkins with additional features to support many different needs.
Install suggested plugins
Install plugins the Jenkins community finds most useful.
Select plugins to install
Select and install plugins most suitable for your needs.

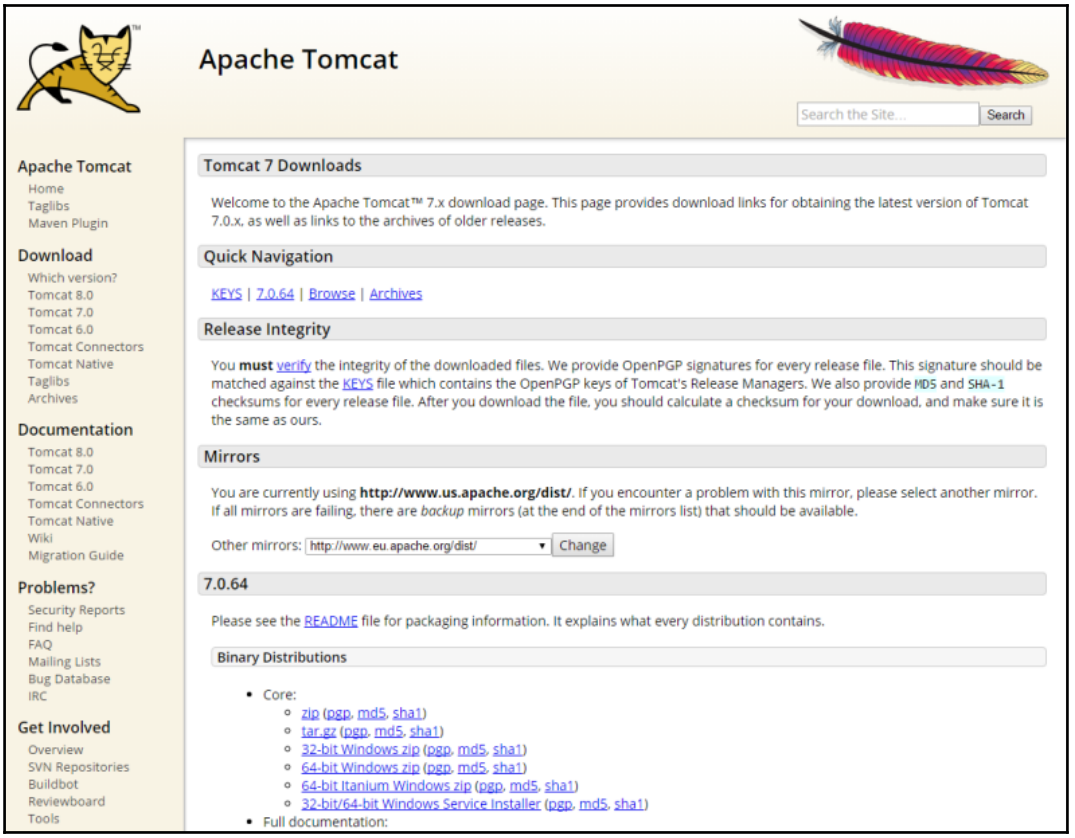

Getting Started
Getting Started
Folders Plugin
Formatter Plugin
Plugin
Timestamper
Workspace Cleanup Plugin
Ant Plugin
Gradle Plugin
Pipeline
GitHub Branch Source Plugin
Pipeline: GitHub Groovy Libraries
Pipeline: Stage View Plugin
Git plugin
Subversion Plug-in
SSH Slaves plugin
Matrix Authorization Strategy Plugin
PAM Authentication plugin
LDAP Plugin
Email Extension Plugin
Mailer Plugin
Folders Plugin
** Structs Plugin
** JUnit Plugin
OWASP Markup Formatter Plugin
PAM Authentication plugin
** Windows Slaves Plugin
** Display URL API
Jenkins Mailer Plugin
LDAP Plugin
** Pipeline: Step API
** Script Security Plugin
** SCM API Plugin
** Pipeline: API
** Pipeline: Supporting APIs
** Pipeline: Job
** Token Macro Plugin
** External Monitor Job Type
** - required dependency
Jenkins 2.60.3

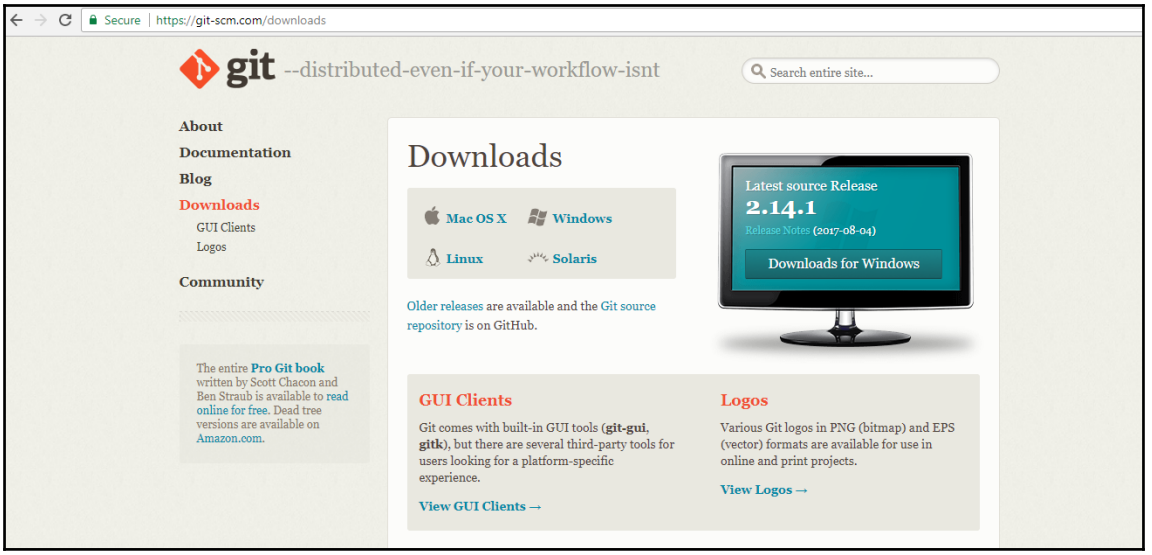

Getting Started
Create First Admin User
Username:
Password:
Confirm password:
Full name:
E-mail address:
Jenkins 2.60.3
Continue as admin
Save and Finish

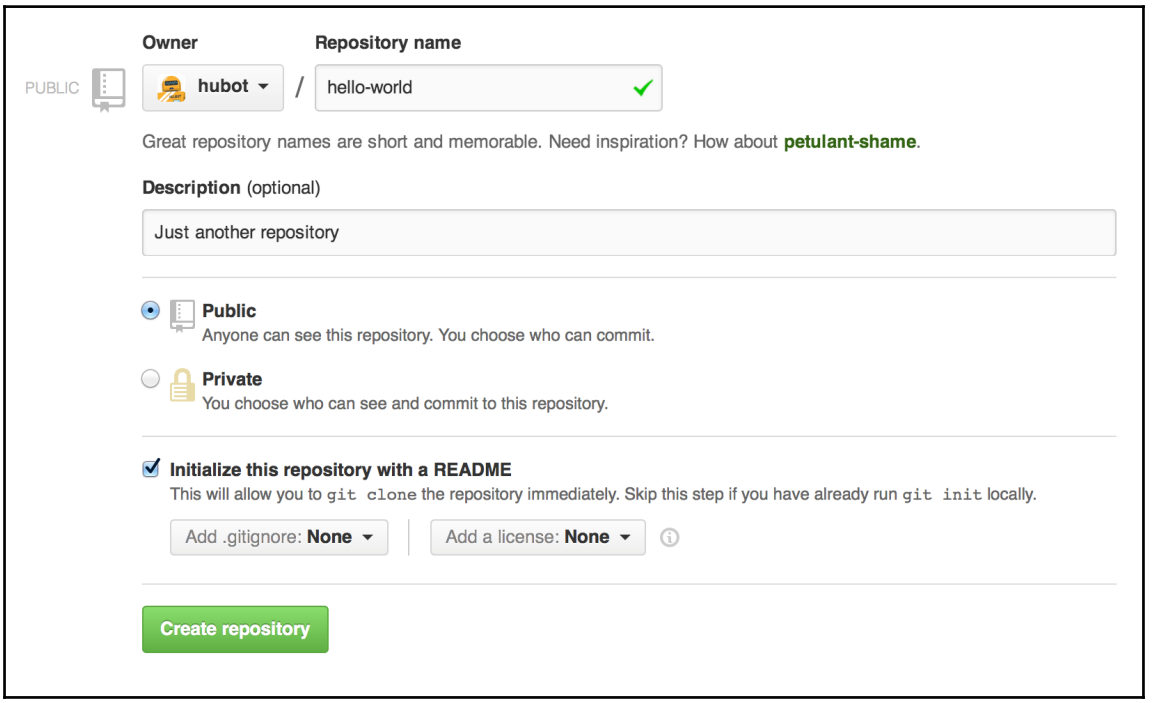

localhost:8080
Jenkins
search
admin
| log out
Jenkins
ENABLE AUTO REFRESH
New Item
People
Build History
Manage Jenkins
My Views
Credentials
add description
Welcome to Jenkins!
Please create new jobs to get started.
Build Queue
No builds in the queue.
Build Executor Status
1 Idle
2 Idle
Page generated: Sep 13, 2017 3:25:09 PM IST
REST API
Jenkins ver. 2.60.3

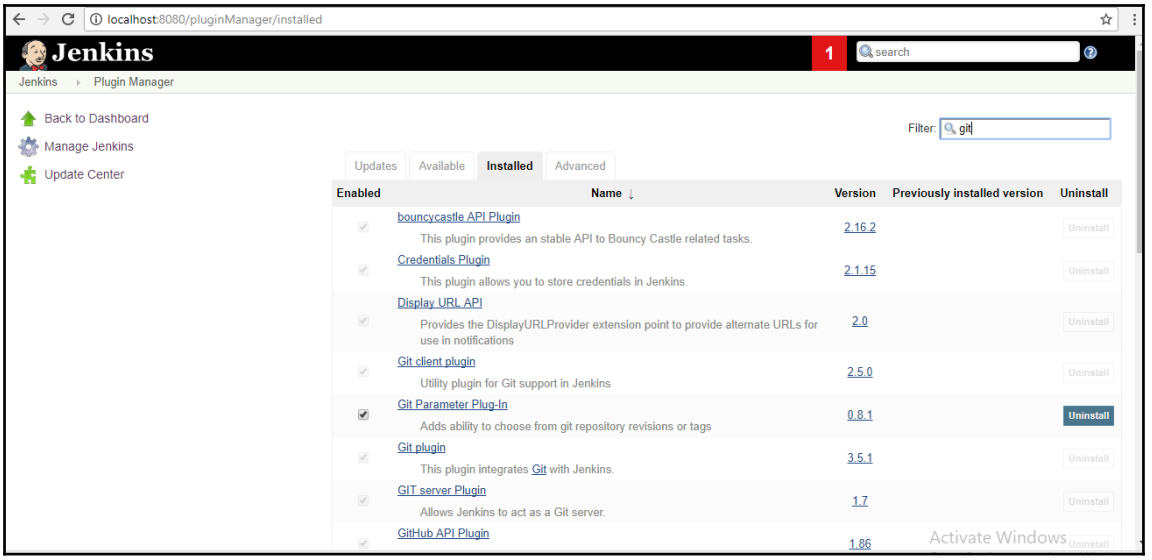

localhost:8080/manage
Jenkins
search
admin
log out
Jenkins
ENABLE AUTO REFRESH
New Item
People
Build History
Manage Jenkins
My Views
Credentials
Build Queue
No builds in the queue.
Build Executor Status
1 Idle
2 Idle
Manage Jenkins
Configure System
Configure global settings and paths.
Configure Global Security
Secure Jenkins; define who is allowed to access/use the system.
Configure Credentials
Configure the credential providers and types
Global Tool Configuration
Configure tools, their locations and automatic installers.
Reload Configuration from Disk
Discard all the loaded data in memory and reload everything from file system. Useful when you modified config files directly on disk.
Manage Plugins
Add, remove, disable or enable plugins that can extend the functionality of Jenkins.
System Information
Displays various environmental information to assist trouble-shooting.
System Log
System log captures output from java.util.logging output related to Jenkins.
Load Statistics
Check your resource utilization and see if you need more computers for your builds.
Activate Windows

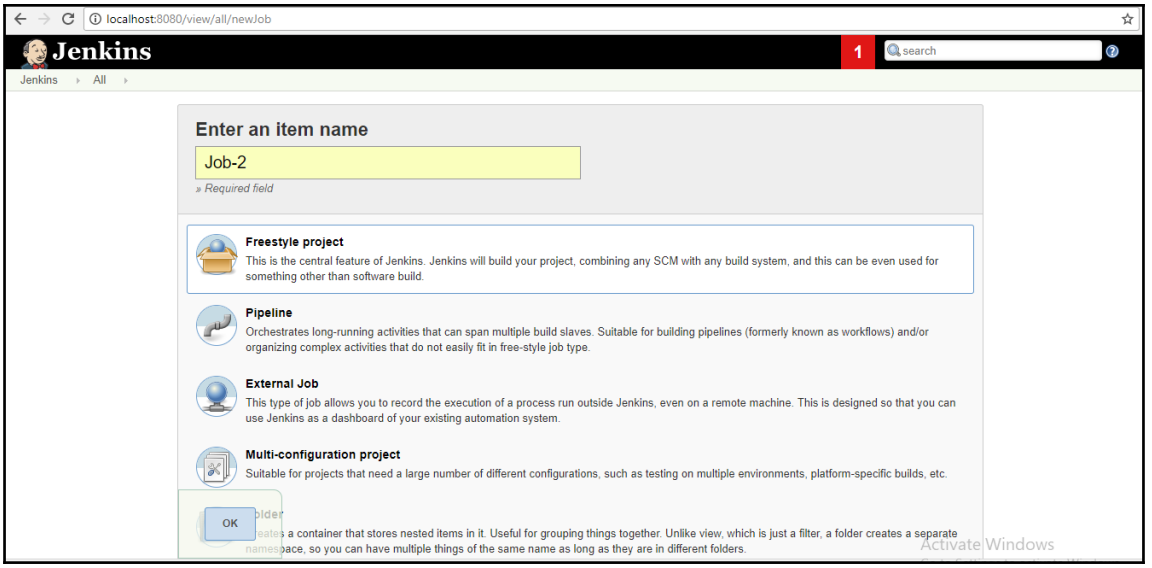

Jenkins
1
search
Jenkins
Plugin Manager
Back to Dashboard
Manage Jenkins
Filter:
Updates
Available
Installed
Advanced
Install
Name
Version
.NET Development
CCM Plug-in
This plug-in generates the trend report for CCM, an open source static code analysis program.
3.1
FxCop Runner plugin
1.1
MSBuild Plugin
1.27
MSTest plugin
Generates test reports for MSTest.
0.20
MSTestRunner plugin
1.3.0
NAnt Plugin
1.4.3
NCover plugin
0.3
PowerShell plugin
1.3
Violation Comments to Bitbucket Server Plugin
Install without restart
Download now and install after restart
Update information obtained: 19 hr ago
Check now
Activate Windows

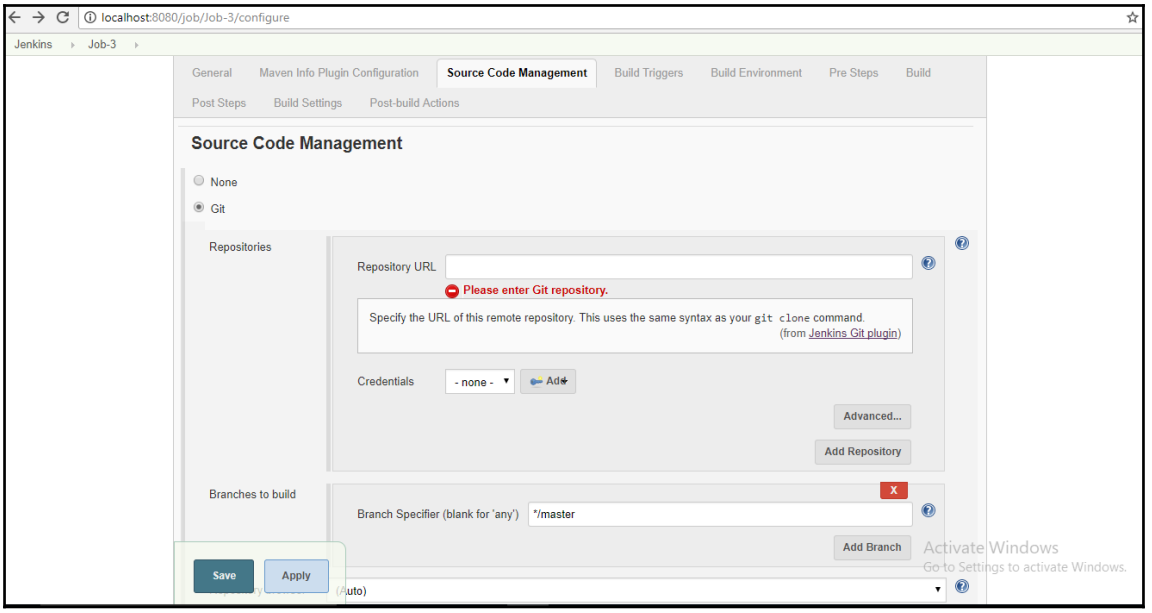

Apache Tomcat
Search the Site...
Search
Apache Tomcat
Home
Taglibs
Maven Plugin
Download
Which version?
Tomcat 8.0
Tomcat 7.0
Tomcat 6.0
Tomcat Connectors
Tomcat Native
Taglibs
Archives
Documentation
Tomcat 8.0
Tomcat 7.0
Tomcat 6.0
Tomcat Connectors
Tomcat Native
Wiki
Migration Guide
Problems?
Security Reports
Find help
FAQ
Mailing Lists
Bug Database
IRC
Get Involved
Overview
SVN Repositories
Buildbot
Reviewboard
Tools
Tomcat 7 Downloads
Welcome to the Apache Tomcat™ 7.x download page. This page provides download links for obtaining the latest version of Tomcat 7.0.x, as well as links to the archives of older releases.
Quick Navigation
KEYS | 7.0.64 | Browse | Archives
Release Integrity
You must verify the integrity of the downloaded files. We provide OpenPGP signatures for every release file. This signature should be matched against the KEYS file which contains the OpenPGP keys of Tomcat's Release Managers. We also provide MD5 and SHA-1 checksums for every release file. After you download the file, you should calculate a checksum for your download, and make sure it is the same as ours.
Mirrors
You are currently using http://www.us.apache.org/dist/. If you encounter a problem with this mirror, please select another mirror. If all mirrors are failing, there are backup mirrors (at the end of the mirrors list) that should be available.
Other mirrors: http://www.eu.apache.org/dist/ Change
7.0.64
Please see the README file for packaging information. It explains what every distribution contains.
Binary Distributions
Core:
zip (pgp, md5, sha1)
tar.gz (pgp, md5, sha1)
32-bit Windows zip (pgp, md5, sha1)
64-bit Windows zip (pgp, md5, sha1)
64-bit Itanium Windows zip (pgp, md5, sha1)
32-bit/64-bit Windows Service Installer (pgp, md5, sha1)
Full documentation:

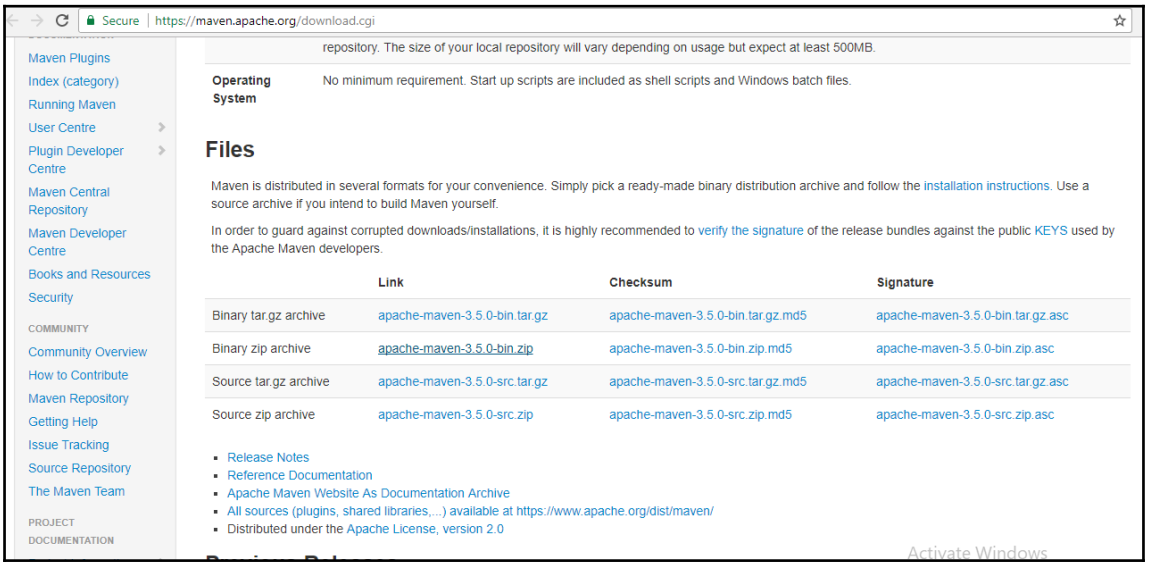

Secure | https://git-scm.com/downloads
git --distributed-even-if-your-workflow-isnt
Search entire site...
About
Documentation
Blog
Downloads
GUI Clients
Logos
Community
The entire Pro Git book written by Scott Chacon and Ben Straub is available to read online for free. Dead tree versions are available on Amazon.com.
Downloads
Mac OS X
Windows
Linux
Solaris
Older releases are available and the Git source repository is on GitHub.
Latest source Release
2.14.1
Release Notes (2017-08-04)
Downloads for Windows
GUI Clients
Git comes with built-in GUI tools (git-gui, gitk), but there are several third-party tools for users looking for a platform-specific experience.
View GUI Clients →
Logos
Various Git logos in PNG (bitmap) and EPS (vector) formats are available for use in online and print projects.
View Logos →

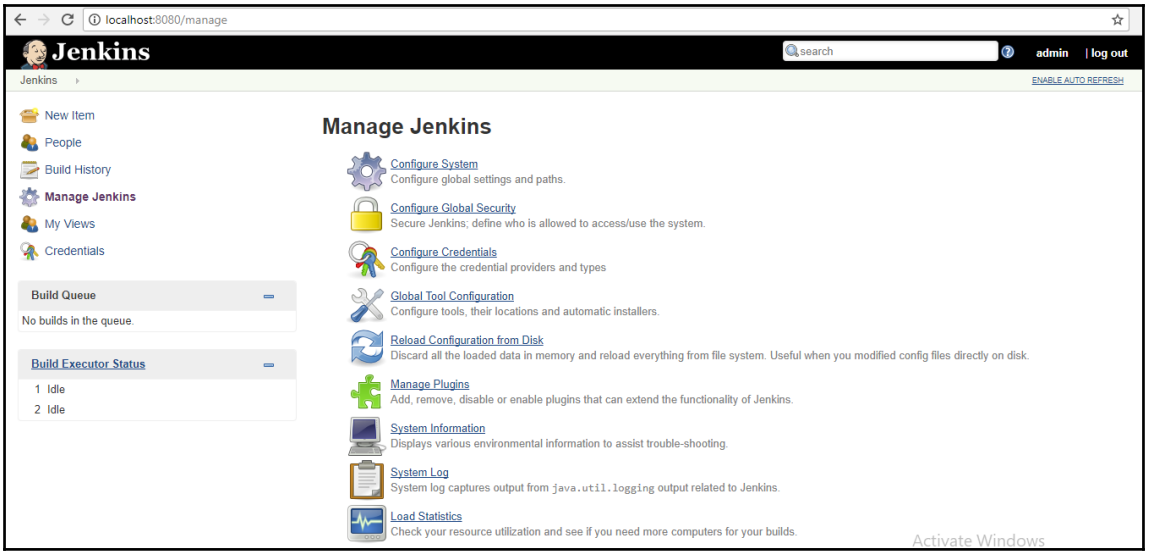

Owner
Repository name
PUBLIC
hubot
/
hello-world
Great repository names are short and memorable. Need inspiration? How about petulant-shame.
Description (optional)
Just another repository
Public
Anyone can see this repository. You choose who can commit.
Private
You choose who can see and commit to this repository.
Initialize this repository with a README
This will allow you to git clone the repository immediately. Skip this step if you have already run git init locally.
Add .gitignore: None
Add a license: None
Create repository

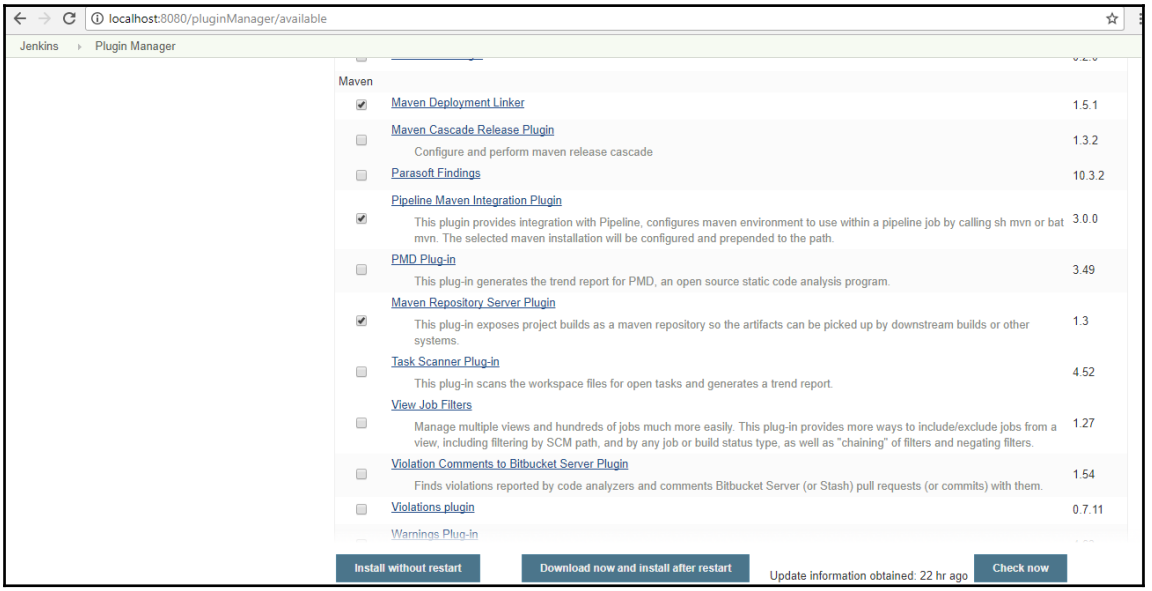

localhost:8080/pluginManager/installed
Jenkins
search
Jenkins › Plugin Manager
Back to Dashboard
Manage Jenkins
Update Center
Filter: git
Updates
Available
Installed
Advanced
Enabled
Name
Version
Previously installed version
Uninstall
bouncycastle API Plugin
This plugin provides an stable API to Bouncy Castle related tasks.
2.16.2
Credentials Plugin
This plugin allows you to store credentials in Jenkins.
2.1.15
Display URL API
Provides the DisplayURLProvider extension point to provide alternate URLs for use in notifications
2.0
Git client plugin
Utility plugin for Git support in Jenkins
2.5.0
Git Parameter Plug-In
Adds ability to choose from git repository revisions or tags
0.8.1
Uninstall
Git plugin
This plugin integrates Git with Jenkins.
3.5.1
GIT server Plugin
Allows Jenkins to act as a Git server.
1.7
GitHub API Plugin
1.86
Activate Windows

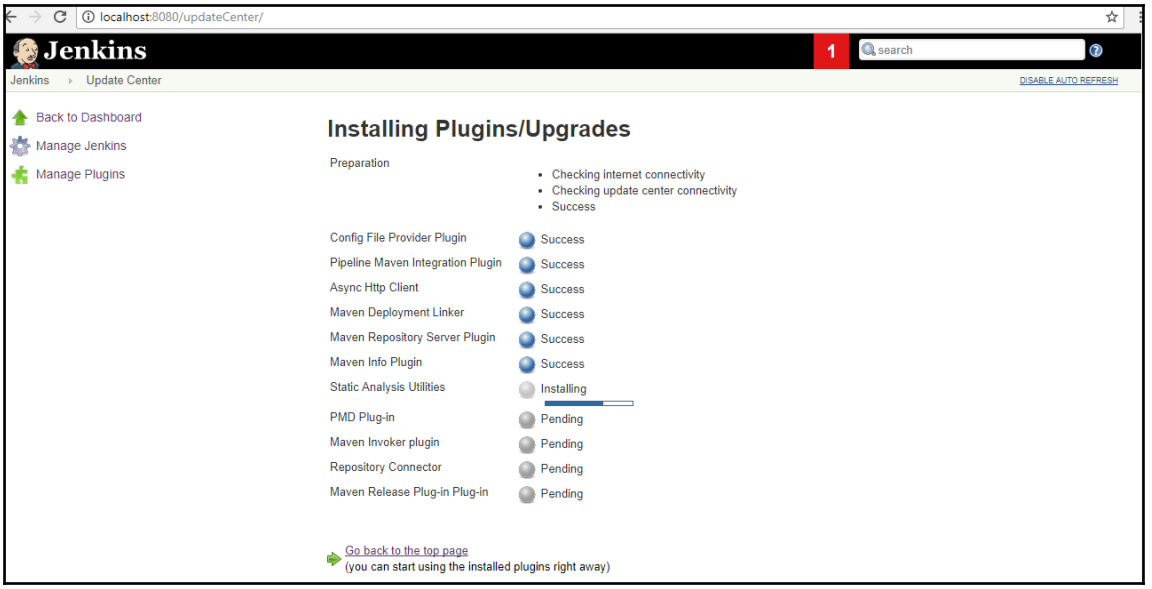

localhost:8080/view/all/newJob
Jenkins
search
Jenkins › All ›
Enter an item name
Job-2
» Required field
Freestyle project
This is the central feature of Jenkins. Jenkins will build your project, combining any SCM with any build system, and this can be even used for something other than software build.
Pipeline
Orchestrates long-running activities that can span multiple build slaves. Suitable for building pipelines (formerly known as workflows) and/or organizing complex activities that do not easily fit in free-style job type.
External Job
This type of job allows you to record the execution of a process run outside Jenkins, even on a remote machine. This is designed so that you can use Jenkins as a dashboard of your existing automation system.
Multi-configuration project
Suitable for projects that need a large number of different configurations, such as testing on multiple environments, platform-specific builds, etc.
OK
Activate Windows

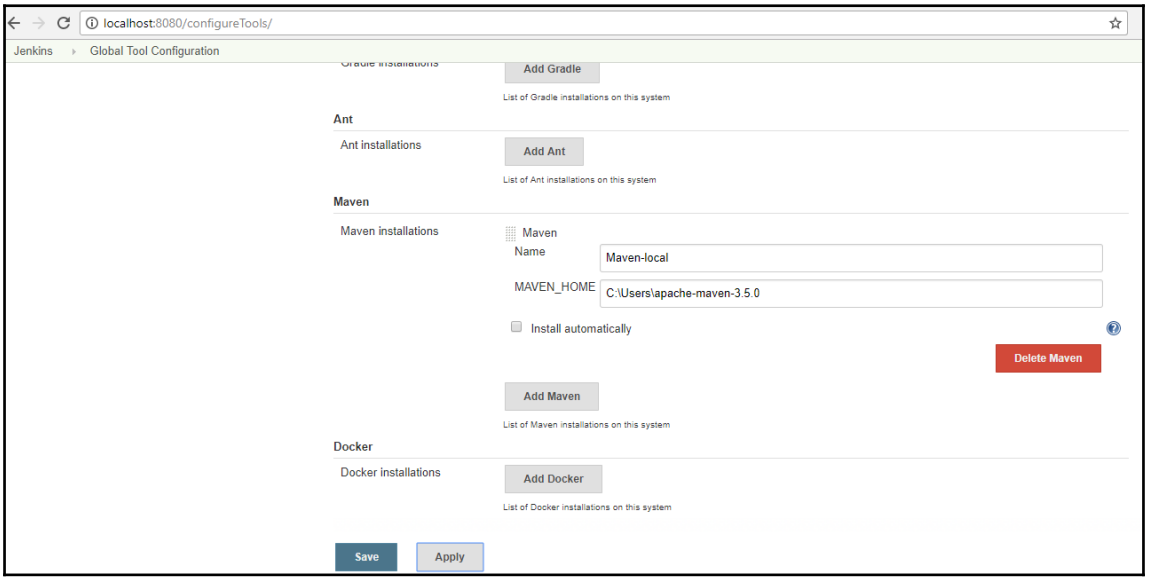

localhost:8080/job/Job-3/configure
Jenkins
Job-3
General
Maven Info Plugin Configuration
Source Code Management
Build Triggers
Build Environment
Pre Steps
Build
Post Steps
Build Settings
Post-build Actions
Source Code Management
None
Git
Repositories
Repository URL
Please enter Git repository.
Specify the URL of this remote repository. This uses the same syntax as your git clone command.
(from Jenkins Git plugin)
Credentials
- none -
Advanced...
Add Repository
Branches to build
Branch Specifier (blank for 'any')
*/master
Add Branch
Save
Apply
Activate Windows
Go to Settings to activate Windows.

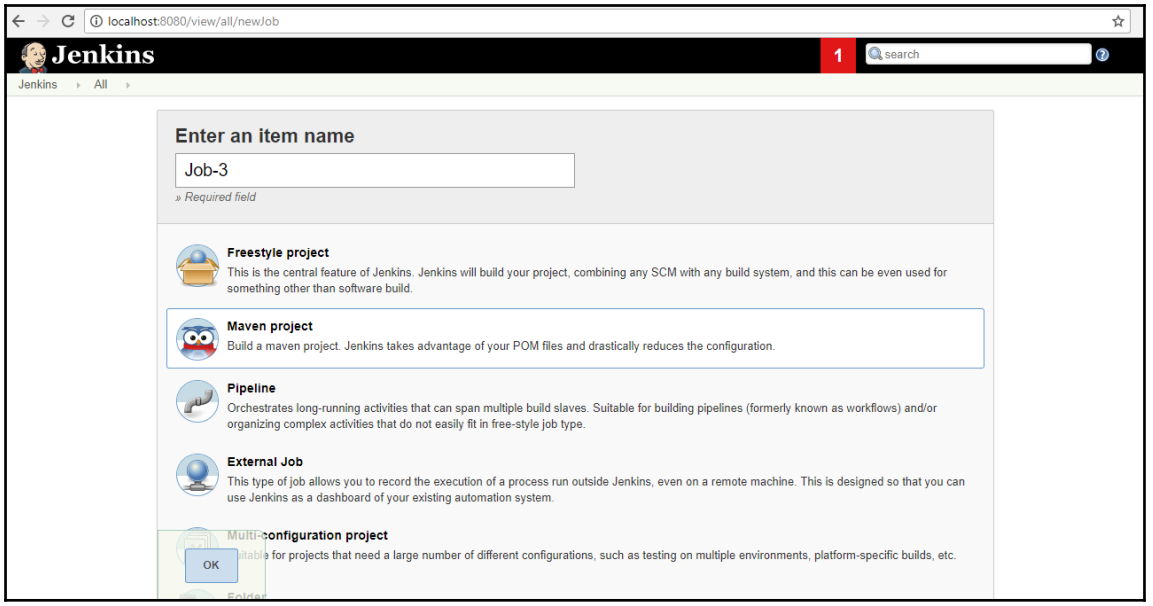

Secure
https://maven.apache.org/download.cgi
Maven Plugins
Index (category)
Running Maven
User Centre
Plugin Developer Centre
Maven Central Repository
Maven Developer Centre
Books and Resources
Security
COMMUNITY
Community Overview
How to Contribute
Maven Repository
Getting Help
Issue Tracking
Source Repository
The Maven Team
PROJECT DOCUMENTATION
repository. The size of your local repository will vary depending on usage but expect at least 500MB.
Operating System
No minimum requirement. Start up scripts are included as shell scripts and Windows batch files.
Files
Maven is distributed in several formats for your convenience. Simply pick a ready-made binary distribution archive and follow the installation instructions. Use a source archive if you intend to build Maven yourself.
In order to guard against corrupted downloads/installations, it is highly recommended to verify the signature of the release bundles against the public KEYS used by the Apache Maven developers.
Link
Checksum
Signature
Binary tar.gz archive
apache-maven-3.5.0-bin.tar.gz
apache-maven-3.5.0-bin.tar.gz.md5
apache-maven-3.5.0-bin.tar.gz.asc
Binary zip archive
apache-maven-3.5.0-bin.zip
apache-maven-3.5.0-bin.zip.md5
apache-maven-3.5.0-bin.zip.asc
Source tar.gz archive
apache-maven-3.5.0-src.tar.gz
apache-maven-3.5.0-src.tar.gz.md5
apache-maven-3.5.0-src.tar.gz.asc
Source zip archive
apache-maven-3.5.0-src.zip
apache-maven-3.5.0-src.zip.md5
apache-maven-3.5.0-src.zip.asc
Release Notes
Reference Documentation
Apache Maven Website As Documentation Archive
All sources (plugins, shared libraries,...) available at https://www.apache.org/dist/maven/
Distributed under the Apache License, version 2.0
Activate Windows

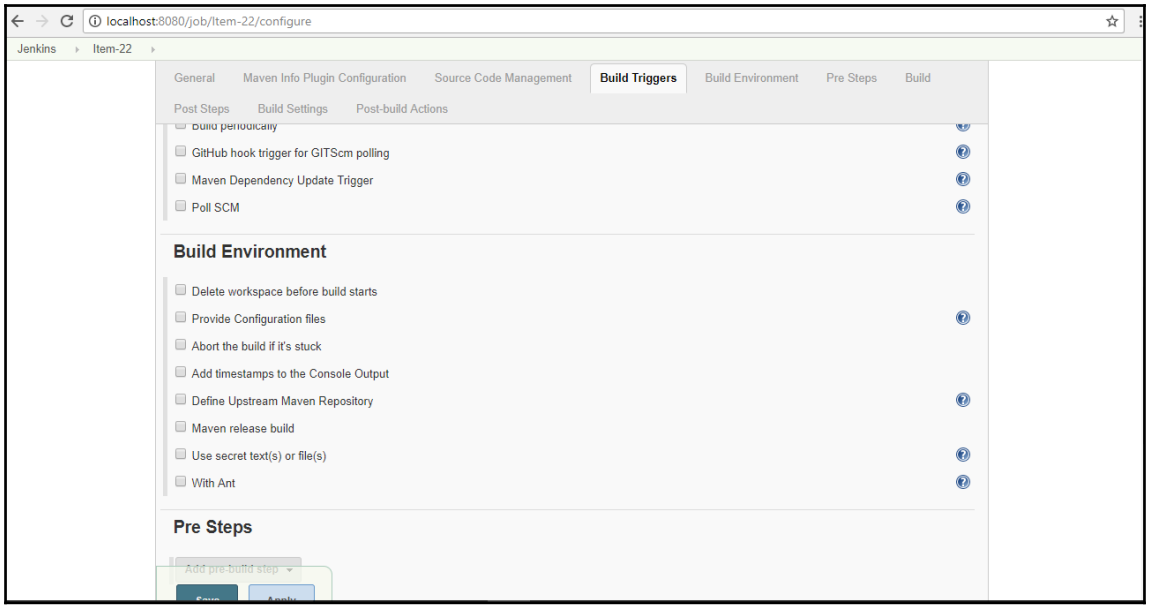

localhost:8080/manage
Jenkins
search
admin
log out
Jenkins
ENABLE AUTO REFRESH
New Item
People
Build History
Manage Jenkins
My Views
Credentials
Build Queue
No builds in the queue.
Build Executor Status
1 Idle
2 Idle
Manage Jenkins
Configure System
Configure global settings and paths.
Configure Global Security
Secure Jenkins; define who is allowed to access/use the system.
Configure Credentials
Configure the credential providers and types
Global Tool Configuration
Configure tools, their locations and automatic installers.
Reload Configuration from Disk
Discard all the loaded data in memory and reload everything from file system. Useful when you modified config files directly on disk.
Manage Plugins
Add, remove, disable or enable plugins that can extend the functionality of Jenkins.
System Information
Displays various environmental information to assist trouble-shooting.
System Log
System log captures output from java.util.logging output related to Jenkins.
Load Statistics
Check your resource utilization and see if you need more computers for your builds.
Activate Windows

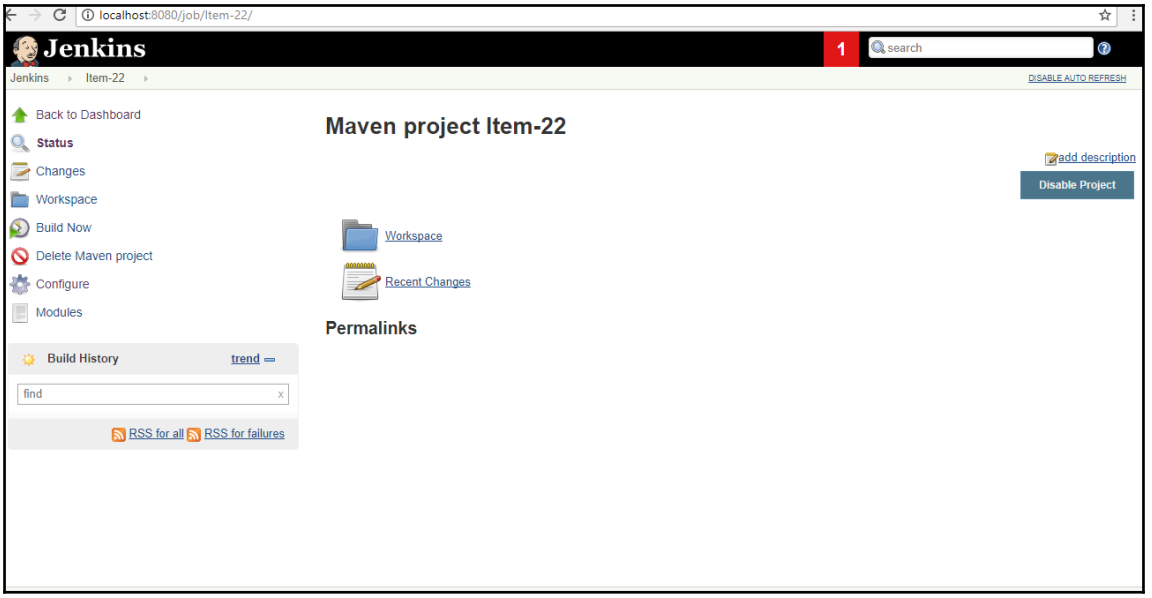

localhost:8080/pluginManager/available
Jenkins
Plugin Manager
Maven
Maven Deployment Linker
1.5.1
Maven Cascade Release Plugin
Configure and perform maven release cascade
1.3.2
Parasoft Findings
10.3.2
Pipeline Maven Integration Plugin
This plugin provides integration with Pipeline, configures maven environment to use within a pipeline job by calling sh mvn or bat mvn. The selected maven installation will be configured and prepended to the path.
3.0.0
PMD Plug-in
This plug-in generates the trend report for PMD, an open source static code analysis program.
3.49
Maven Repository Server Plugin
This plug-in exposes project builds as a maven repository so the artifacts can be picked up by downstream builds or other systems.
1.3
Task Scanner Plug-in
This plug-in scans the workspace files for open tasks and generates a trend report.
4.52
View Job Filters
Manage multiple views and hundreds of jobs much more easily. This plug-in provides more ways to include/exclude jobs from a view, including filtering by SCM path, and by any job or build status type, as well as "chaining" of filters and negating filters.
1.27
Violation Comments to Bitbucket Server Plugin
Finds violations reported by code analyzers and comments Bitbucket Server (or Stash) pull requests (or commits) with them.
1.54
Violations plugin
0.7.11
Warnings Plug-in
Install without restart
Download now and install after restart
Update information obtained: 22 hr ago
Check now

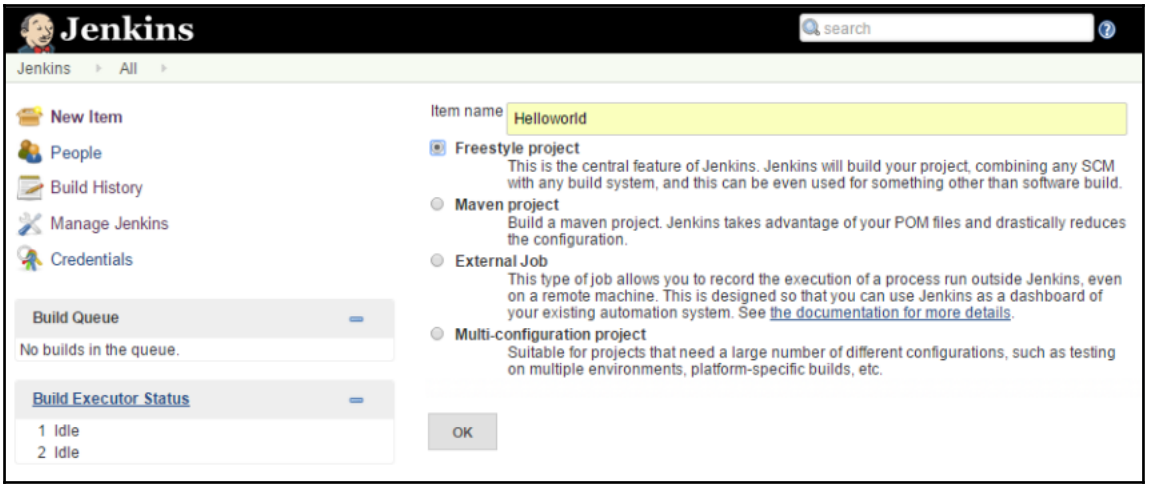

localhost:8080/updateCenter/
Jenkins
search
Jenkins › Update Center
DISABLE AUTO REFRESH
Back to Dashboard
Manage Jenkins
Manage Plugins
Installing Plugins/Upgrades
Preparation
Checking internet connectivity
Checking update center connectivity
Success
Config File Provider Plugin Success
Pipeline Maven Integration Plugin Success
Async Http Client Success
Maven Deployment Linker Success
Maven Repository Server Plugin Success
Maven Info Plugin Success
Static Analysis Utilities Installing
PMD Plug-in Pending
Maven Invoker plugin Pending
Repository Connector Pending
Maven Release Plug-in Plug-in Pending
Go back to the top page
(you can start using the installed plugins right away)

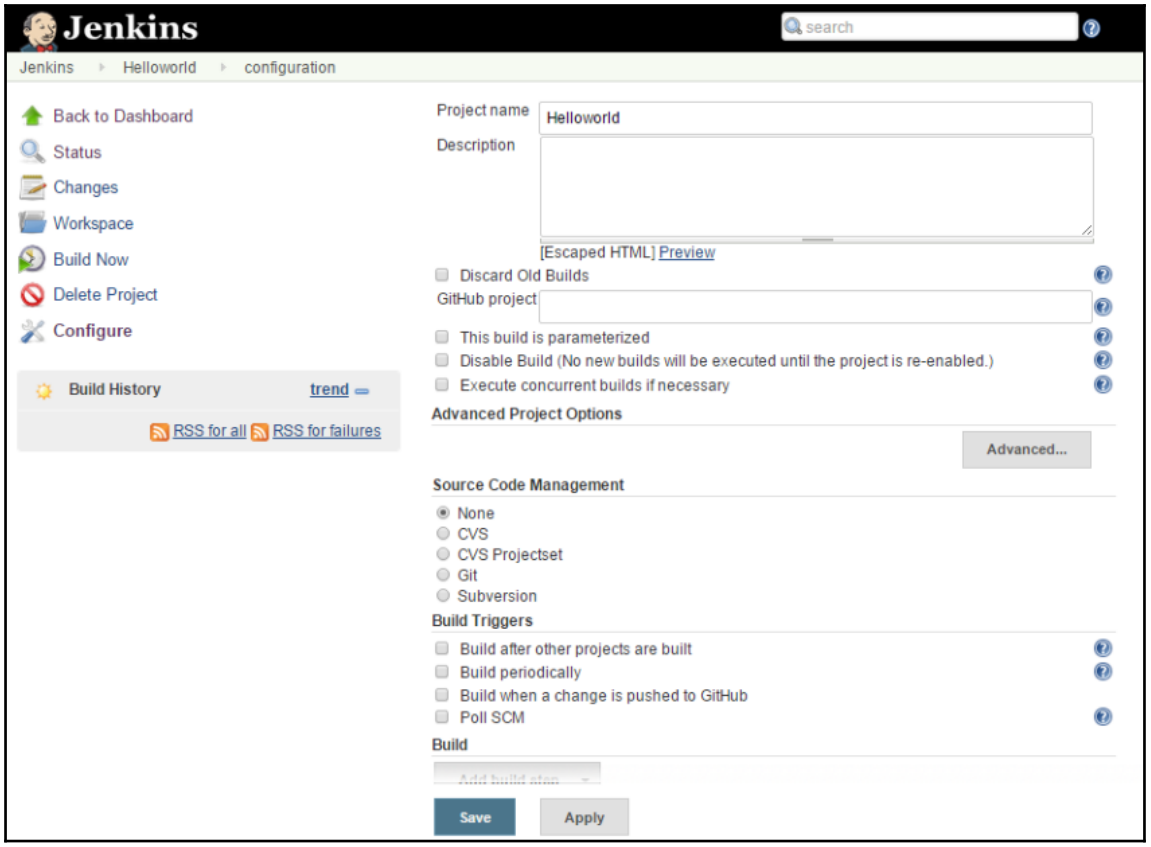

localhost:8080/configureTools/
Jenkins › Global Tool Configuration
Add Gradle
List of Gradle installations on this system
Ant
Ant installations
Add Ant
List of Ant installations on this system
Maven
Maven installations
Maven
Name
Maven-local
MAVEN_HOME
C:\Users\apache-maven-3.5.0
Install automatically
Delete Maven
Add Maven
List of Maven installations on this system
Docker
Docker installations
Add Docker
List of Docker installations on this system
Save
Apply

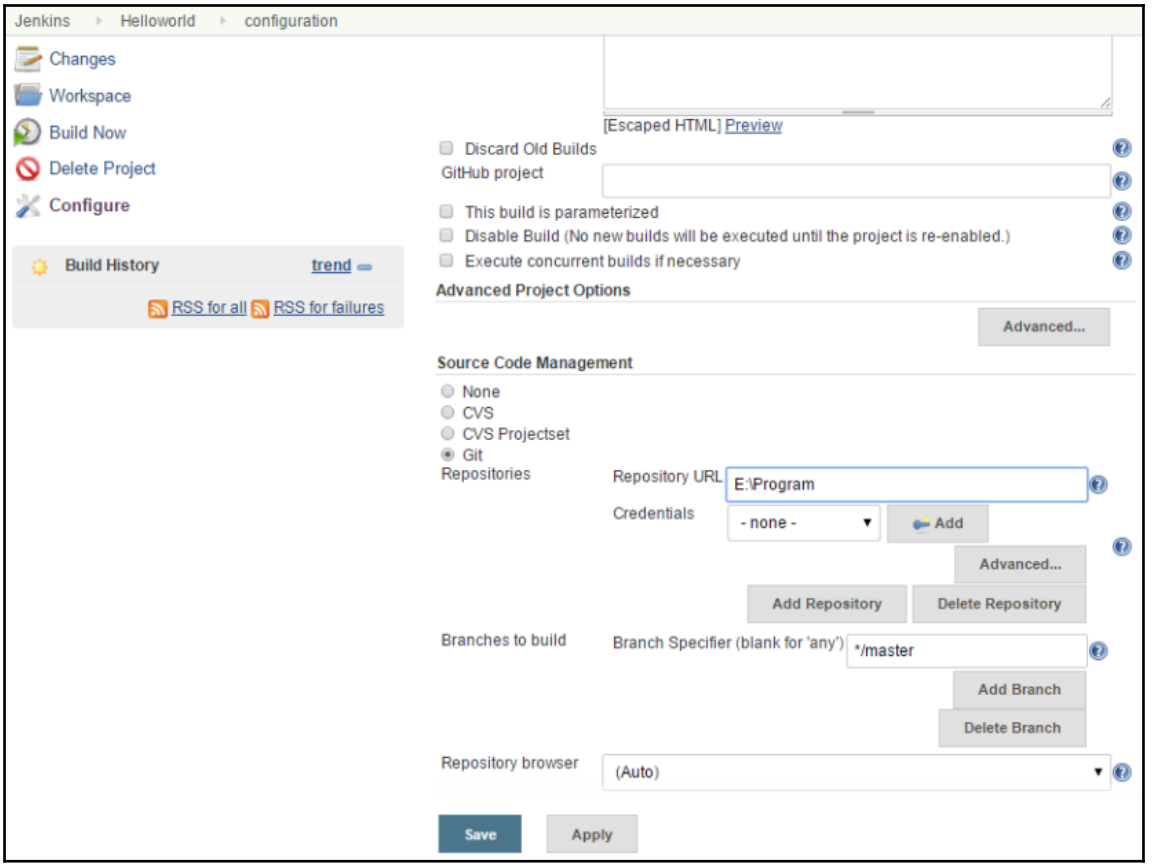

localhost:8080/view/all/newJob
Jenkins
1
search
Jenkins
All
Enter an item name
Job-3
» Required field
Freestyle project
This is the central feature of Jenkins. Jenkins will build your project, combining any SCM with any build system, and this can be even used for something other than software build.
Maven project
Build a maven project. Jenkins takes advantage of your POM files and drastically reduces the configuration.
Pipeline
Orchestrates long-running activities that can span multiple build slaves. Suitable for building pipelines (formerly known as workflows) and/or organizing complex activities that do not easily fit in free-style job type.
External Job
This type of job allows you to record the execution of a process run outside Jenkins, even on a remote machine. This is designed so that you can use Jenkins as a dashboard of your existing automation system.
Multi-configuration project
for projects that need a large number of different configurations, such as testing on multiple environments, platform-specific builds, etc.
OK

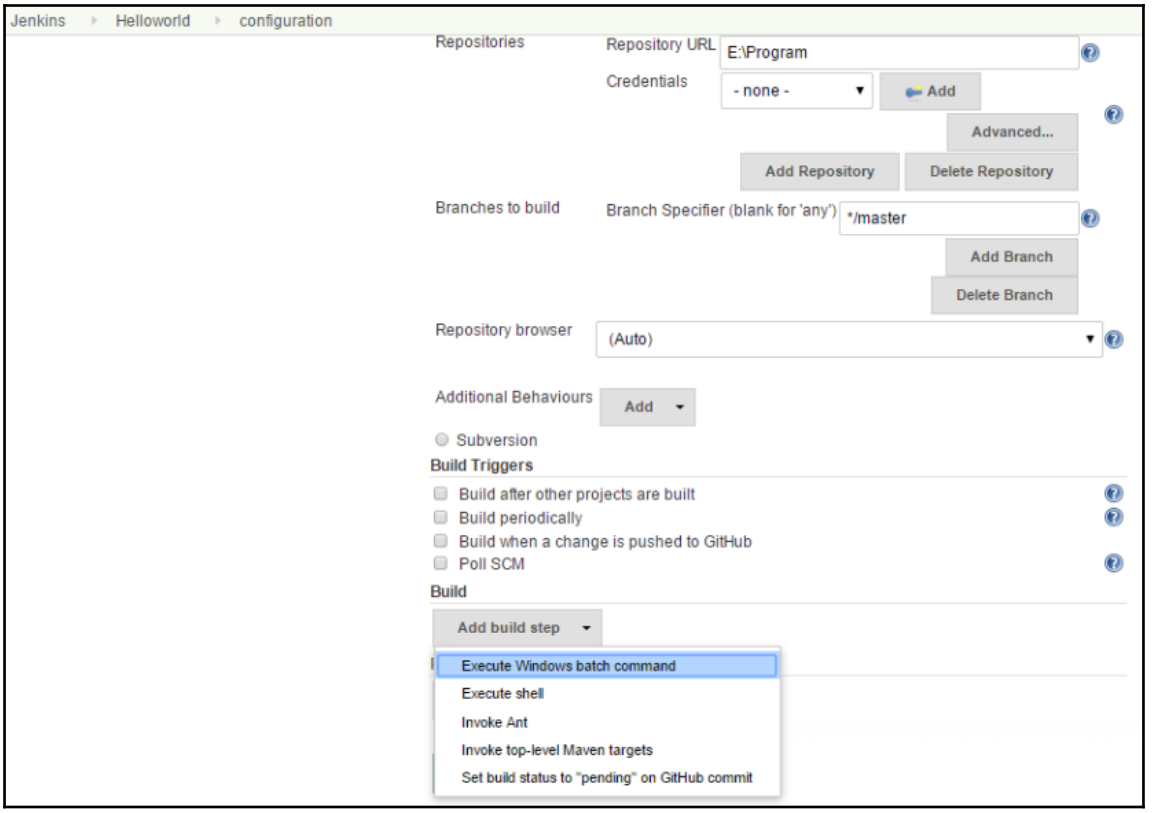

localhost:8080/job/Item-22/configure
Jenkins
Item-22
General
Maven Info Plugin Configuration
Source Code Management
Build Triggers
Build Environment
Pre Steps
Build
Post Steps
Build Settings
Post-build Actions
GitHub hook trigger for GITScm polling
Maven Dependency Update Trigger
Poll SCM
Build Environment
Delete workspace before build starts
Provide Configuration files
Abort the build if it's stuck
Add timestamps to the Console Output
Define Upstream Maven Repository
Maven release build
Use secret text(s) or file(s)
With Ant
Pre Steps
Add pre-build step

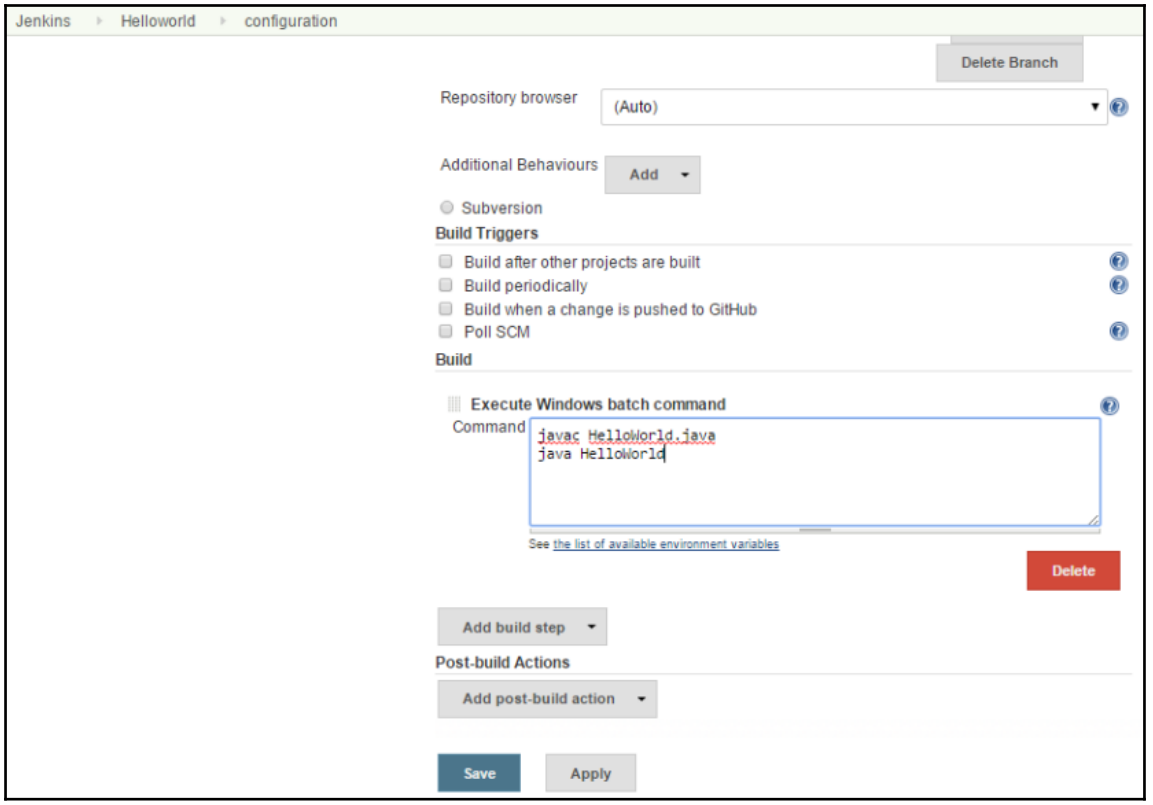

localhost:8080/job/Item-22/
Jenkins
1
search
Jenkins
Item-22
DISABLE AUTO REFRESH
Back to Dashboard
Status
Changes
Workspace
Build Now
Delete Maven project
Configure
Modules
Build History
trend
find
RSS for all
RSS for failures
Maven project Item-22
add description
Disable Project
Workspace
Recent Changes
Permalinks


Jenkins
search
Jenkins
All
New Item
People
Build History
Manage Jenkins
Credentials
Build Queue
No builds in the queue.
Build Executor Status
1 Idle
2 Idle
Item name
Helloworld
Freestyle project
This is the central feature of Jenkins. Jenkins will build your project, combining any SCM with any build system, and this can be even used for something other than software build.
Maven project
Build a maven project. Jenkins takes advantage of your POM files and drastically reduces the configuration.
External Job
This type of job allows you to record the execution of a process run outside Jenkins, even on a remote machine. This is designed so that you can use Jenkins as a dashboard of your existing automation system. See the documentation for more details.
Multi-configuration project
Suitable for projects that need a large number of different configurations, such as testing on multiple environments, platform-specific builds, etc.
OK

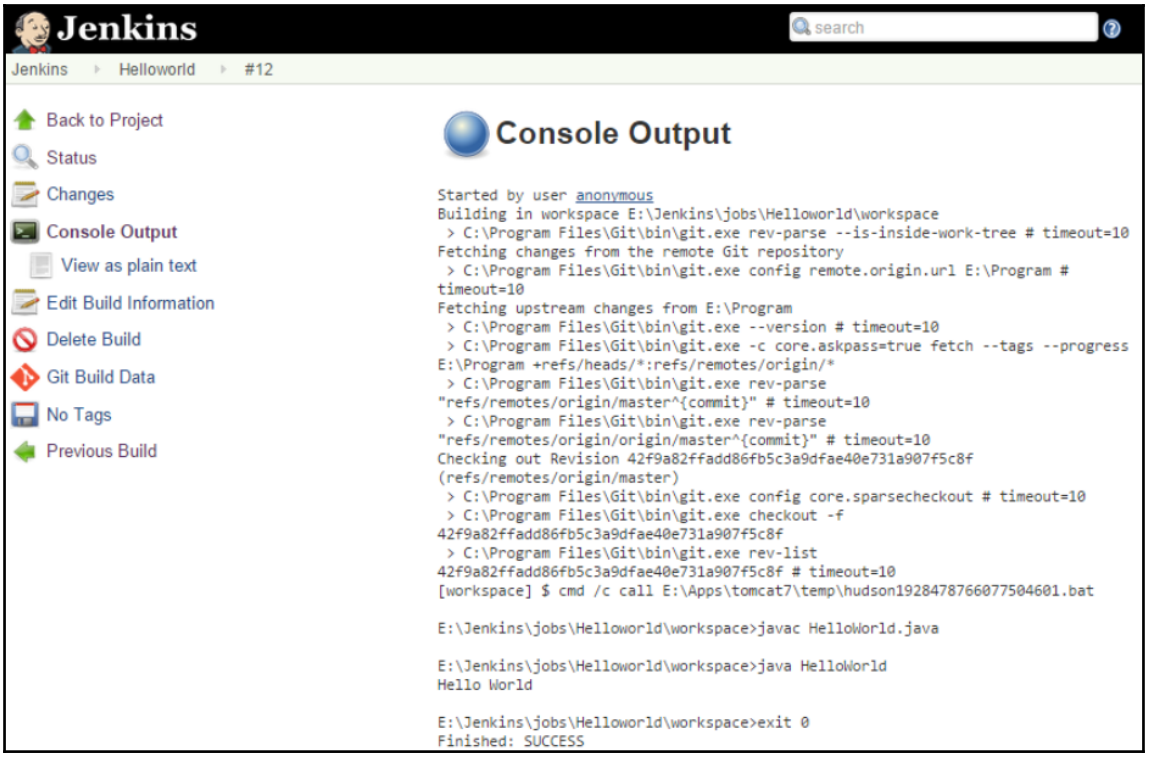

Jenkins
search
Jenkins
Helloworld
configuration
Back to Dashboard
Status
Changes
Workspace
Build Now
Delete Project
Configure
Build History
trend
RSS for all
RSS for failures
Project name
Helloworld
Description
[Escaped HTML] Preview
Discard Old Builds
GitHub project
This build is parameterized
Disable Build (No new builds will be executed until the project is re-enabled.)
Execute concurrent builds if necessary
Advanced Project Options
Advanced...
Source Code Management
None
CVS
CVS Projectset
Git
Subversion
Build Triggers
Build after other projects are built
Build periodically
Build when a change is pushed to GitHub
Poll SCM
Build
Save
Apply

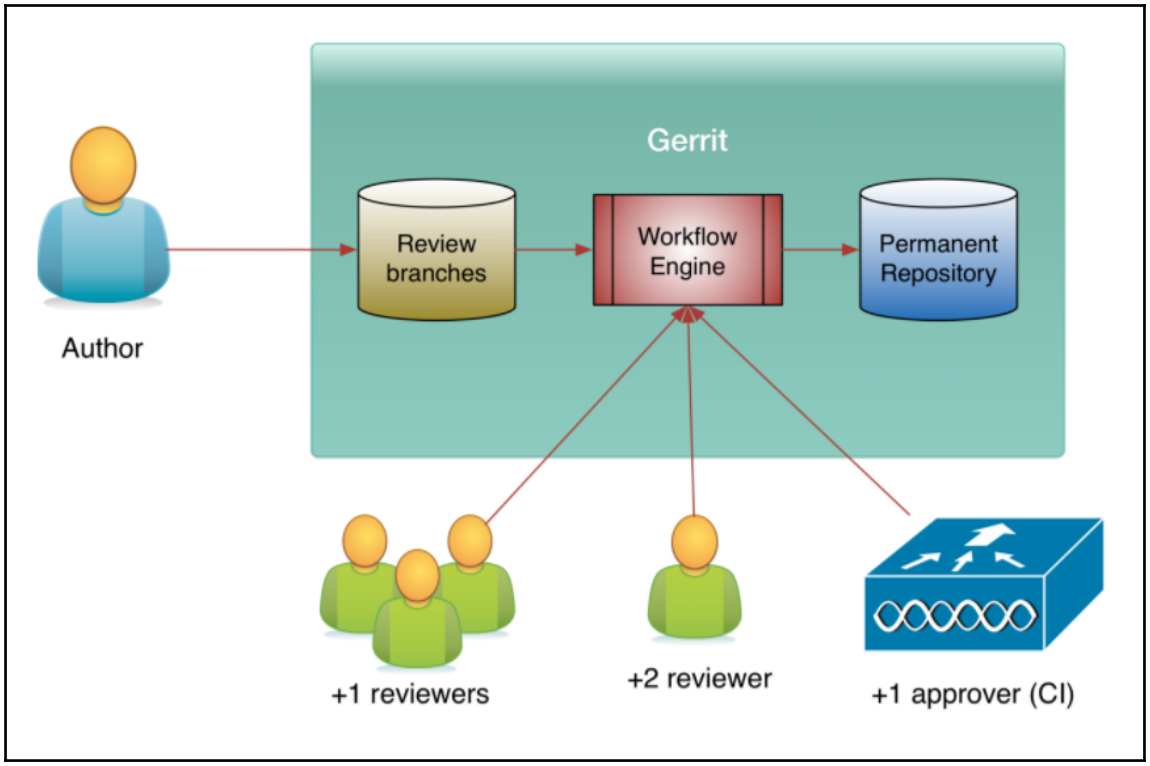

Jenkins
Helloworld
configuration
Changes
Workspace
Build Now
Delete Project
Configure
Build History
trend
RSS for all
RSS for failures
[Escaped HTML] Preview
Discard Old Builds
GitHub project
This build is parameterized
Disable Build (No new builds will be executed until the project is re-enabled.)
Execute concurrent builds if necessary
Advanced Project Options
Advanced...
Source Code Management
None
CVS
CVS Projectset
Git
Repositories
Repository URL
E:\Program
Credentials
- none -
Add
Advanced...
Add Repository
Delete Repository
Branches to build
Branch Specifier (blank for 'any')
*/master
Add Branch
Delete Branch
Repository browser
(Auto)
Save
Apply

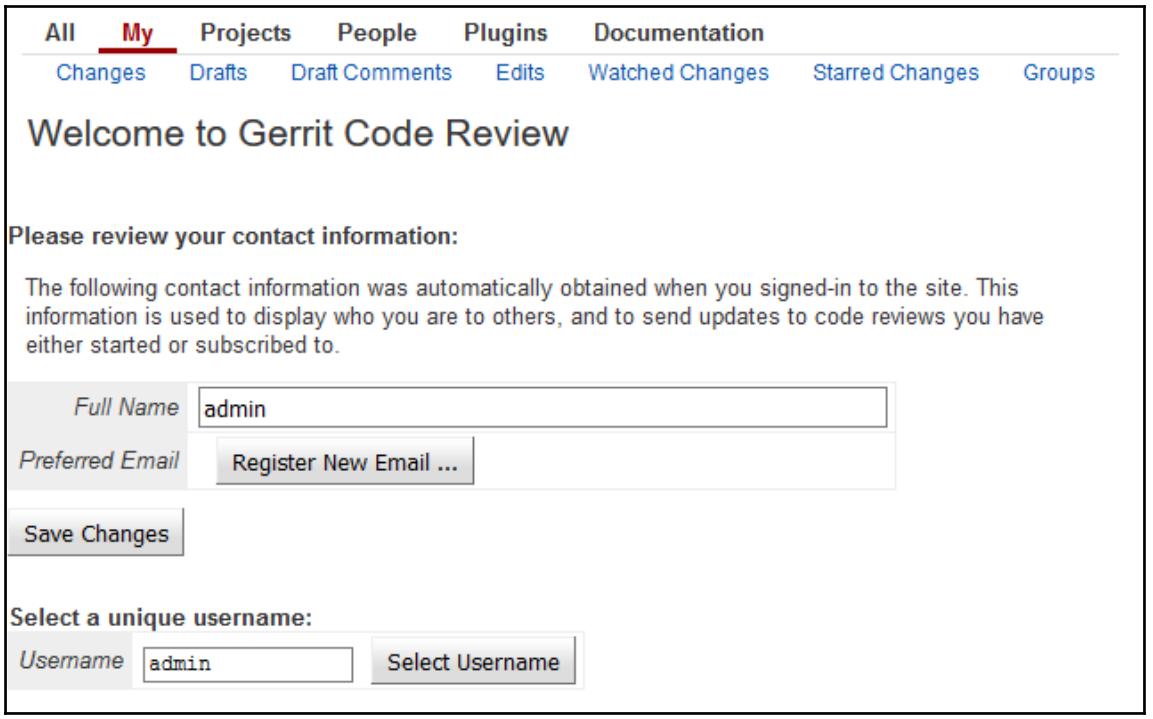

Jenkins
Helloworld
configuration
Repositories
Repository URL
E:\Program
Credentials
- none -
Add
Advanced...
Add Repository
Delete Repository
Branches to build
Branch Specifier (blank for 'any')
*/master
Add Branch
Delete Branch
Repository browser
(Auto)
Additional Behaviours
Add
Subversion
Build Triggers
Build after other projects are built
Build periodically
Build when a change is pushed to GitHub
Poll SCM
Build
Add build step
Execute Windows batch command
Execute shell
Invoke Ant
Invoke top-level Maven targets
Set build status to "pending" on GitHub commit

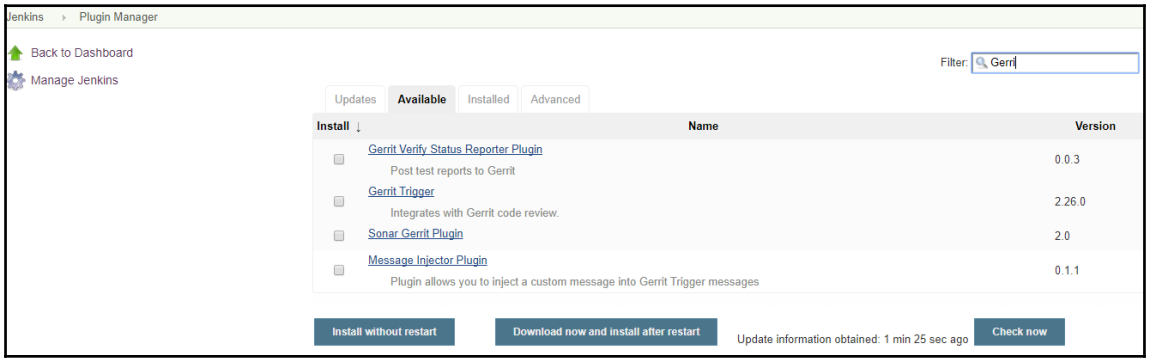

Jenkins
Helloworld
configuration
Delete Branch
Repository browser
(Auto)
Additional Behaviours
Add
Subversion
Build Triggers
Build after other projects are built
Build periodically
Build when a change is pushed to GitHub
Poll SCM
Build
Execute Windows batch command
Command
javac HelloWorld.java
java HelloWorld
See the list of available environment variables
Delete
Add build step
Post-build Actions
Add post-build action
Save
Apply

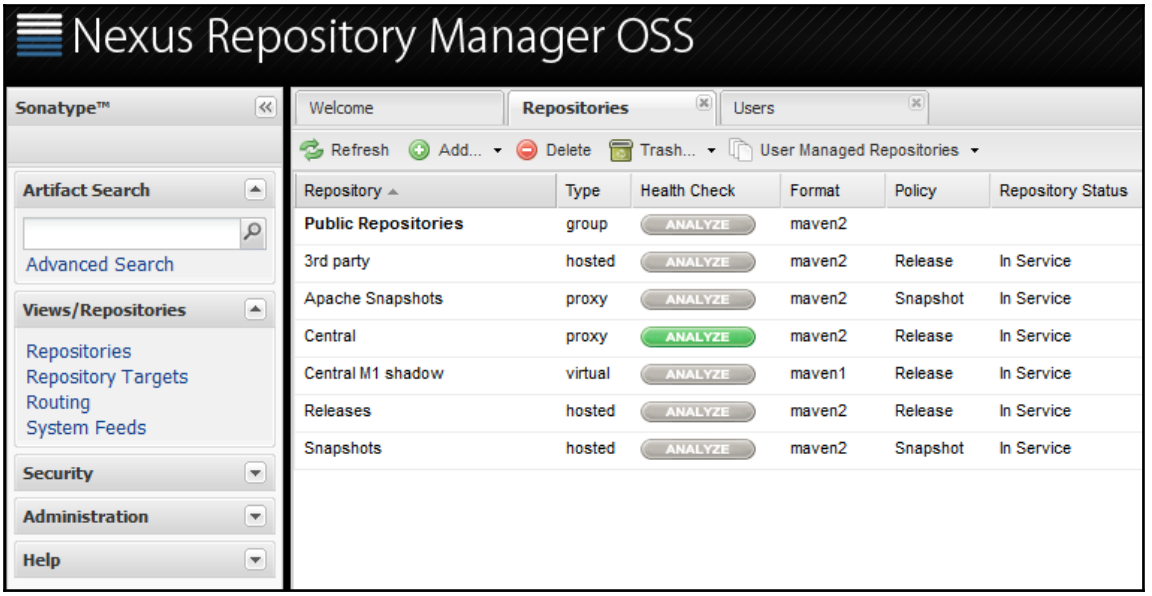

Jenkins
search
Jenkins
Helloworld
ENABLE AUTO REFRESH
Back to Dashboard
Status
Changes
Workspace
Build Now
Delete Project
Configure
Project Helloworld
add description
Disable Project
Workspace
Recent Changes
Permalinks
Build History
trend
RSS for all
RSS for failures

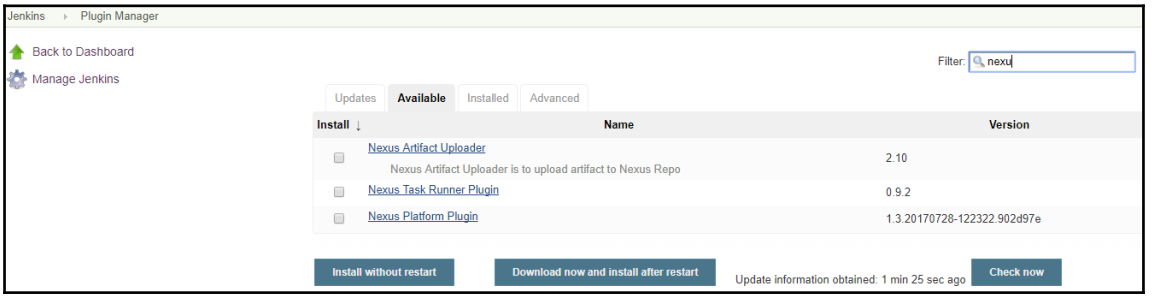

Jenkins
search
Jenkins
Helloworld
#12
Back to Project
Status
Changes
Console Output
View as plain text
Edit Build Information
Delete Build
Git Build Data
No Tags
Previous Build
Console Output
Started by user anonymous
Building in workspace E:\Jenkins\jobs\Helloworld\workspace
> C:\Program Files\Git\bin\git.exe rev-parse --is-inside-work-tree # timeout=10
Fetching changes from the remote Git repository
> C:\Program Files\Git\bin\git.exe config remote.origin.url E:\Program #
timeout=10
Fetching upstream changes from E:\Program
> C:\Program Files\Git\bin\git.exe --version # timeout=10
> C:\Program Files\Git\bin\git.exe -c core.askpass=true fetch --tags --progress
E:\Program +refs/heads/*:refs/remotes/origin/*
> C:\Program Files\Git\bin\git.exe rev-parse
"refs/remotes/origin/master^{commit}" # timeout=10
> C:\Program Files\Git\bin\git.exe rev-parse
"refs/remotes/origin/origin/master^{commit}" # timeout=10
Checking out Revision 42f9a82ffadd86fb5c3a9dfae40e731a907f5c8f
(refs/remotes/origin/master)
> C:\Program Files\Git\bin\git.exe config core.sparsecheckout # timeout=10
> C:\Program Files\Git\bin\git.exe checkout -f
42f9a82ffadd86fb5c3a9dfae40e731a907f5c8f
> C:\Program Files\Git\bin\git.exe rev-list
42f9a82ffadd86fb5c3a9dfae40e731a907f5c8f # timeout=10
[workspace] $ cmd /c call E:\Apps\tomcat7\temp\hudson1928478766077504601.bat
E:\Jenkins\jobs\Helloworld\workspace>javac HelloWorld.java
E:\Jenkins\jobs\Helloworld\workspace>java HelloWorld
Hello World
E:\Jenkins\jobs\Helloworld\workspace>exit 0
Finished: SUCCESS

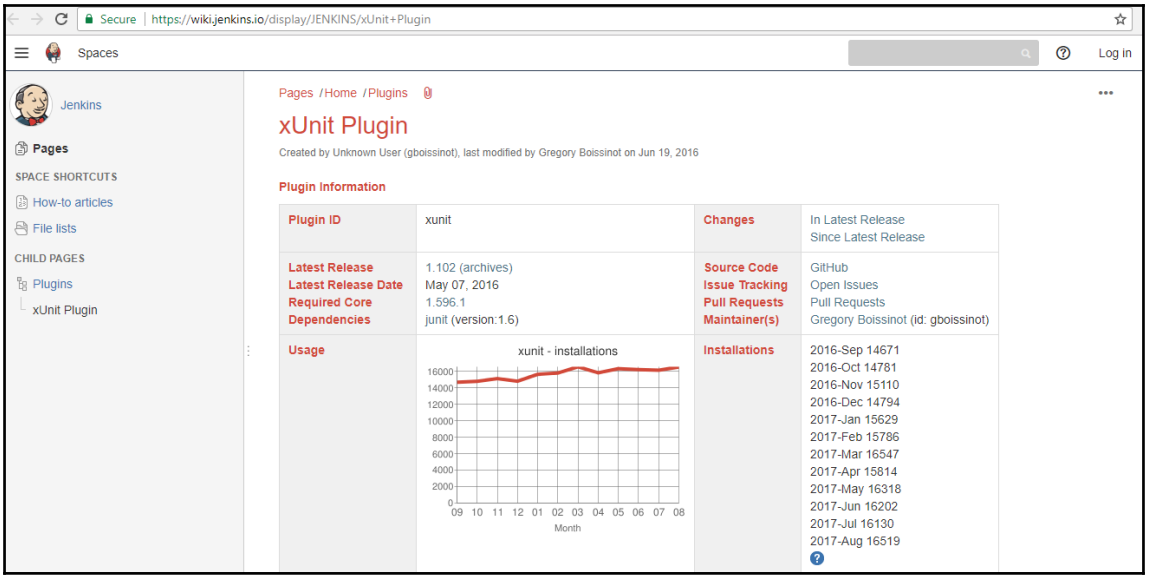

Gerrit
Review branches
Workflow Engine
Permanent Repository
Author
+1 reviewers
+2 reviewer
+1 approver (CI)

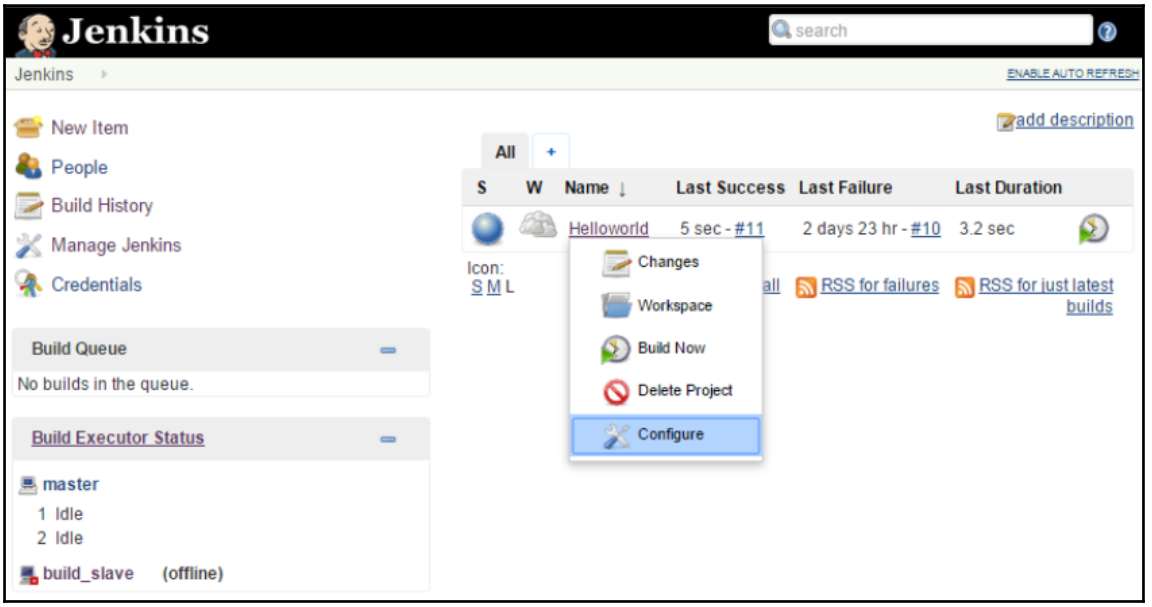

All
My
Projects
People
Plugins
Documentation
Changes
Drafts
Draft Comments
Edits
Watched Changes
Starred Changes
Groups
Welcome to Gerrit Code Review
Please review your contact information:
The following contact information was automatically obtained when you signed-in to the site. This information is used to display who you are to others, and to send updates to code reviews you have either started or subscribed to.
Full Name
admin
Preferred Email
Register New Email ...
Save Changes
Select a unique username:
Username
admin
Select Username

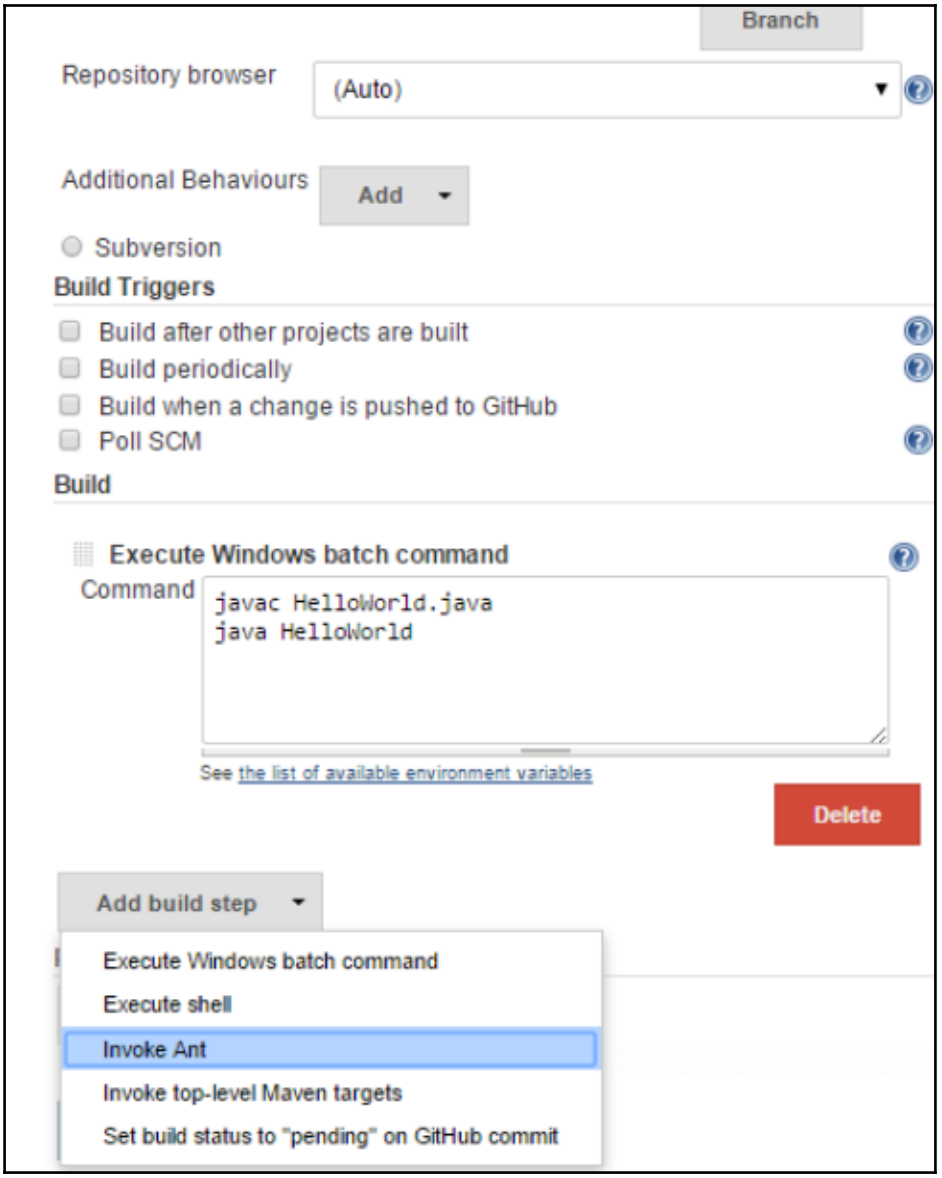

Jenkins
Plugin Manager
Back to Dashboard
Manage Jenkins
Filter:
Gerri
Updates
Available
Installed
Advanced
Install
Name
Version
Gerrit Verify Status Reporter Plugin
Post test reports to Gerrit
0.0.3
Gerrit Trigger
Integrates with Gerrit code review.
2.26.0
Sonar Gerrit Plugin
2.0
Message Injector Plugin
Plugin allows you to inject a custom message into Gerrit Trigger messages
0.1.1
Install without restart
Download now and install after restart
Update information obtained: 1 min 25 sec ago
Check now

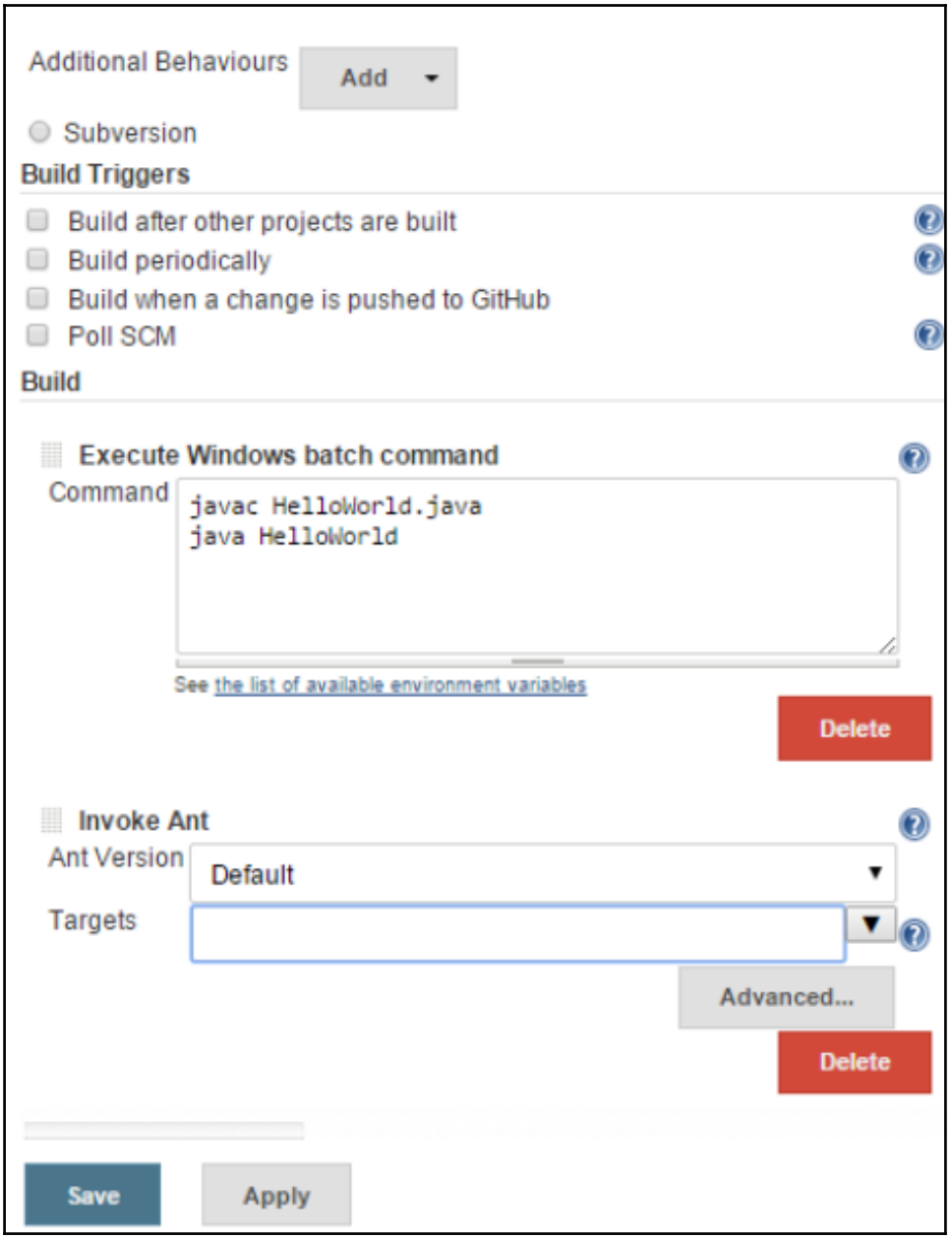

Nexus Repository Manager OSS
Sonatype™
Artifact Search
Advanced Search
Views/Repositories
Repositories
Repository Targets
Routing
System Feeds
Security
Administration
Help
Welcome
Repositories
Users
Refresh
Add...
Delete
Trash...
User Managed Repositories
Repository
Type
Health Check
Format
Policy
Repository Status
Public Repositories
group
maven2
3rd party
hosted
maven2
Release
In Service
Apache Snapshots
proxy
maven2
Snapshot
In Service
Central
proxy
maven2
Release
In Service
Central M1 shadow
virtual
maven1
Release
In Service
Releases
hosted
maven2
Release
In Service
Snapshots
hosted
maven2
Snapshot
In Service
ANALYZE

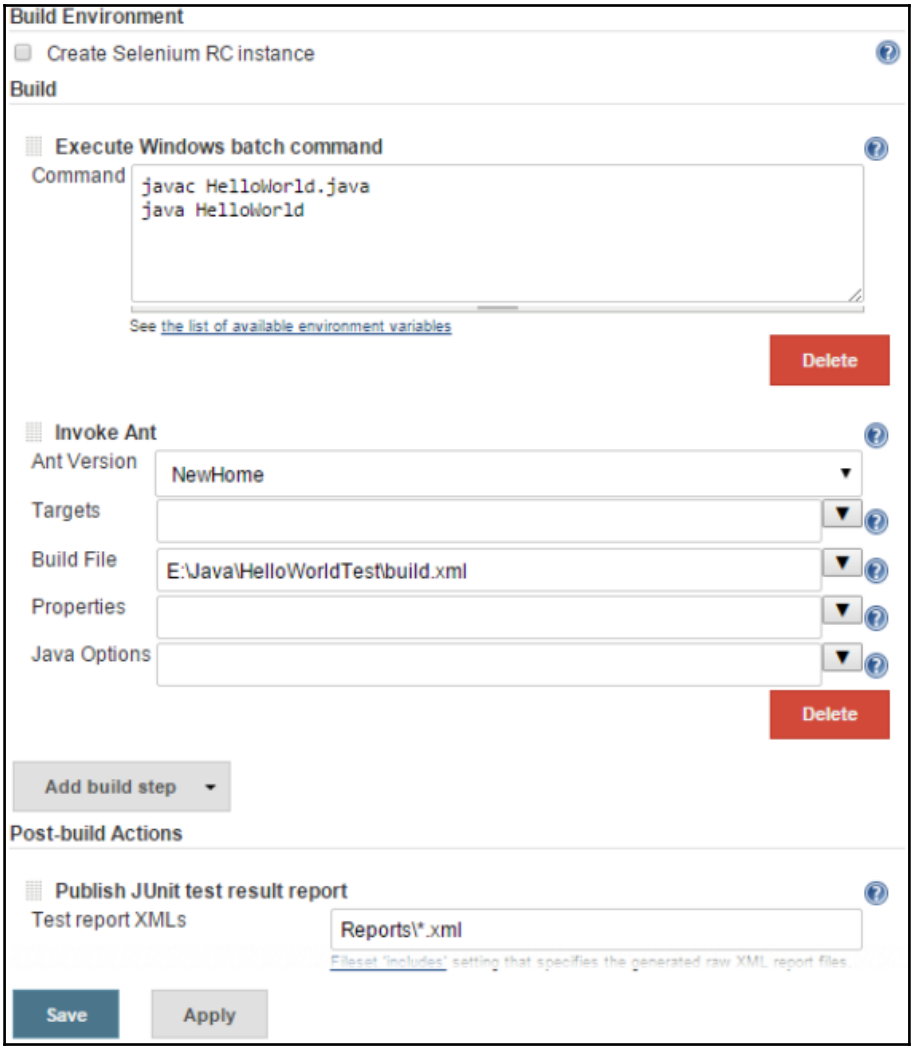

Jenkins
Plugin Manager
Back to Dashboard
Manage Jenkins
Filter:
nexu
Updates
Available
Installed
Advanced
Install
Name
Version
Nexus Artifact Uploader
Nexus Artifact Uploader is to upload artifact to Nexus Repo
2.10
Nexus Task Runner Plugin
0.9.2
Nexus Platform Plugin
1.3.20170728-122322.902d97e
Install without restart
Download now and install after restart
Update information obtained: 1 min 25 sec ago
Check now

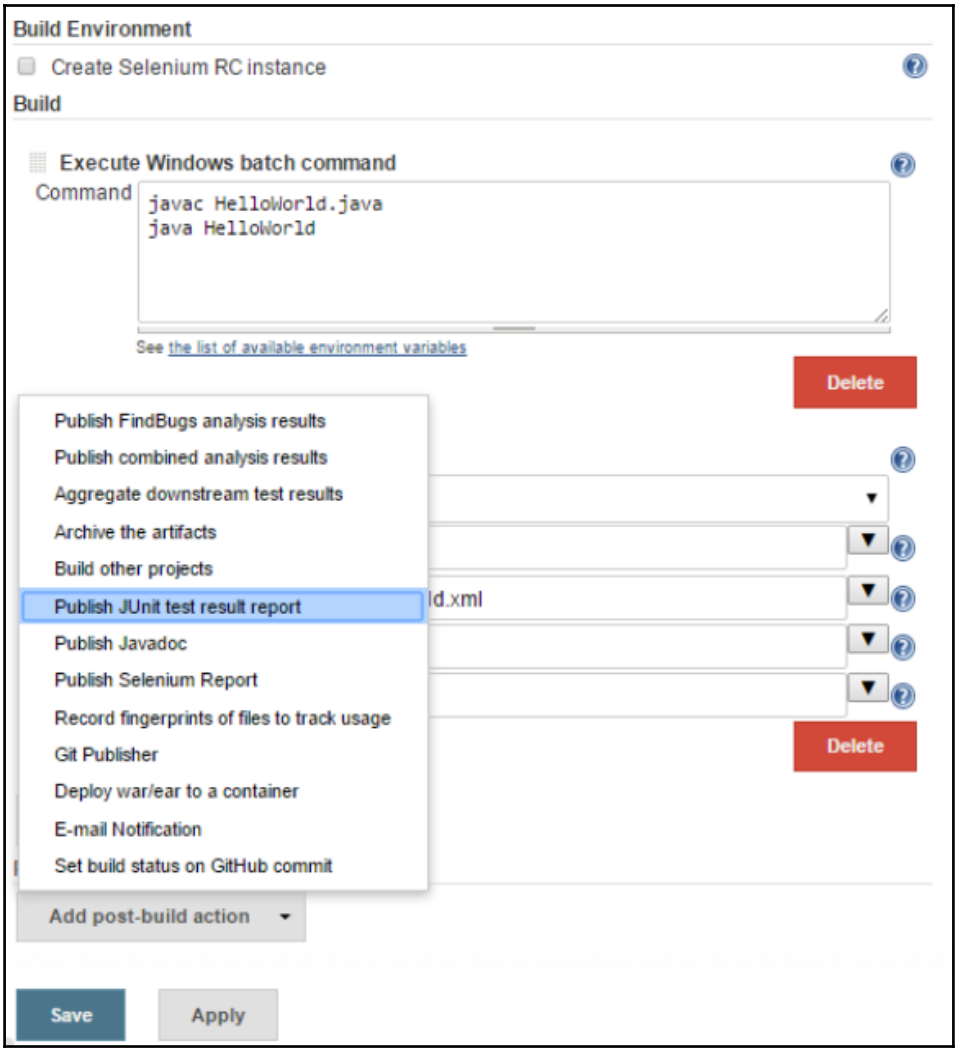

Secure | https://wiki.jenkins.io/display/JENKINS/xUnit+Plugin
Spaces
Log in
Jenkins
Pages
SPACE SHORTCUTS
How-to articles
File lists
CHILD PAGES
Plugins
xUnit Plugin
Pages / Home / Plugins
xUnit Plugin
Created by Unknown User (gboissinot), last modified by Gregory Boissinot on Jun 19, 2016
Plugin Information
Plugin ID
xunit
Changes
In Latest Release
Since Latest Release
Latest Release
Latest Release Date
Required Core
Dependencies
1.102 (archives)
May 07, 2016
1.596.1
junit (version:1.6)
Source Code
Issue Tracking
Pull Requests
Maintainer(s)
GitHub
Open Issues
Pull Requests
Gregory Boissinot (id: gboissinot)
Usage
xunit - installations
16000
14000
12000
10000
8000
6000
4000
2000
0
09 10 11 12 01 02 03 04 05 06 07 08
Month
Installations
2016-Sep 14671
2016-Oct 14781
2016-Nov 15110
2016-Dec 14794
2017-Jan 15629
2017-Feb 15786
2017-Mar 16547
2017-Apr 15814
2017-May 16318
2017-Jun 16202
2017-Jul 16130
2017-Aug 16519

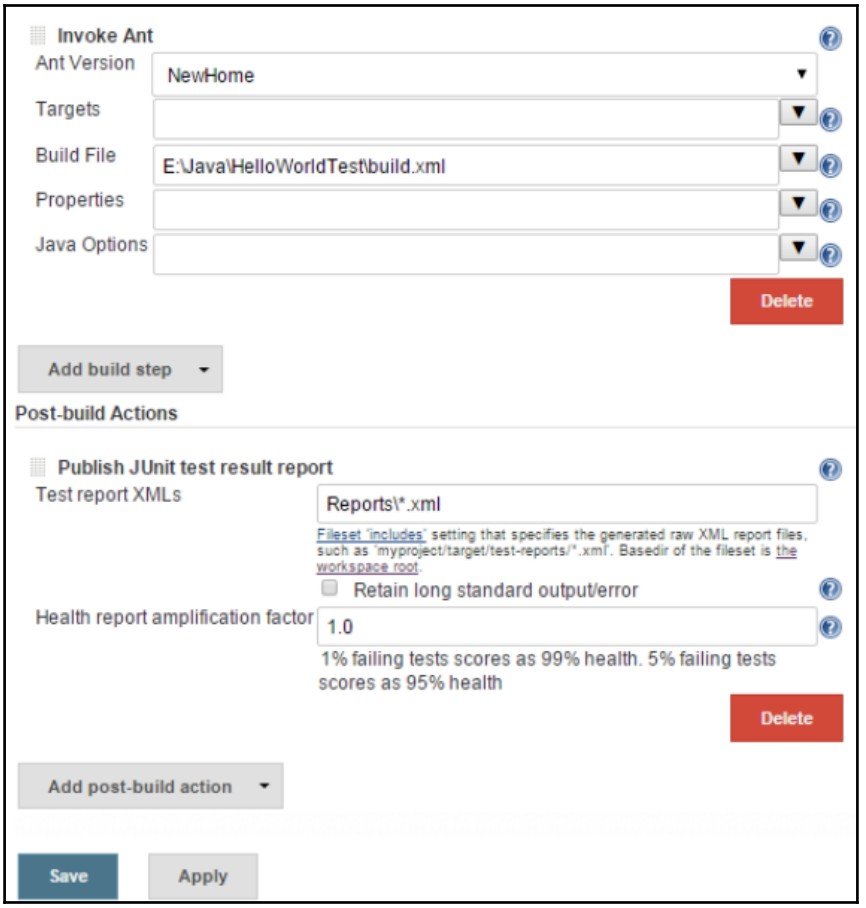

Jenkins
search
Jenkins
ENABLE AUTO REFRESH
New Item
People
Build History
Manage Jenkins
Credentials
add description
All
S
W
Name
Last Success
Last Failure
Last Duration
Helloworld
5 sec - #11
2 days 23 hr - #10
3.2 sec
Changes
Workspace
Build Now
Delete Project
Configure
Icon:
S M L
RSS for failures
RSS for just latest builds
Build Queue
No builds in the queue.
Build Executor Status
master
1 Idle
2 Idle
build_slave (offline)

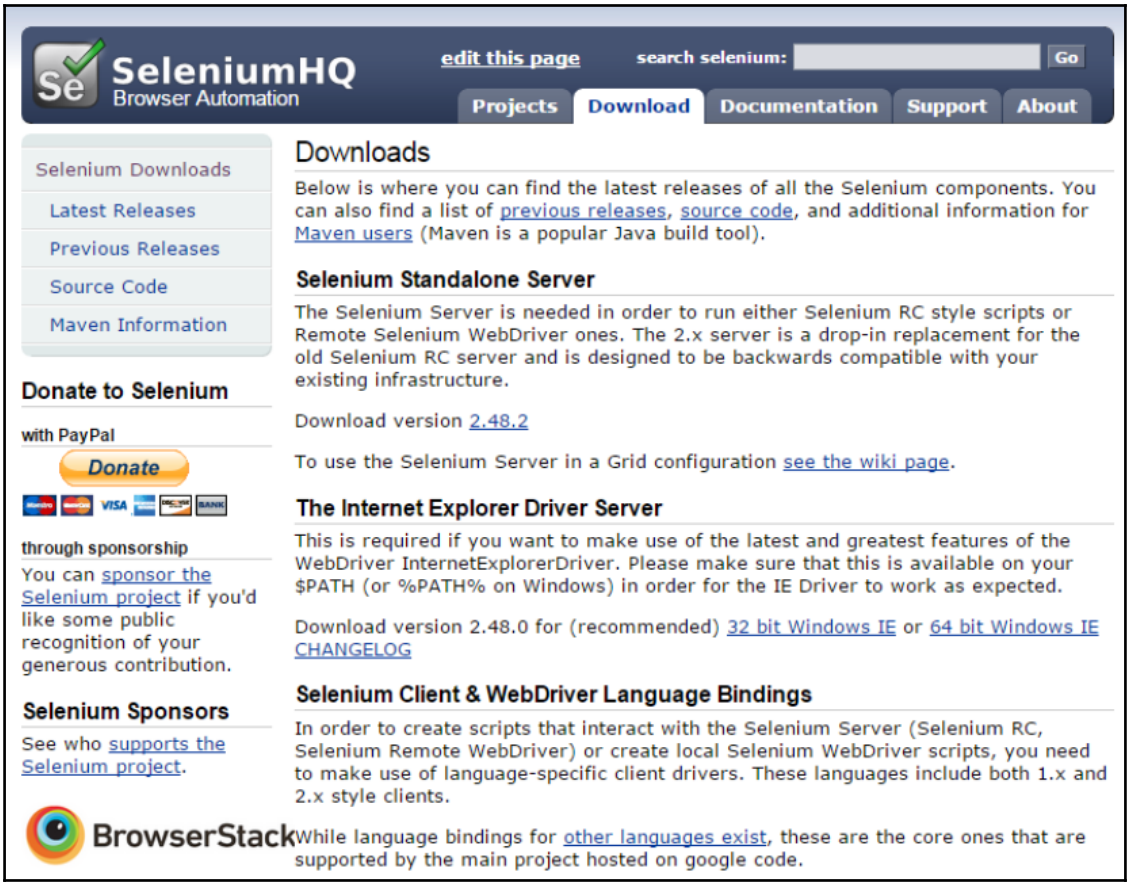

Branch
Repository browser
(Auto)
Additional Behaviours
Add
Subversion
Build Triggers
Build after other projects are built
Build periodically
Build when a change is pushed to GitHub
Poll SCM
Build
Execute Windows batch command
Command
javac HelloWorld.java
java HelloWorld
See the list of available environment variables
Delete
Add build step
Execute Windows batch command
Execute shell
Invoke Ant
Invoke top-level Maven targets
Set build status to "pending" on GitHub commit

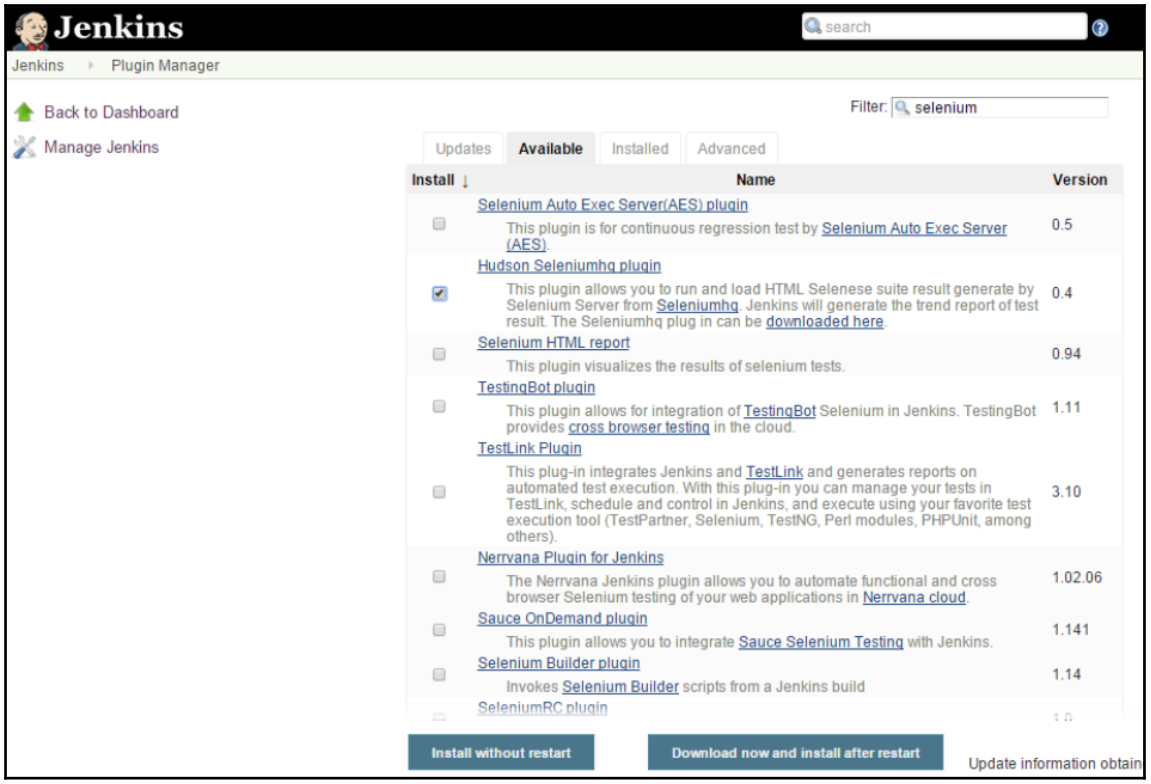

Additional Behaviours
Add
Subversion
Build Triggers
Build after other projects are built
Build periodically
Build when a change is pushed to GitHub
Poll SCM
Build
Execute Windows batch command
Command
javac HelloWorld.java
java HelloWorld
See the list of available environment variables
Delete
Invoke Ant
Ant Version
Default
Targets
Advanced...
Delete
Save
Apply

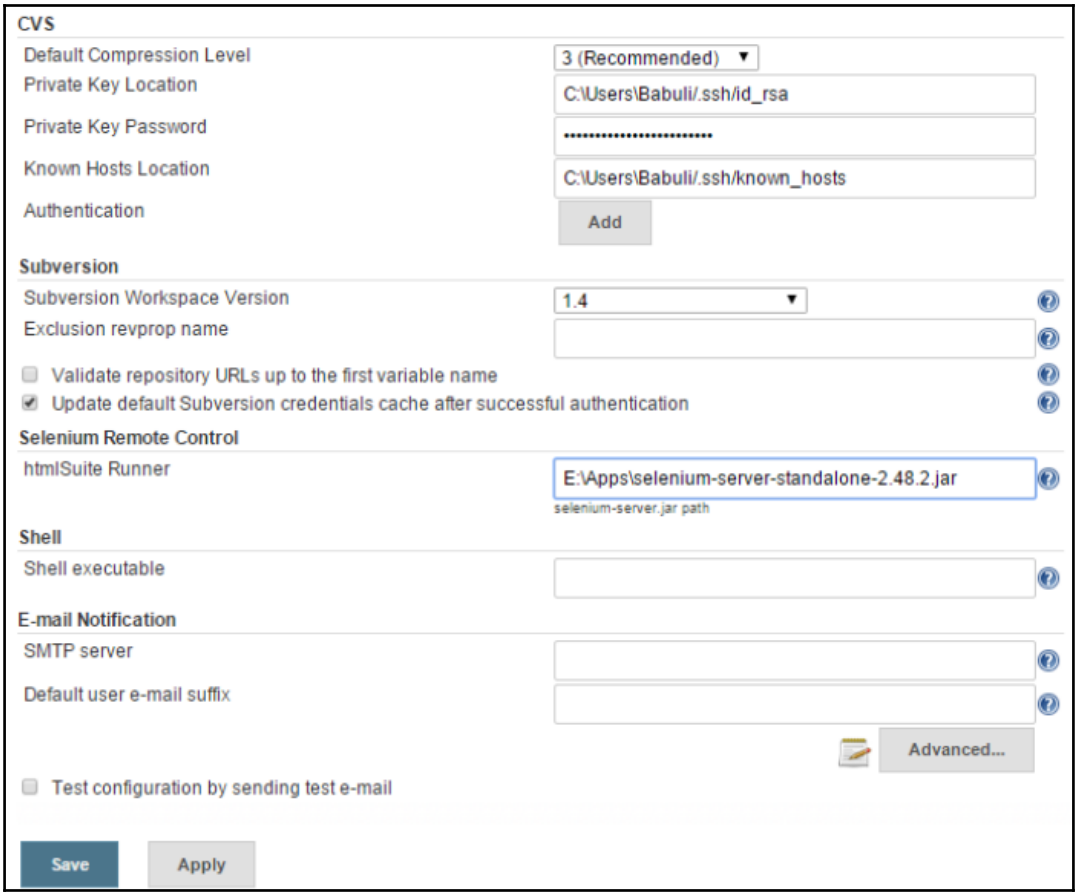

Build Environment
Create Selenium RC instance
Build
Execute Windows batch command
Command
javac HelloWorld.java
java HelloWorld
See the list of available environment variables
Delete
Invoke Ant
Ant Version
NewHome
Targets
Build File
E:\Java\HelloWorldTest\build.xml
Properties
Java Options
Delete
Add build step
Post-build Actions
Publish JUnit test result report
Test report XMLs
Reports*.xml
Save
Apply

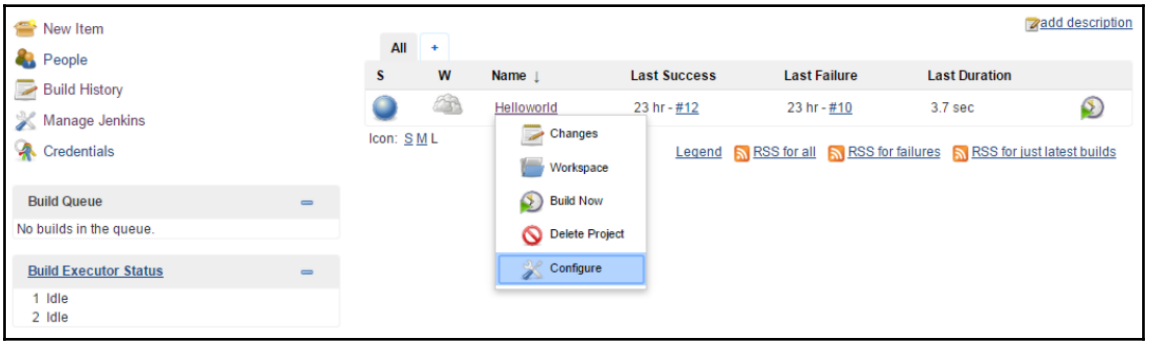

Build Environment
Create Selenium RC instance
Build
Execute Windows batch command
Command
javac HelloWorld.java
java HelloWorld
See the list of available environment variables
Delete
Publish FindBugs analysis results
Publish combined analysis results
Aggregate downstream test results
Archive the artifacts
Build other projects
Publish JUnit test result report
Publish Javadoc
Publish Selenium Report
Record fingerprints of files to track usage
Git Publisher
Deploy war/ear to a container
E-mail Notification
Set build status on GitHub commit
ld.xml
Delete
Add post-build action
Save
Apply

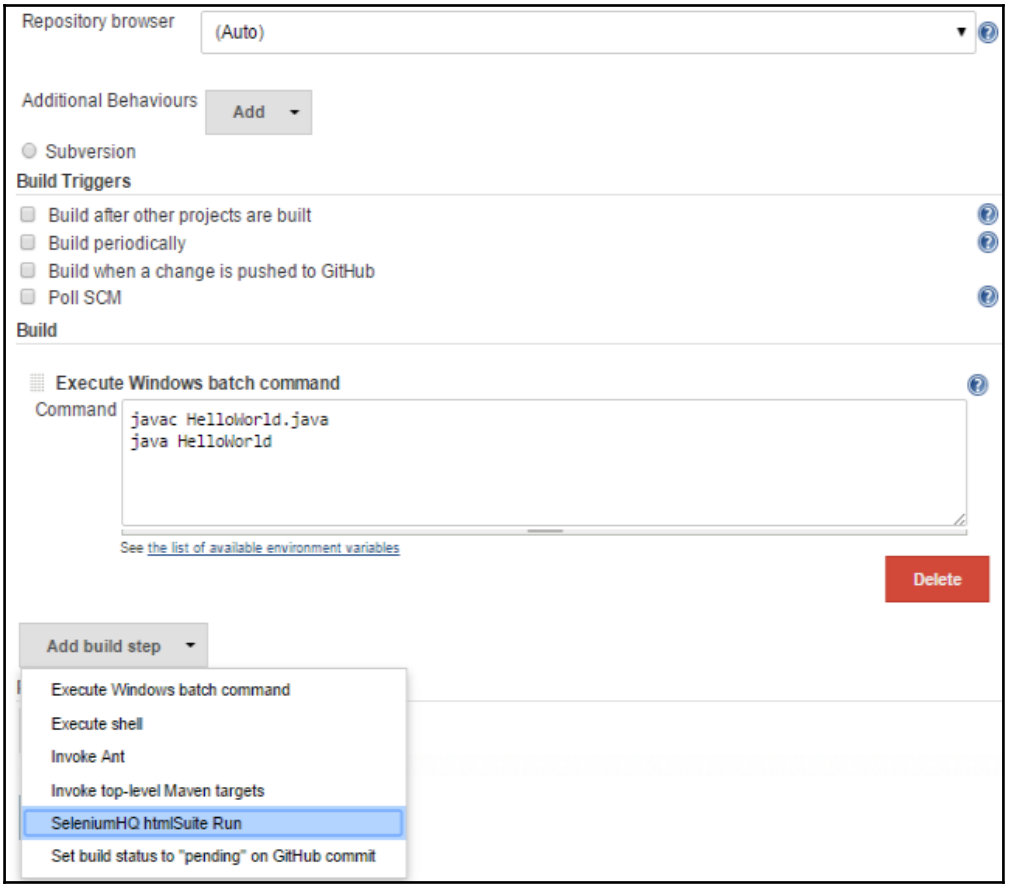

Invoke Ant
Ant Version
NewHome
Targets
Build File
E:\Java\HelloWorldTest\build.xml
Properties
Java Options
Delete
Add build step
Post-build Actions
Publish JUnit test result report
Test report XMLs
Reports*.xml
Fileset 'includes' setting that specifies the generated raw XML report files, such as 'myproject/target/test-reports/*.xml'. Basedir of the fileset is the workspace root.
Retain long standard output/error
Health report amplification factor
1.0
1% failing tests scores as 99% health. 5% failing tests scores as 95% health
Delete
Add post-build action
Save
Apply

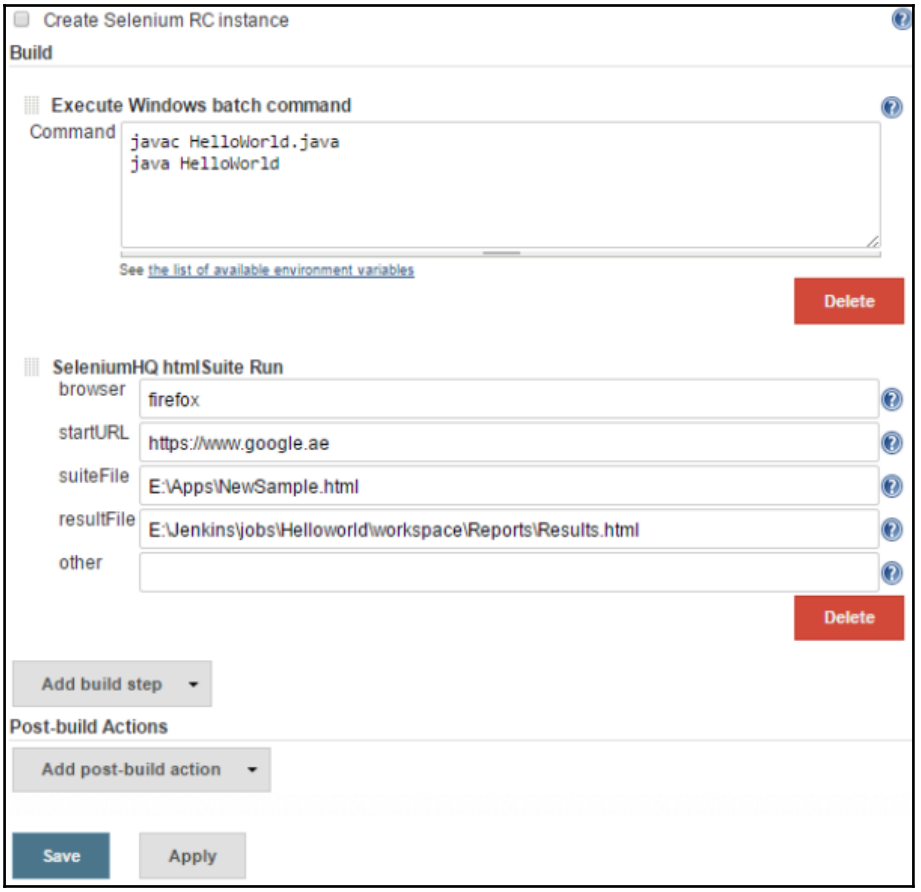

SeleniumHQ
Browser Automation
edit this page
search selenium:
Go
Projects
Download
Documentation
Support
About
Selenium Downloads
Latest Releases
Previous Releases
Source Code
Maven Information
Donate to Selenium
with PayPal
Donate
through sponsorship
You can sponsor the Selenium project if you'd like some public recognition of your generous contribution.
Selenium Sponsors
See who supports the Selenium project.
BrowserStack
Downloads
Below is where you can find the latest releases of all the Selenium components. You can also find a list of previous releases, source code, and additional information for Maven users (Maven is a popular Java build tool).
Selenium Standalone Server
The Selenium Server is needed in order to run either Selenium RC style scripts or Remote Selenium WebDriver ones. The 2.x server is a drop-in replacement for the old Selenium RC server and is designed to be backwards compatible with your existing infrastructure.
Download version 2.48.2
To use the Selenium Server in a Grid configuration see the wiki page.
The Internet Explorer Driver Server
This is required if you want to make use of the latest and greatest features of the WebDriver InternetExplorerDriver. Please make sure that this is available on your $PATH (or %PATH% on Windows) in order for the IE Driver to work as expected.
Download version 2.48.0 for (recommended) 32 bit Windows IE or 64 bit Windows IE
CHANGELOG
Selenium Client & WebDriver Language Bindings
In order to create scripts that interact with the Selenium Server (Selenium RC, Selenium Remote WebDriver) or create local Selenium WebDriver scripts, you need to make use of language-specific client drivers. These languages include both 1.x and 2.x style clients.
While language bindings for other languages exist, these are the core ones that are supported by the main project hosted on google code.

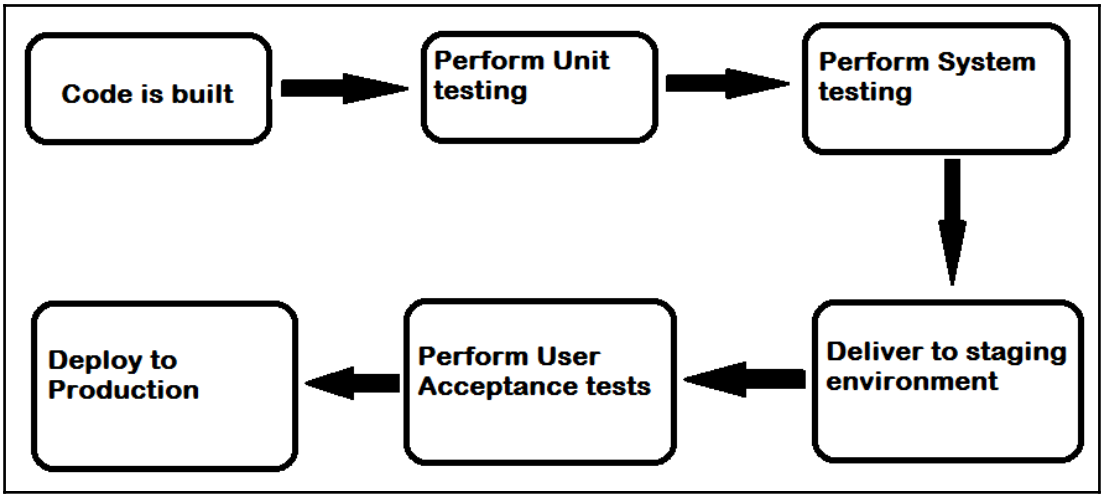

Jenkins
search
Jenkins
Plugin Manager
Back to Dashboard
Manage Jenkins
Filter: selenium
Updates
Available
Installed
Advanced
Install
Name
Version
Selenium Auto Exec Server(AES) plugin
This plugin is for continuous regression test by Selenium Auto Exec Server (AES).
0.5
Hudson Seleniumhq plugin
This plugin allows you to run and load HTML Selenese suite result generate by Selenium Server from Seleniumhq. Jenkins will generate the trend report of test result. The Seleniumhq plug in can be downloaded here.
0.4
Selenium HTML report
This plugin visualizes the results of selenium tests.
0.94
TestingBot plugin
This plugin allows for integration of TestingBot Selenium in Jenkins. TestingBot provides cross browser testing in the cloud.
1.11
TestLink Plugin
This plug-in integrates Jenkins and TestLink and generates reports on automated test execution. With this plug-in you can manage your tests in TestLink, schedule and control in Jenkins, and execute using your favorite test execution tool (TestPartner, Selenium, TestNG, Perl modules, PHPUnit, among others).
3.10
Nerrvana Plugin for Jenkins
The Nerrvana Jenkins plugin allows you to automate functional and cross browser Selenium testing of your web applications in Nerrvana cloud.
1.02.06
Sauce OnDemand plugin
This plugin allows you to integrate Sauce Selenium Testing with Jenkins.
1.141
Selenium Builder plugin
Invokes Selenium Builder scripts from a Jenkins build
1.14
SeleniumRC plugin
Install without restart
Download now and install after restart
Update information obtain

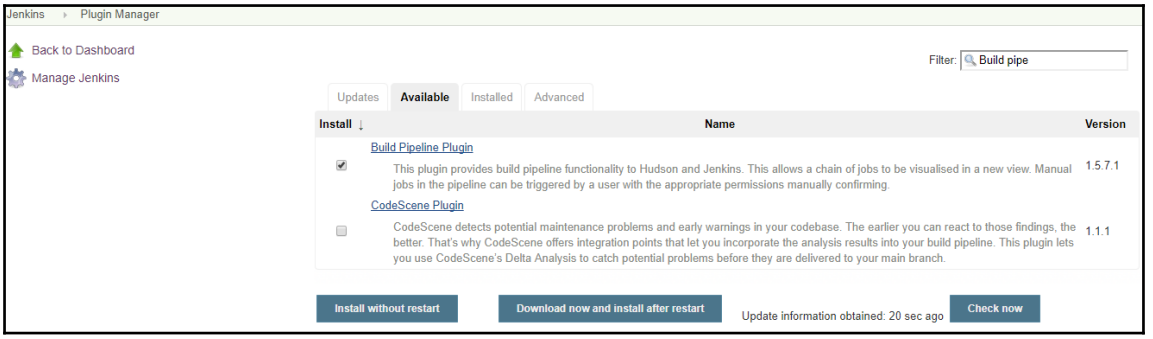

CVS
Default Compression Level
3 (Recommended)
Private Key Location
C:\Users\Babuli/.ssh/id_rsa
Private Key Password
Known Hosts Location
C:\Users\Babuli/.ssh/known_hosts
Authentication
Add
Subversion
Subversion Workspace Version
1.4
Exclusion revprop name
Validate repository URLs up to the first variable name
Update default Subversion credentials cache after successful authentication
Selenium Remote Control
htmlSuite Runner
E:\Apps\selenium-server-standalone-2.48.2.jar
selenium-server.jar path
Shell
Shell executable
E-mail Notification
SMTP server
Default user e-mail suffix
Advanced...
Test configuration by sending test e-mail
Save
Apply

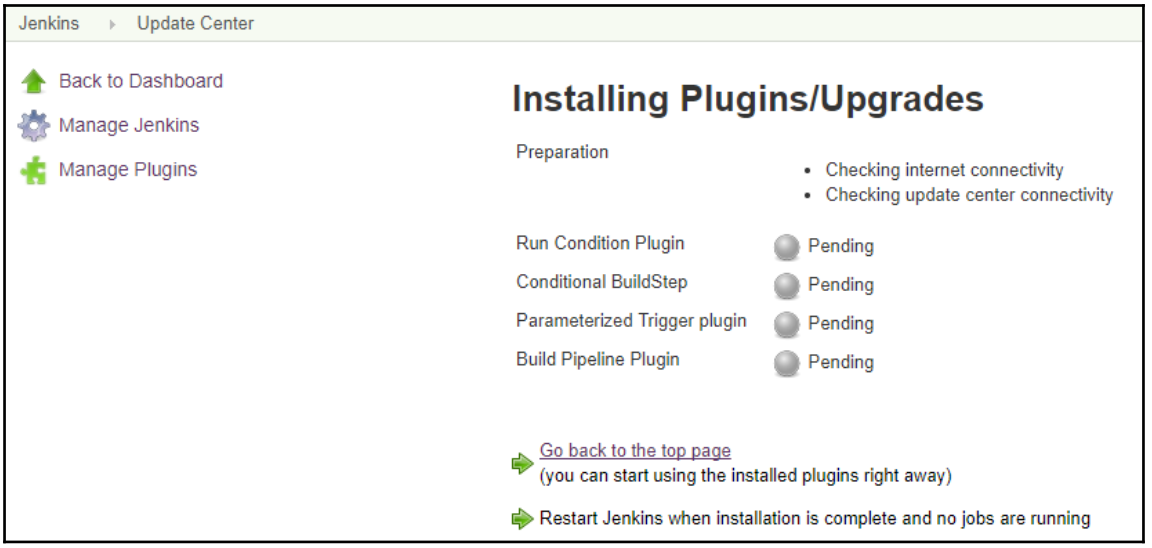

New Item
People
Build History
Manage Jenkins
Credentials
Build Queue
No builds in the queue.
Build Executor Status
1 Idle
2 Idle
add description
All
S
W
Name
Last Success
Last Failure
Last Duration
Helloworld
23 hr - #12
23 hr - #10
3.7 sec
Icon: S M L
Changes
Workspace
Build Now
Delete Project
Configure
Legend
RSS for all
RSS for failures
RSS for just latest builds

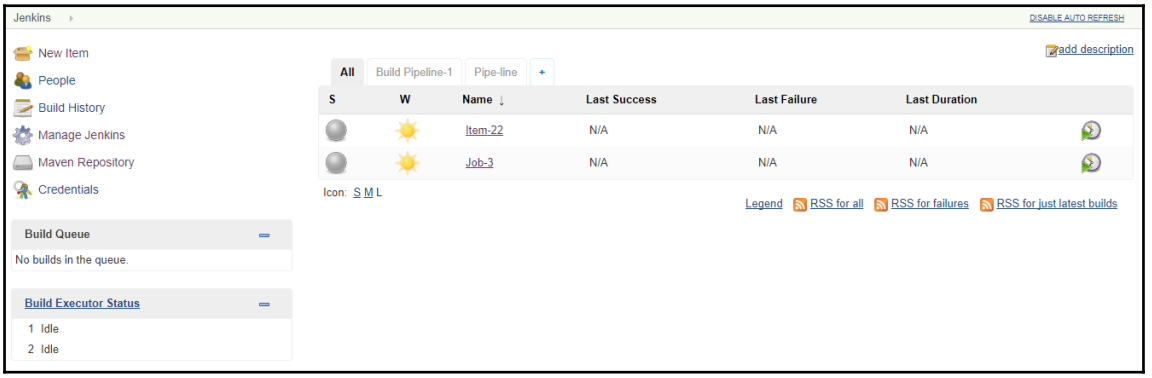

Repository browser
(Auto)
Additional Behaviours
Add
Subversion
Build Triggers
Build after other projects are built
Build periodically
Build when a change is pushed to GitHub
Poll SCM
Build
Execute Windows batch command
Command
javac HelloWorld.java
java HelloWorld
See the list of available environment variables
Delete
Add build step
Execute Windows batch command
Execute shell
Invoke Ant
Invoke top-level Maven targets
SeleniumHQ htmlSuite Run
Set build status to "pending" on GitHub commit


Create Selenium RC instance
Build
Execute Windows batch command
Command
javac HelloWorld.java
java HelloWorld
See the list of available environment variables
Delete
SeleniumHQ htmlSuite Run
browser
firefox
startURL
https://www.google.ae
suiteFile
E:\Apps\NewSample.html
resultFile
E:\Jenkins\jobs\Helloworld\workspace\Reports\Results.html
other
Delete
Add build step
Post-build Actions
Add post-build action
Save
Apply

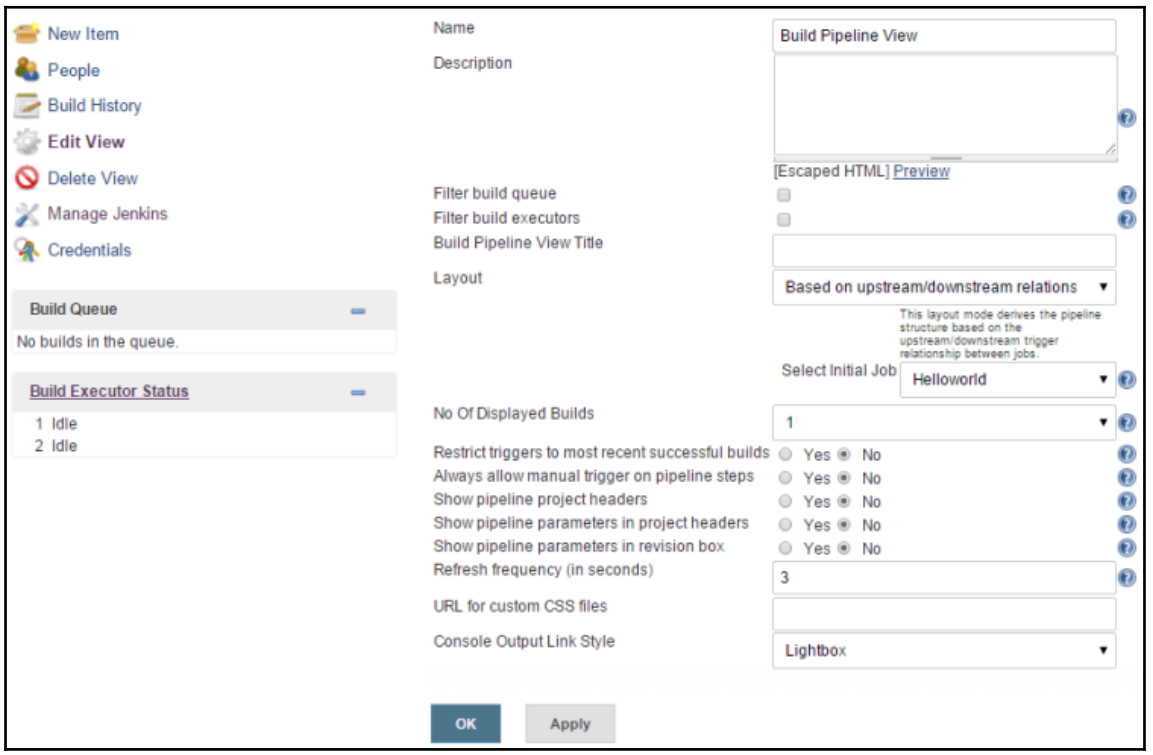

Code is built
Perform Unit testing
Perform System testing
Deliver to staging environment
Perform User Acceptance tests
Deploy to Production

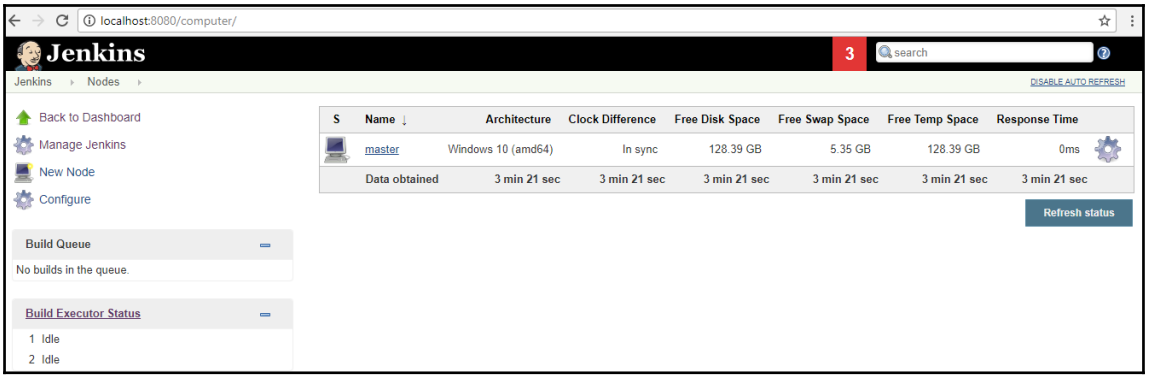

Jenkins
Plugin Manager
Back to Dashboard
Manage Jenkins
Filter:
Build pipe
Updates
Available
Installed
Advanced
Install
Name
Version
Build Pipeline Plugin
This plugin provides build pipeline functionality to Hudson and Jenkins. This allows a chain of jobs to be visualised in a new view. Manual jobs in the pipeline can be triggered by a user with the appropriate permissions manually confirming.
1.5.7.1
CodeScene Plugin
CodeScene detects potential maintenance problems and early warnings in your codebase. The earlier you can react to those findings, the better. That's why CodeScene offers integration points that let you incorporate the analysis results into your build pipeline. This plugin lets you use CodeScene's Delta Analysis to catch potential problems before they are delivered to your main branch.
1.1.1
Install without restart
Download now and install after restart
Update information obtained: 20 sec ago
Check now

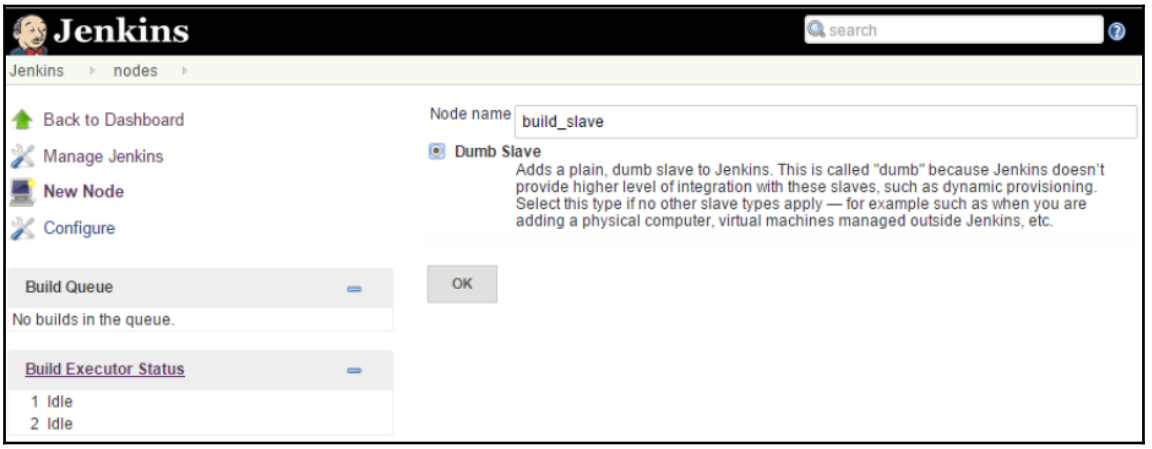

Jenkins
Update Center
Back to Dashboard
Manage Jenkins
Manage Plugins
Installing Plugins/Upgrades
Preparation
Checking internet connectivity
Checking update center connectivity
Run Condition Plugin
Pending
Conditional BuildStep
Pending
Parameterized Trigger plugin
Pending
Build Pipeline Plugin
Pending
Go back to the top page
(you can start using the installed plugins right away)
Restart Jenkins when installation is complete and no jobs are running

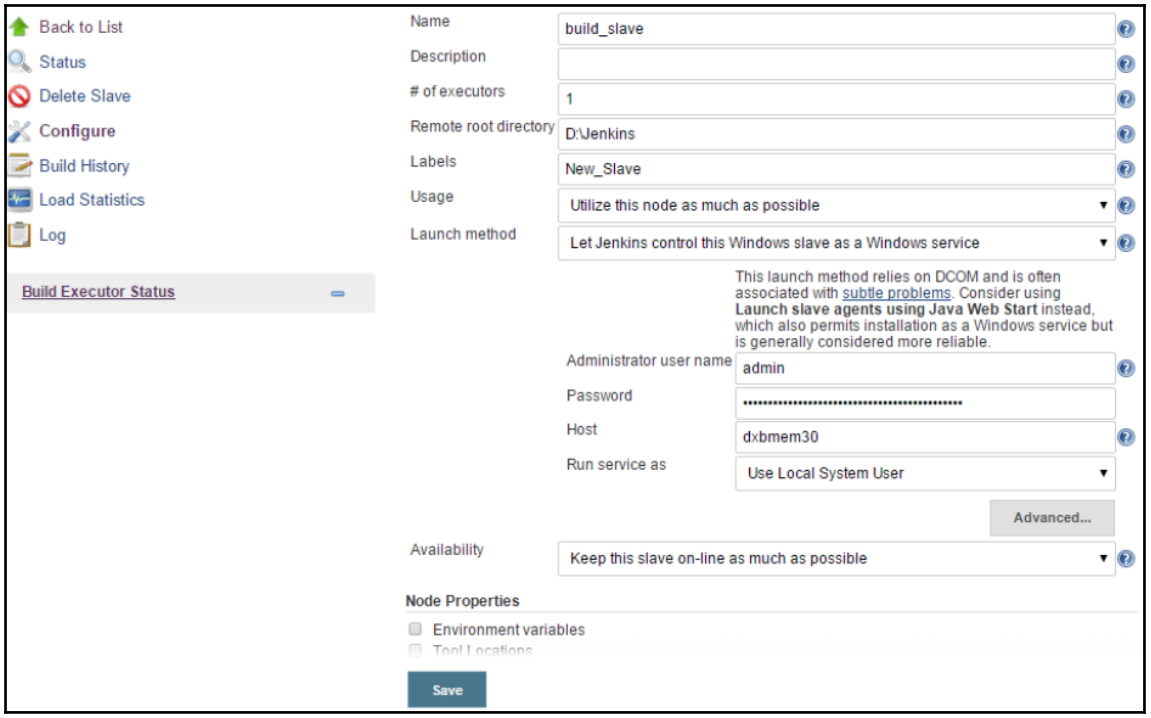

Jenkins
DISABLE AUTO REFRESH
New Item
People
Build History
Manage Jenkins
Maven Repository
Credentials
add description
All
Build Pipeline-1
Pipe-line
+
S
W
Name
Last Success
Last Failure
Last Duration
Item-22
N/A
N/A
N/A
Job-3
N/A
N/A
N/A
Icon: S M L
Legend
RSS for all
RSS for failures
RSS for just latest builds
Build Queue
No builds in the queue.
Build Executor Status
1 Idle
2 Idle

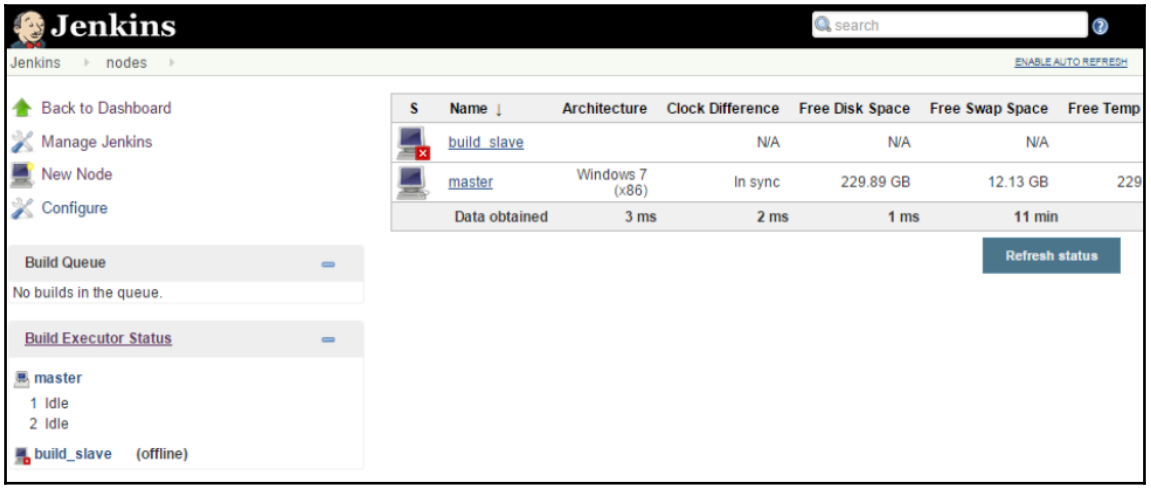

Jenkins
New Item
People
Build History
Manage Jenkins
Maven Repository
Credentials
Build Queue
No builds in the queue.
Build Executor Status
1 Idle
2 Idle
View name
Build Pipeline-1
Build Pipeline View
Shows the jobs in a build pipeline view. The complete pipeline of jobs that a version propagates through are shown as a row in the view.
List View
Shows items in a simple list format. You can choose which jobs are to be displayed in which view.
OK

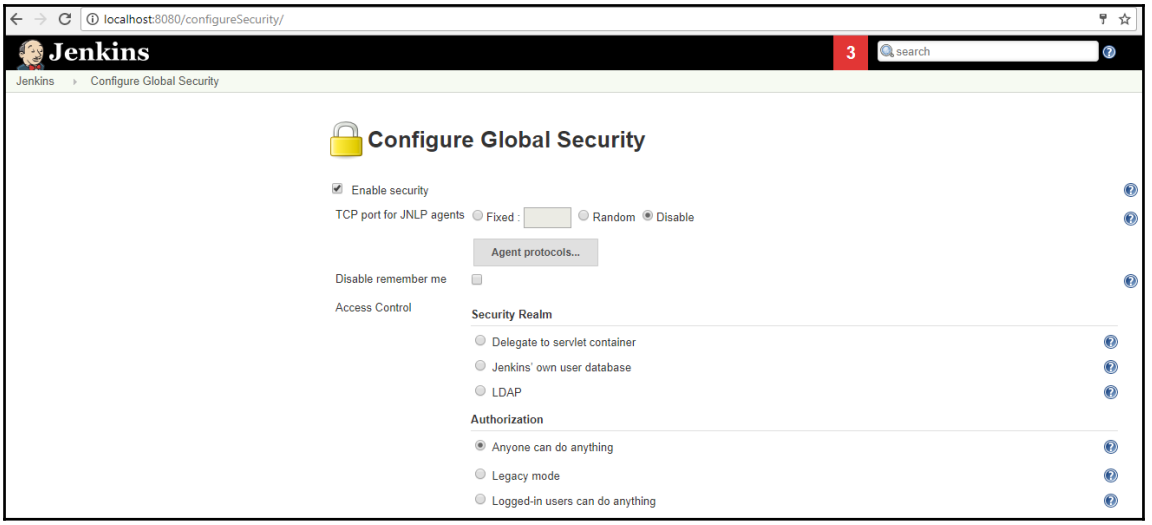

New Item
People
Build History
Edit View
Delete View
Manage Jenkins
Credentials
Build Queue
No builds in the queue.
Build Executor Status
1 Idle
2 Idle
Name
Build Pipeline View
Description
[Escaped HTML] Preview
Filter build queue
Filter build executors
Build Pipeline View Title
Layout
Based on upstream/downstream relations
This layout mode derives the pipeline structure based on the upstream/downstream trigger relationship between jobs.
Select Initial Job
Helloworld
No Of Displayed Builds
1
Restrict triggers to most recent successful builds
Always allow manual trigger on pipeline steps
Show pipeline project headers
Show pipeline parameters in project headers
Show pipeline parameters in revision box
Yes No
Refresh frequency (in seconds)
3
URL for custom CSS files
Console Output Link Style
Lightbox
OK
Apply

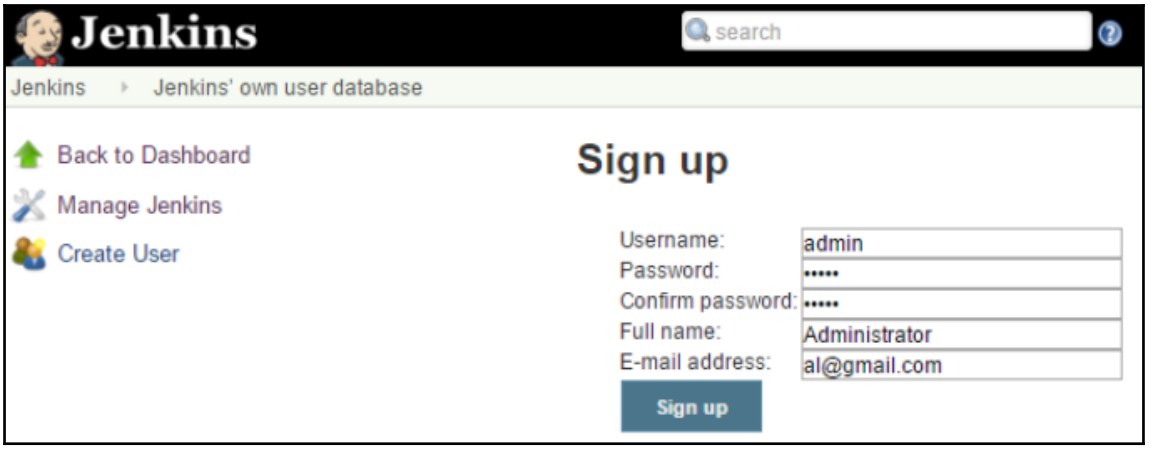

localhost:8080/computer/
Jenkins
3
search
Jenkins
Nodes
DISABLE AUTO REFRESH
Back to Dashboard
Manage Jenkins
New Node
Configure
S
Name
Architecture
Clock Difference
Free Disk Space
Free Swap Space
Free Temp Space
Response Time
master
Windows 10 (amd64)
In sync
128.39 GB
5.35 GB
128.39 GB
0ms
Data obtained
3 min 21 sec
3 min 21 sec
3 min 21 sec
3 min 21 sec
3 min 21 sec
3 min 21 sec
Refresh status
Build Queue
No builds in the queue.
Build Executor Status
1 Idle
2 Idle

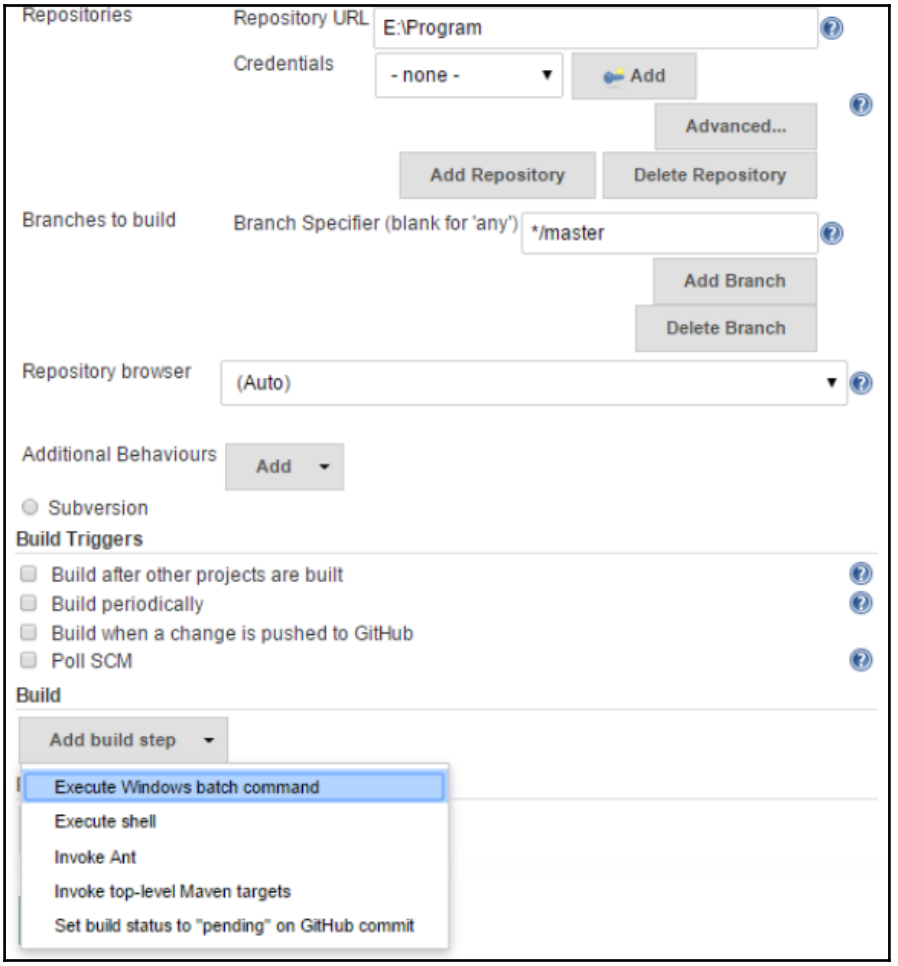

Jenkins
search
Jenkins
nodes
Back to Dashboard
Manage Jenkins
New Node
Configure
Node name
build_slave
Dumb Slave
Adds a plain, dumb slave to Jenkins. This is called "dumb" because Jenkins doesn't provide higher level of integration with these slaves, such as dynamic provisioning. Select this type if no other slave types apply — for example such as when you are adding a physical computer, virtual machines managed outside Jenkins, etc.
OK
Build Queue
No builds in the queue.
Build Executor Status
1 Idle
2 Idle


Back to List
Status
Delete Slave
Configure
Build History
Load Statistics
Log
Build Executor Status
Name
build_slave
Description
# of executors
1
Remote root directory
D:\Jenkins
Labels
New_Slave
Usage
Utilize this node as much as possible
Launch method
Let Jenkins control this Windows slave as a Windows service
This launch method relies on DCOM and is often associated with subtle problems. Consider using Launch slave agents using Java Web Start instead, which also permits installation as a Windows service but is generally considered more reliable.
Administrator user name
admin
Password
Host
dxbmem30
Run service as
Use Local System User
Advanced...
Availability
Keep this slave on-line as much as possible
Node Properties
Environment variables
Save


Jenkins
search
Jenkins
nodes
ENABLE AUTO REFRESH
Back to Dashboard
Manage Jenkins
New Node
Configure
Build Queue
No builds in the queue.
Build Executor Status
master
1 Idle
2 Idle
build_slave (offline)
S
Name
Architecture
Clock Difference
Free Disk Space
Free Swap Space
Free Temp
build_slave
N/A
N/A
N/A
master
Windows 7 (x86)
In sync
229.89 GB
12.13 GB
229
Data obtained
3 ms
2 ms
1 ms
11 min
Refresh status

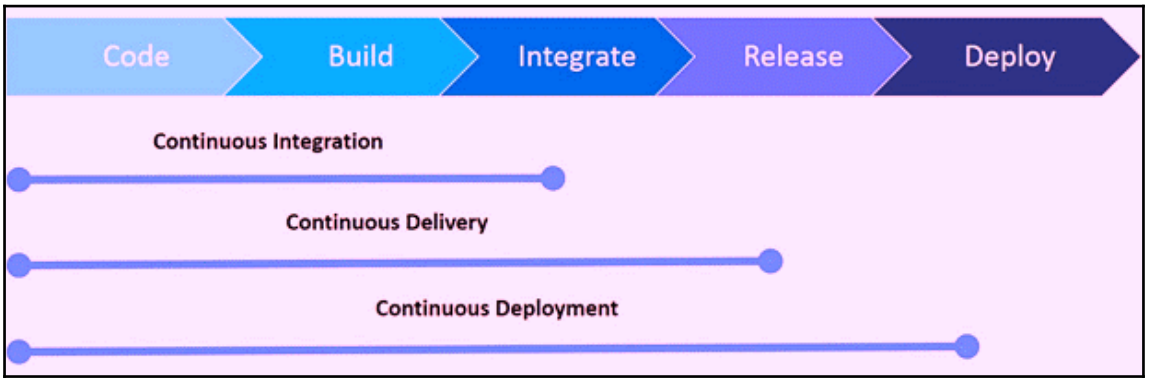

localhost:8080/configureSecurity/
Jenkins
3
search
Jenkins
Configure Global Security
Configure Global Security
Enable security
TCP port for JNLP agents
Fixed :
Random
Disable
Agent protocols...
Disable remember me
Access Control
Security Realm
Delegate to servlet container
Jenkins' own user database
LDAP
Authorization
Anyone can do anything
Legacy mode
Logged-in users can do anything


Jenkins
search
Jenkins
Jenkins' own user database
Back to Dashboard
Manage Jenkins
Create User
Sign up
Username:
admin
Password:
Confirm password:
Full name:
Administrator
E-mail address:
al@gmail.com
Sign up

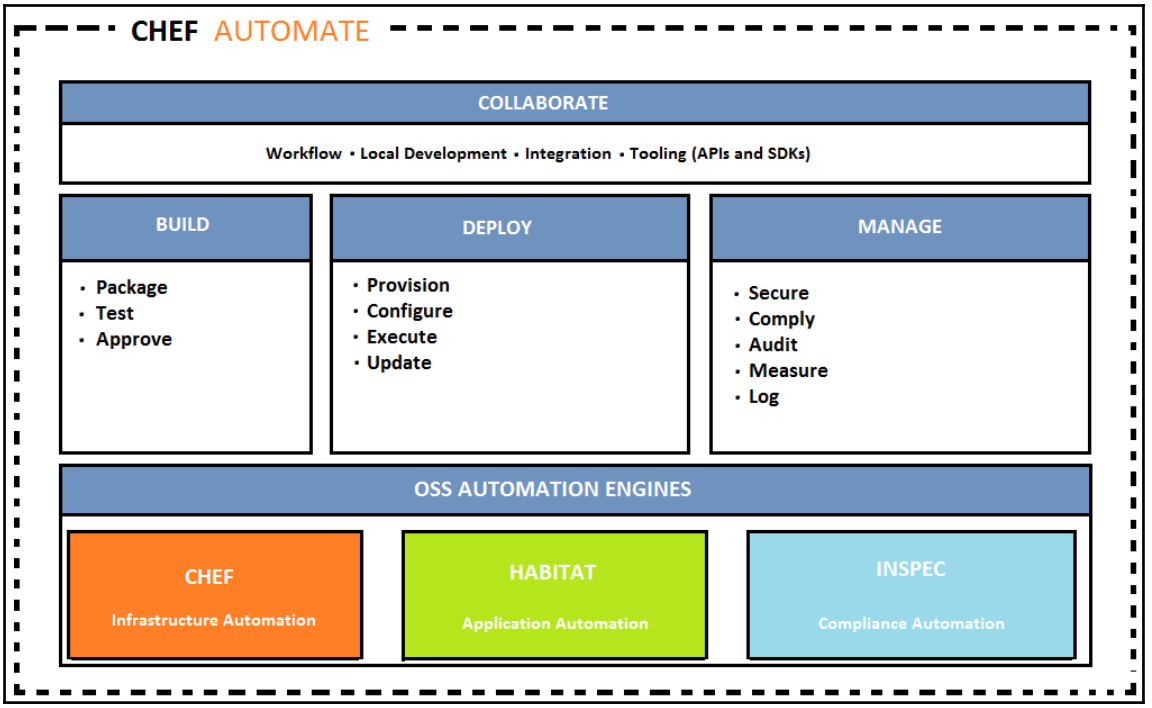

Repositories
Repository URL
E:\Program
Credentials
- none -
Add
Advanced...
Add Repository
Delete Repository
Branches to build
Branch Specifier (blank for 'any')
*/master
Add Branch
Delete Branch
Repository browser
(Auto)
Additional Behaviours
Add
Subversion
Build Triggers
Build after other projects are built
Build periodically
Build when a change is pushed to GitHub
Poll SCM
Build
Add build step
Execute Windows batch command
Execute shell
Invoke Ant
Invoke top-level Maven targets
Set build status to "pending" on GitHub commit

MITTR	Last 7 days	0 ms
	Last 30 days	23 hr
	All Time	23 hr
MITTF	Last 7 days	0 ms
	Last 30 days	2 days 4 hr
	All Time	2 days 4 hr
Standard Deviation	Last 7 days	0 ms
	Last 30 days	52 sec
	All Time	52 sec

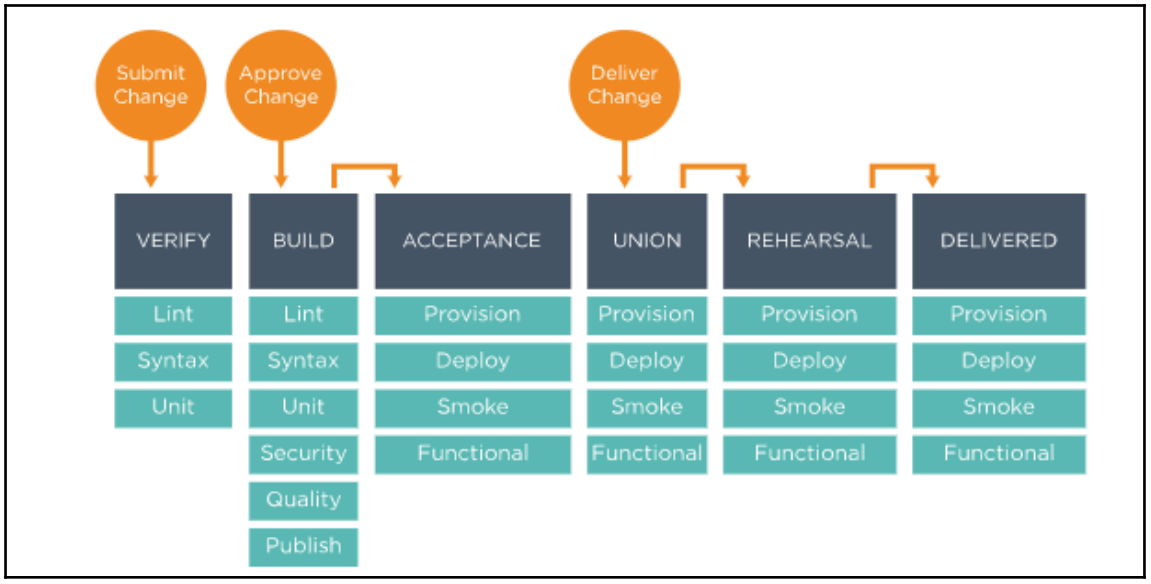
Chapter 8: DevOps Continuous Deployment

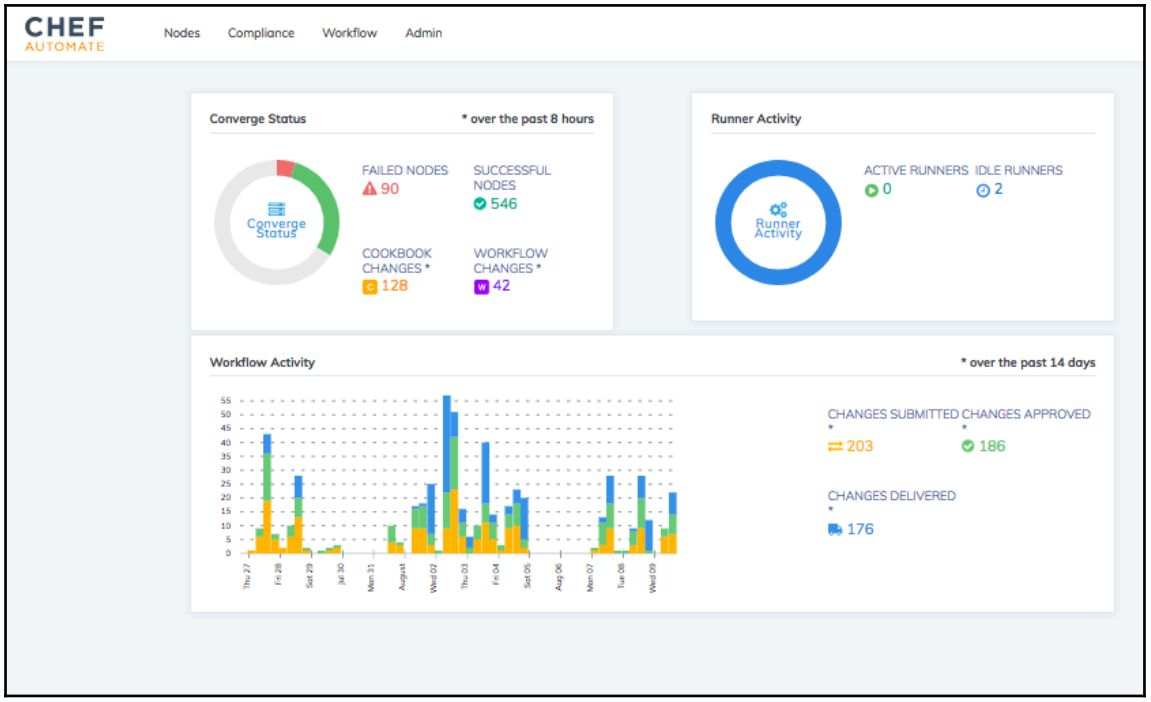


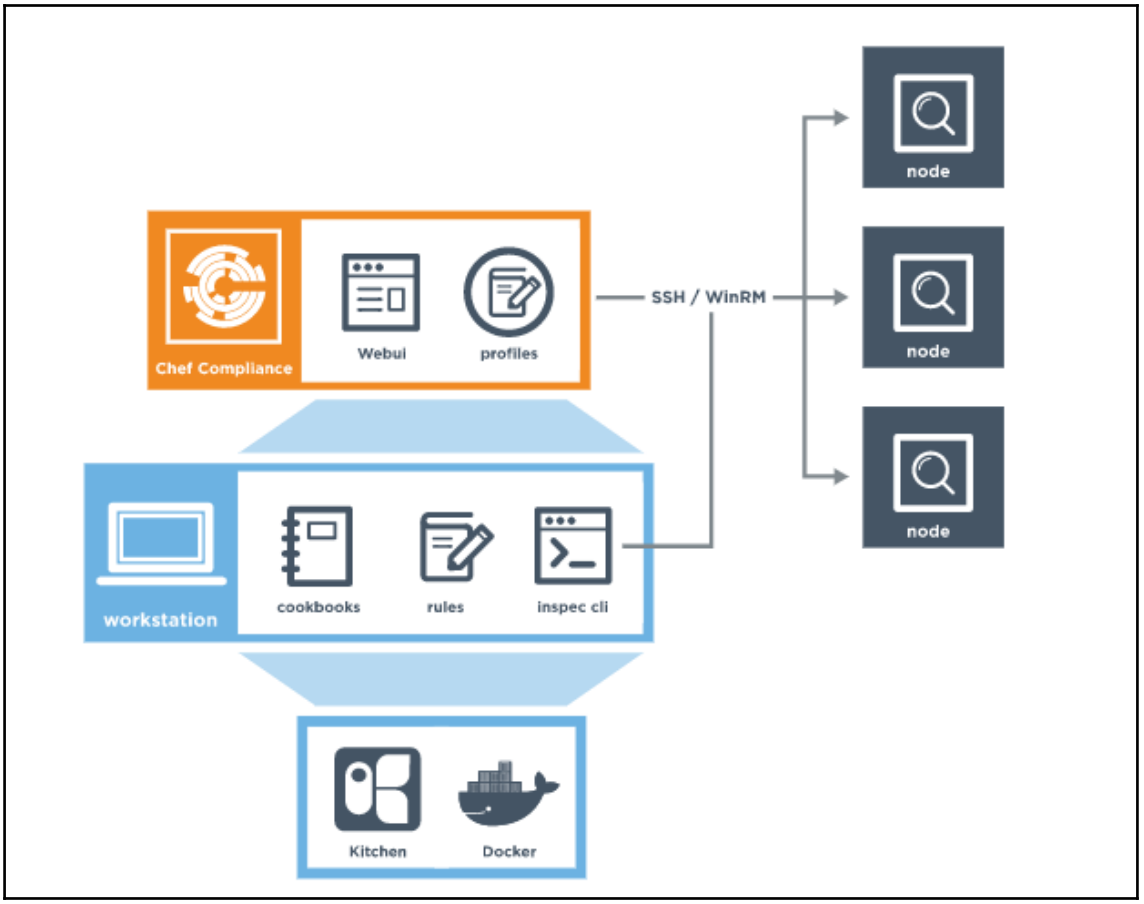
DEV			PROD			
Dev	Build	Test	Deploy	Provision	Monitor	Operate
· Ant · Eclipse · Git · GitHub · Gradle · IDE · IntelliJ · JIRA · JUnit · Maven · MSBuild · Nant · NUnit · Subversion · TeamCity · Visual Studio	· Ant · AWS CodePipeline · Bamboo · Concourse · Electric Cloud · Gradle · Jenkins · Maven · MSBuild · Nant · TeamCity · Visual Studio · Visual Studio TFS	· Bamboo · Blazemeter · Gatling · Jenkins · JMeter · LoadRunner · MSTest · Selenium · SilkPerformer · SoapUI · TeamCity · Visual Studio · Visual Studio TFS	· Ansible · AWS CodeDeploy · Bamboo · Chef · Cloud Foundry · Deis · Docker · Electric Cloud · Jenkins · OpenShift · Puppet Labs · Salt · TeamCity · Wercker	· Ansible · AWS CodeDeploy · Bamboo · Chef · Cloud Foundry · Deis · Docker · Electric Cloud · Jenkins · OpenShift · Puppet Labs · Salt · TeamCity · Wercker	· Elasticsearch · SPLUNK • Nagios	· HipChat · OpsGenie · PagerDuty · ServiceNow · Slack · VictorOps

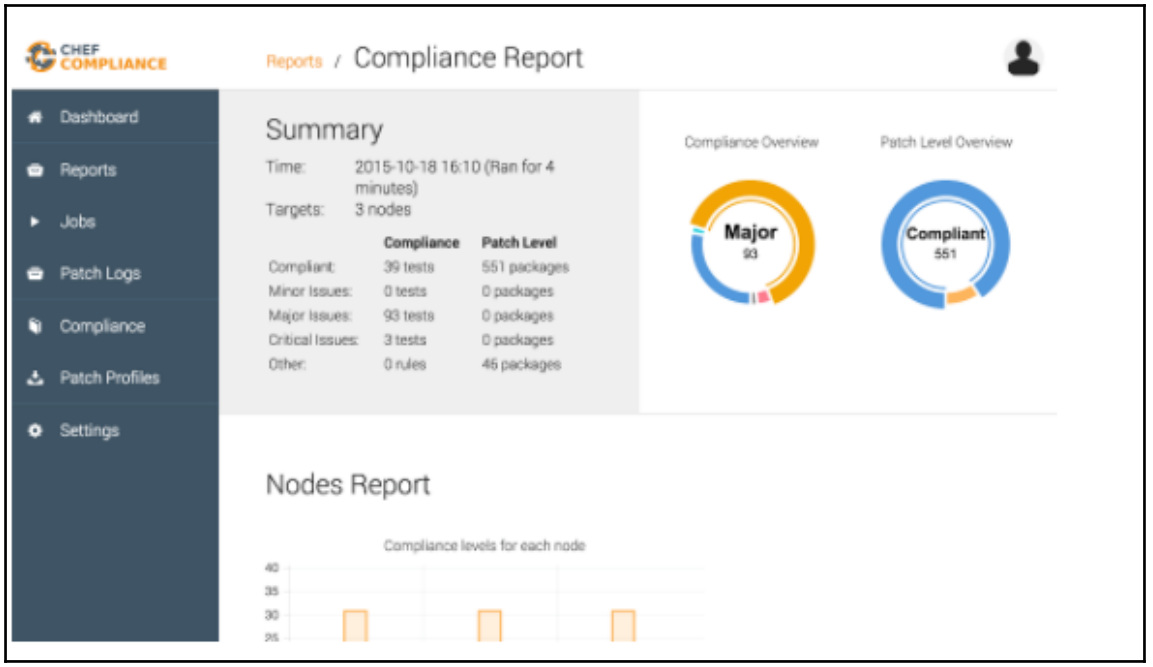

CHEF AUTOMATE
COLLABORATE
Workflow • Local Development • Integration • Tooling (APIs and SDKs)
BUILD
• Package
• Test
• Approve
DEPLOY
• Provision
• Configure
• Execute
• Update
MANAGE
• Secure
• Comply
• Audit
• Measure
• Log
OSS AUTOMATION ENGINES
CHEF
Infrastructure Automation
HABITAT
Application Automation
INSPEC
Compliance Automation

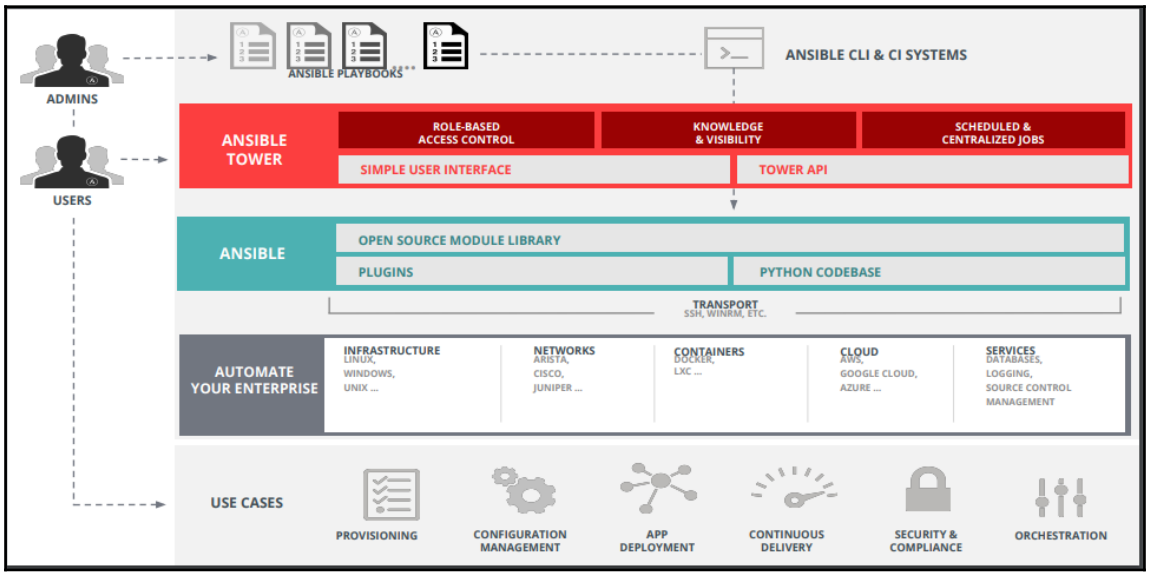

Upload
Chef DK
Chef Server
Clients

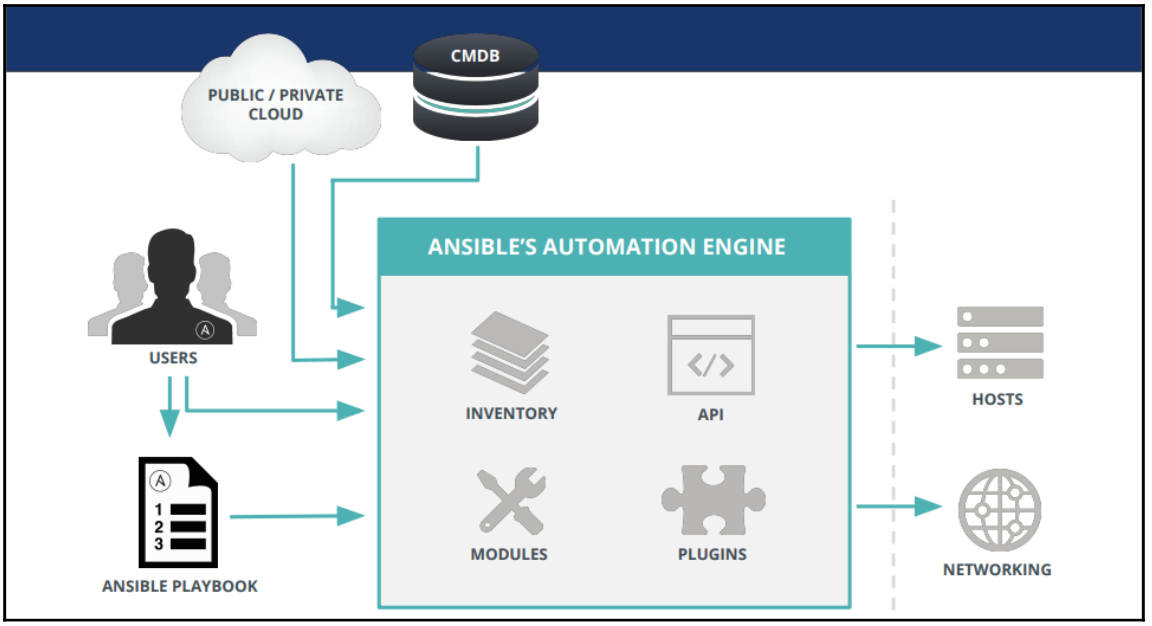

Submit Change
Approve Change
Deliver Change
VERIFY
BUILD
ACCEPTANCE
UNION
REHEARSAL
DELIVERED
Lint
Syntax
Unit
Lint
Syntax
Unit
Security
Quality
Publish
Provision
Deploy
Smoke
Functional
Provision
Deploy
Smoke
Functional
Provision
Deploy
Smoke
Functional
Provision
Deploy
Smoke
Functional

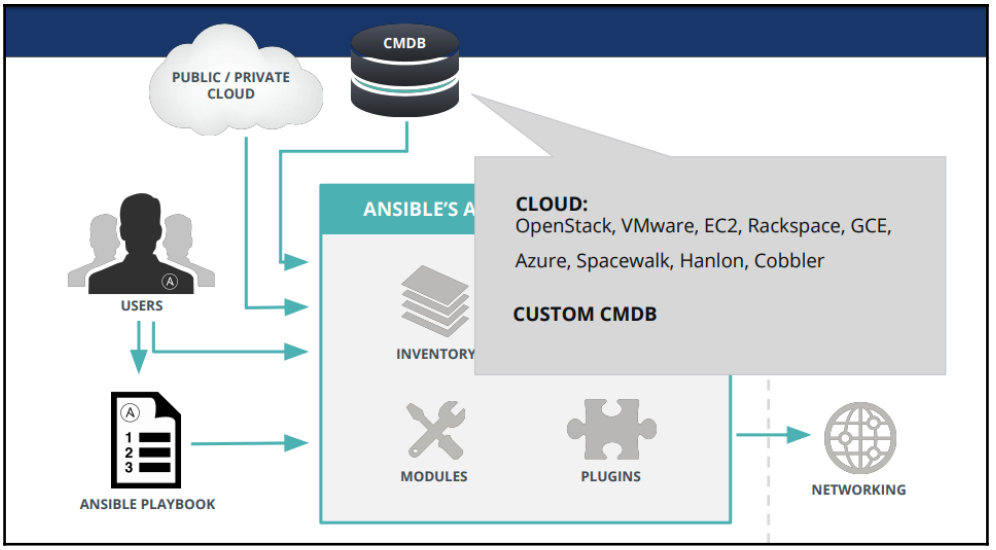

CHEF
AUTOMATE
Nodes
Compliance
Workflow
Admin
Converge Status
* over the past 8 hours
Converge Status
FAILED NODES
90
SUCCESSFUL NODES
546
COOKBOOK CHANGES *
128
WORKFLOW CHANGES *
42
Runner Activity
Runner Activity
ACTIVE RUNNERS
0
IDLE RUNNERS
2
Workflow Activity
* over the past 14 days
CHANGES SUBMITTED *
203
CHANGES APPROVED *
186
CHANGES DELIVERED *
176

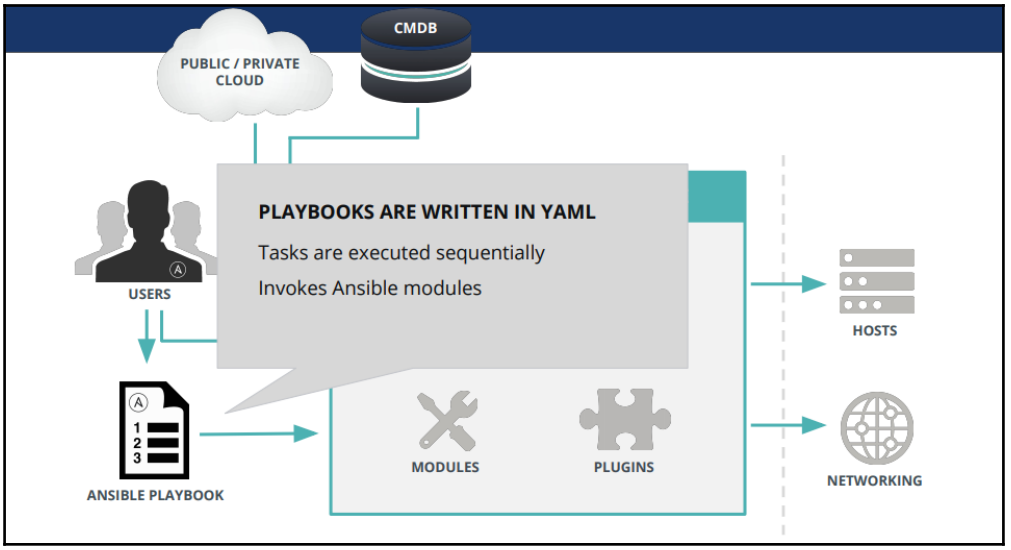

node
node
node
Chef Compliance
Webui
profiles
SSH / WinRM
workstation
cookbooks
rules
inspec cli
Kitchen
Docker

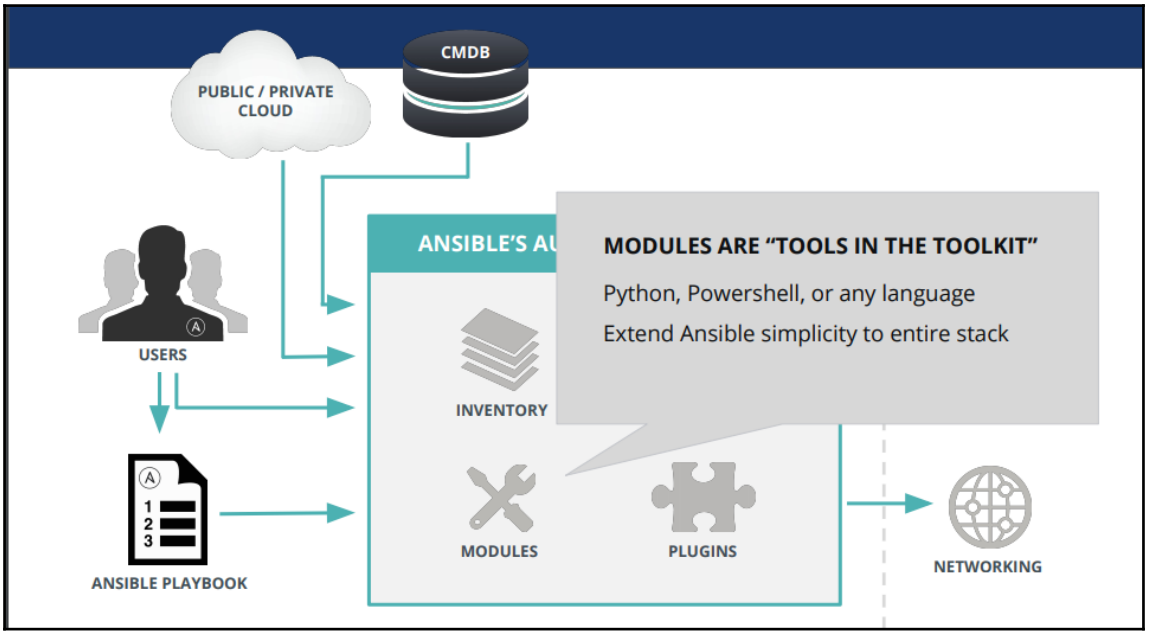

CHEF COMPLIANCE
Reports / Compliance Report
Dashboard
Reports
Jobs
Patch Logs
Compliance
Patch Profiles
Settings
Summary
Time: 2015-10-18 16:10 (Ran for 4 minutes)
Targets: 3 nodes
Compliance
Patch Level
Compliant: 39 tests 551 packages
Minor Issues: 0 tests 0 packages
Major Issues: 93 tests 0 packages
Critical Issues: 3 tests 0 packages
Other: 0 rules 46 packages
Compliance Overview
Major
93
Patch Level Overview
Compliant
551
Nodes Report
Compliance levels for each node
40
35
30
25

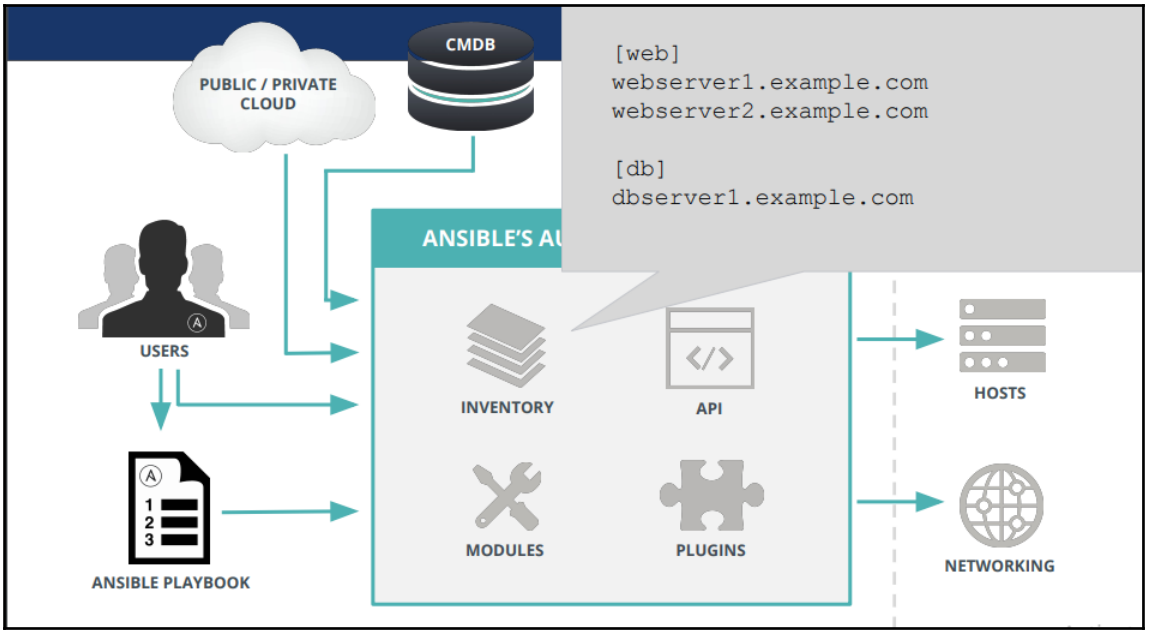

ADMINS
USERS
ANSIBLE PLAYBOOKS
ANSIBLE CLI & CI SYSTEMS
ANSIBLE TOWER
ROLE-BASED ACCESS CONTROL
KNOWLEDGE & VISIBILITY
SCHEDULED & CENTRALIZED JOBS
SIMPLE USER INTERFACE
TOWER API
ANSIBLE
OPEN SOURCE MODULE LIBRARY
PLUGINS
PYTHON CODEBASE
TRANSPORT
SSH, WINRM, ETC.
AUTOMATE YOUR ENTERPRISE
INFRASTRUCTURE
LINUX, WINDOWS, UNIX ...
NETWORKS
ARISTA, CISCO, JUNIPER ...
CONTAINERS
DOCKER, LXC ...
CLOUD
AWS, GOOGLE CLOUD, AZURE ...
SERVICES
DATABASES, LOGGING, SOURCE CONTROL MANAGEMENT
USE CASES
PROVISIONING
CONFIGURATION MANAGEMENT
APP DEPLOYMENT
CONTINUOUS DELIVERY
SECURITY & COMPLIANCE
ORCHESTRATION

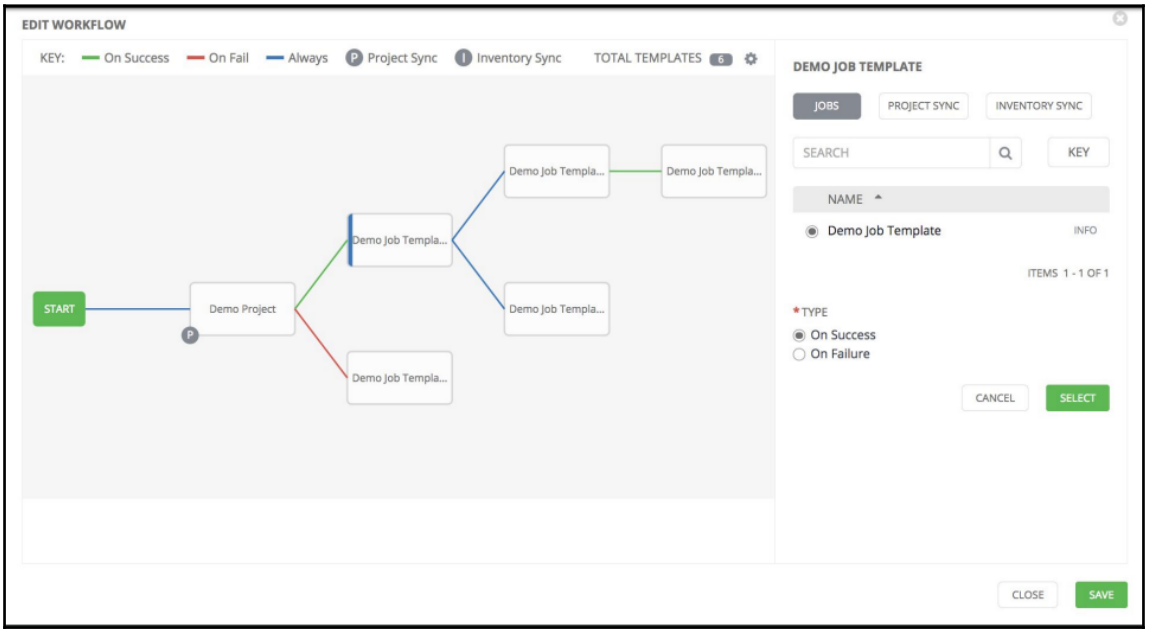

CMDB
PUBLIC / PRIVATE CLOUD
ANSIBLE'S AUTOMATION ENGINE
USERS
INVENTORY
API
HOSTS
ANSIBLE PLAYBOOK
MODULES
PLUGINS
NETWORKING

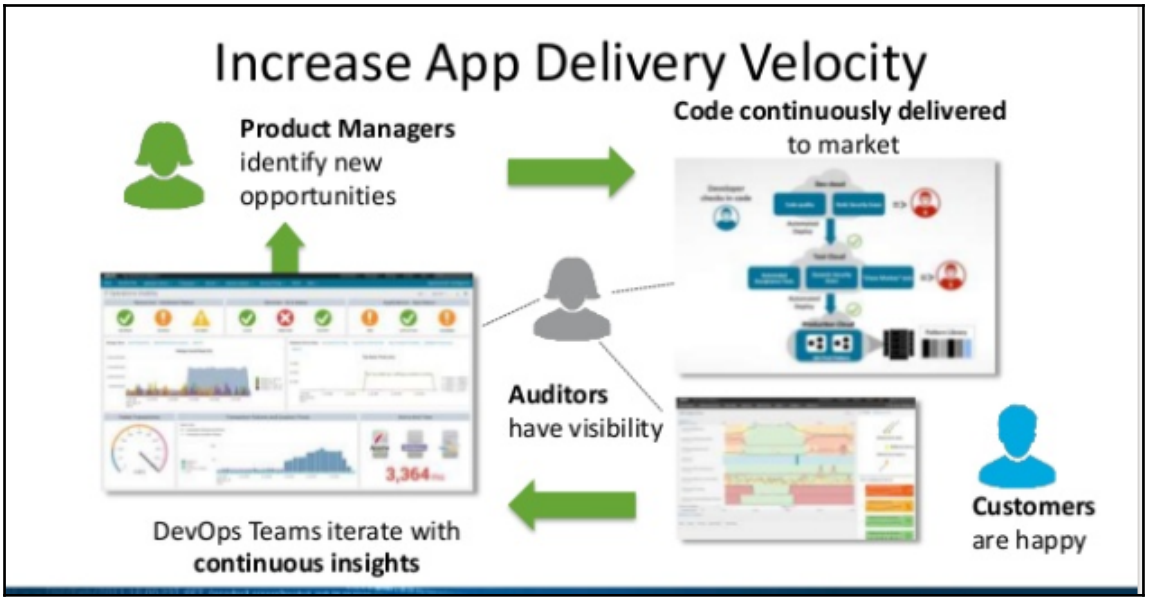

CMDB
PUBLIC / PRIVATE CLOUD
ANSIBLE'S A
CLOUD:
OpenStack, VMware, EC2, Rackspace, GCE,
Azure, Spacewalk, Hanlon, Cobbler
CUSTOM CMDB
USERS
INVENTORY
ANSIBLE PLAYBOOK
MODULES
PLUGINS
NETWORKING


CMDB
PUBLIC / PRIVATE CLOUD
PLAYBOOKS ARE WRITTEN IN YAML
Tasks are executed sequentially
Invokes Ansible modules
USERS
HOSTS
ANSIBLE PLAYBOOK
MODULES
PLUGINS
NETWORKING

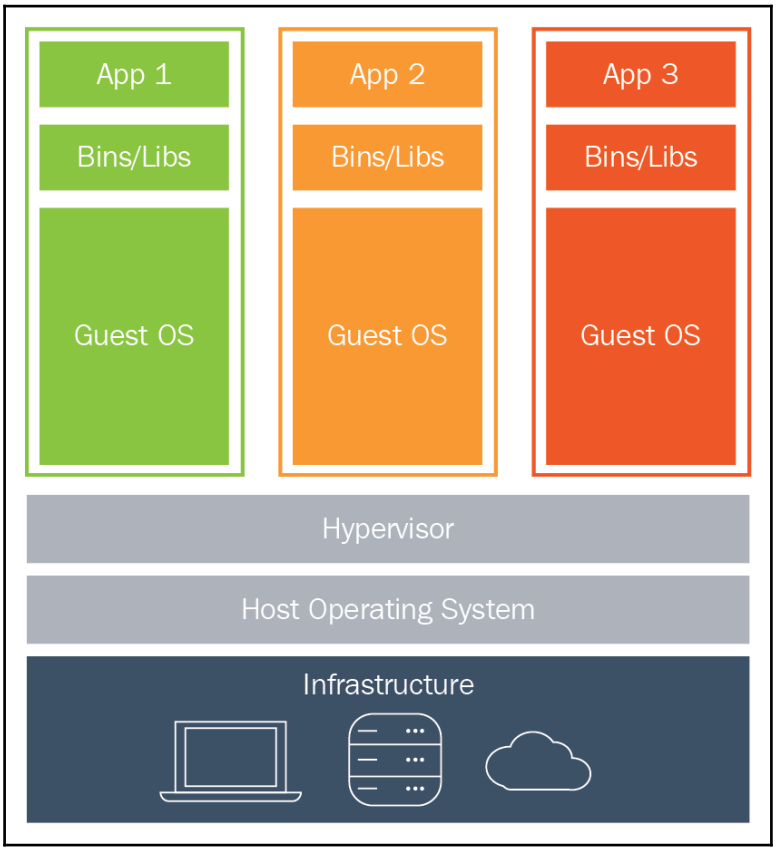

CMDB
PUBLIC / PRIVATE CLOUD
ANSIBLE'S AU
MODULES ARE "TOOLS IN THE TOOLKIT"
Python, Powershell, or any language
Extend Ansible simplicity to entire stack
USERS
INVENTORY
ANSIBLE PLAYBOOK
MODULES
PLUGINS
NETWORKING

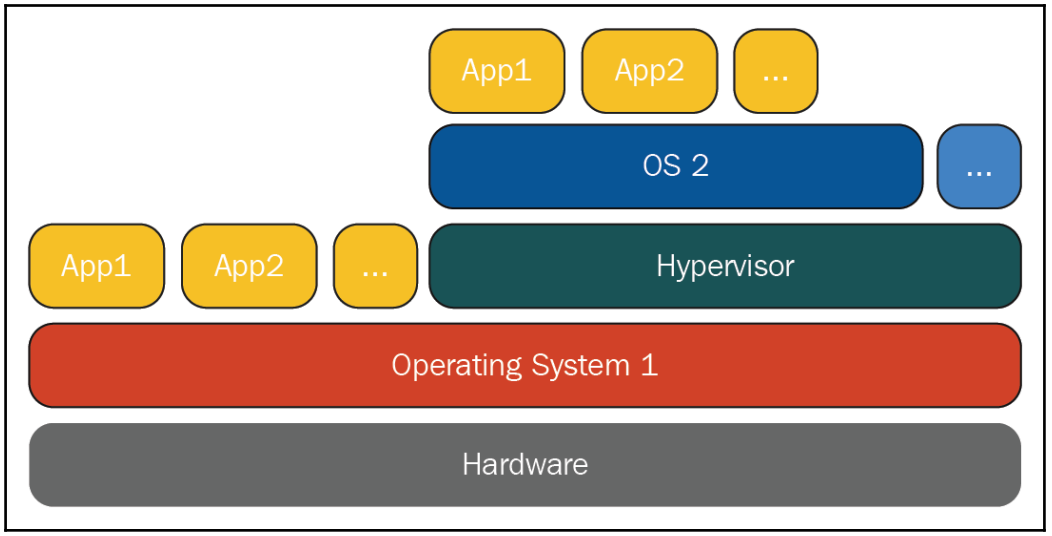

PUBLIC / PRIVATE CLOUD
CMDB
[web]
webserver1.example.com
webserver2.example.com
[db]
dbserver1.example.com
USERS
INVENTORY
API
HOSTS
MODULES
PLUGINS
NETWORKING
ANSIBLE PLAYBOOK

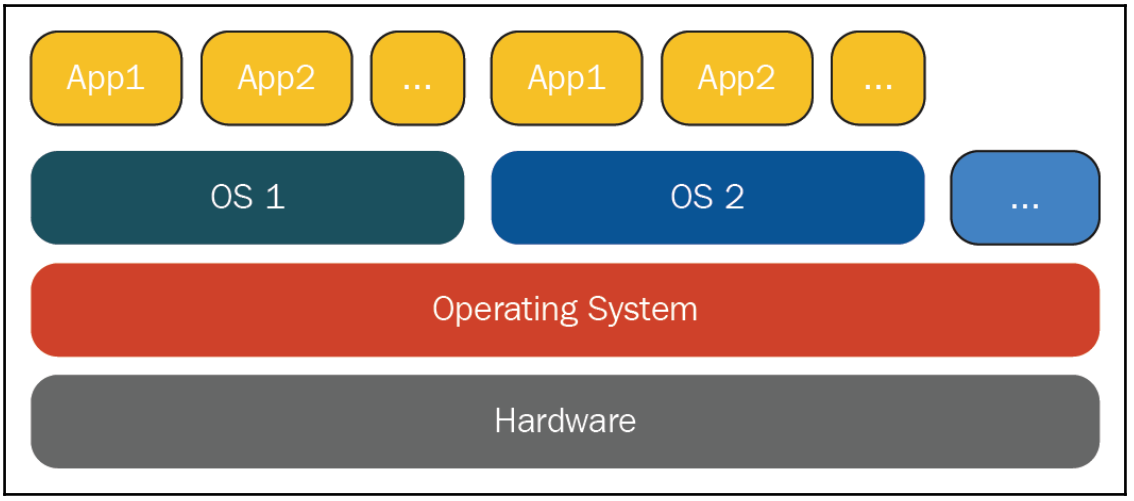

EDIT WORKFLOW
KEY: On Success On Fail Always Project Sync Inventory Sync
TOTAL TEMPLATES 6
START
Demo Project
Demo Job Templa...
Demo Job Templa...
Demo Job Templa...
Demo Job Templa...
Demo Job Templa...
DEMO JOB TEMPLATE
JOBS
PROJECT SYNC
INVENTORY SYNC
SEARCH
KEY
NAME
Demo Job Template
INFO
ITEMS 1 - 1 OF 1
*TYPE
On Success
On Failure
CANCEL
SELECT
CLOSE
SAVE

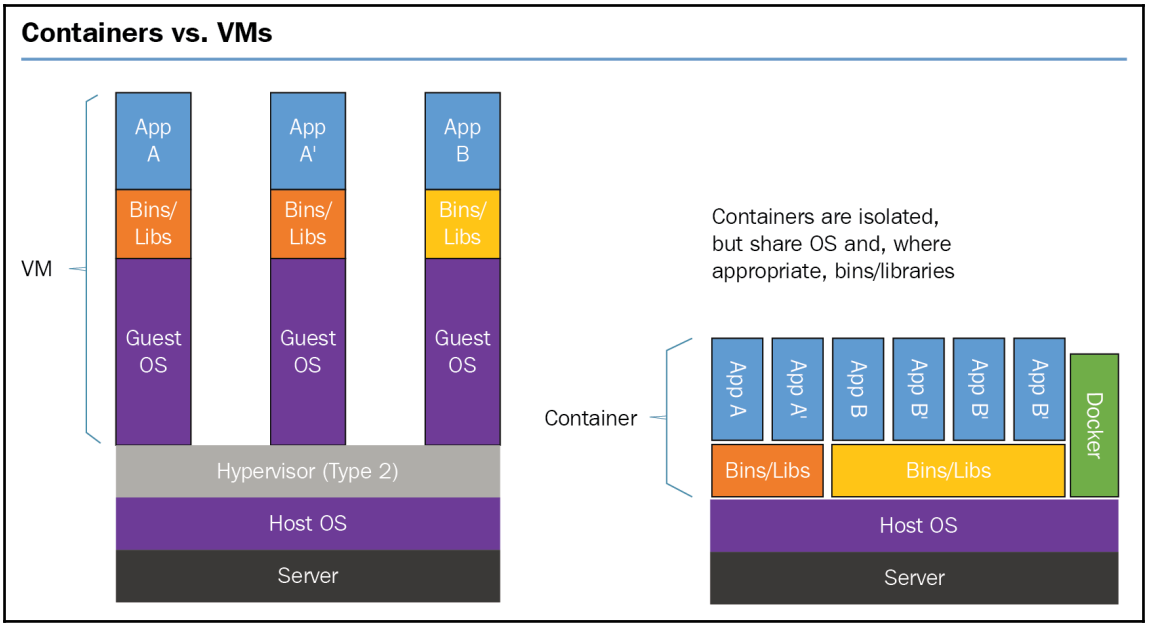

Increase App Delivery Velocity
Product Managers
identify new
opportunities
Code continuously delivered
to market
Auditors
have visibility
Customers
are happy
DevOps Teams iterate with
continuous insights

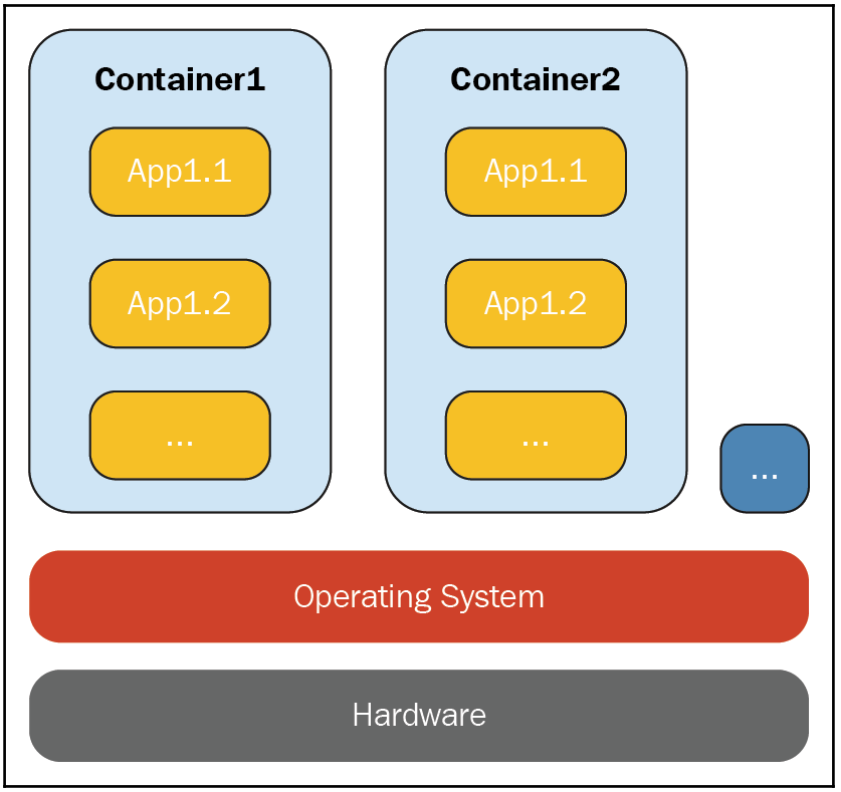
Chapter 9: Containers, IoT, and Microservices

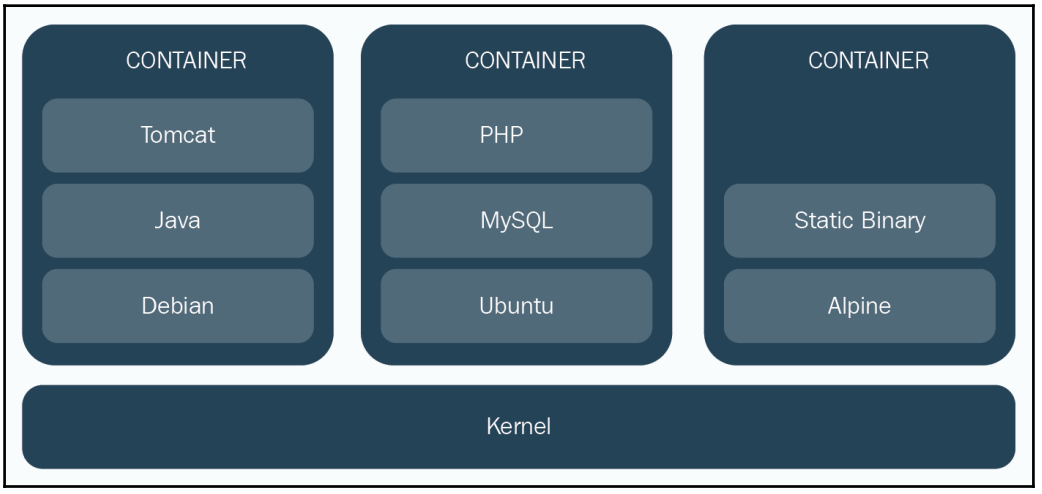


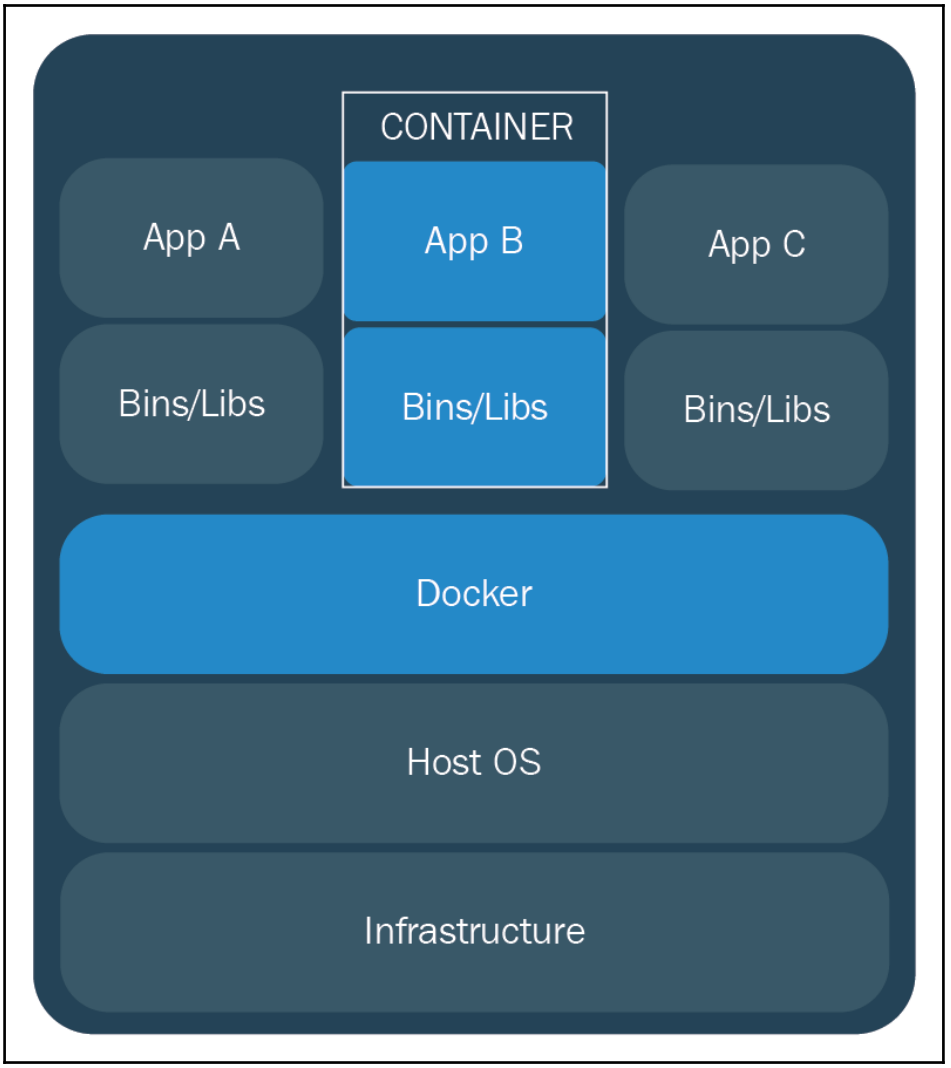

App1
App2
...
OS 2
...
App1
App2
...
Hypervisor
Operating System 1
Hardware

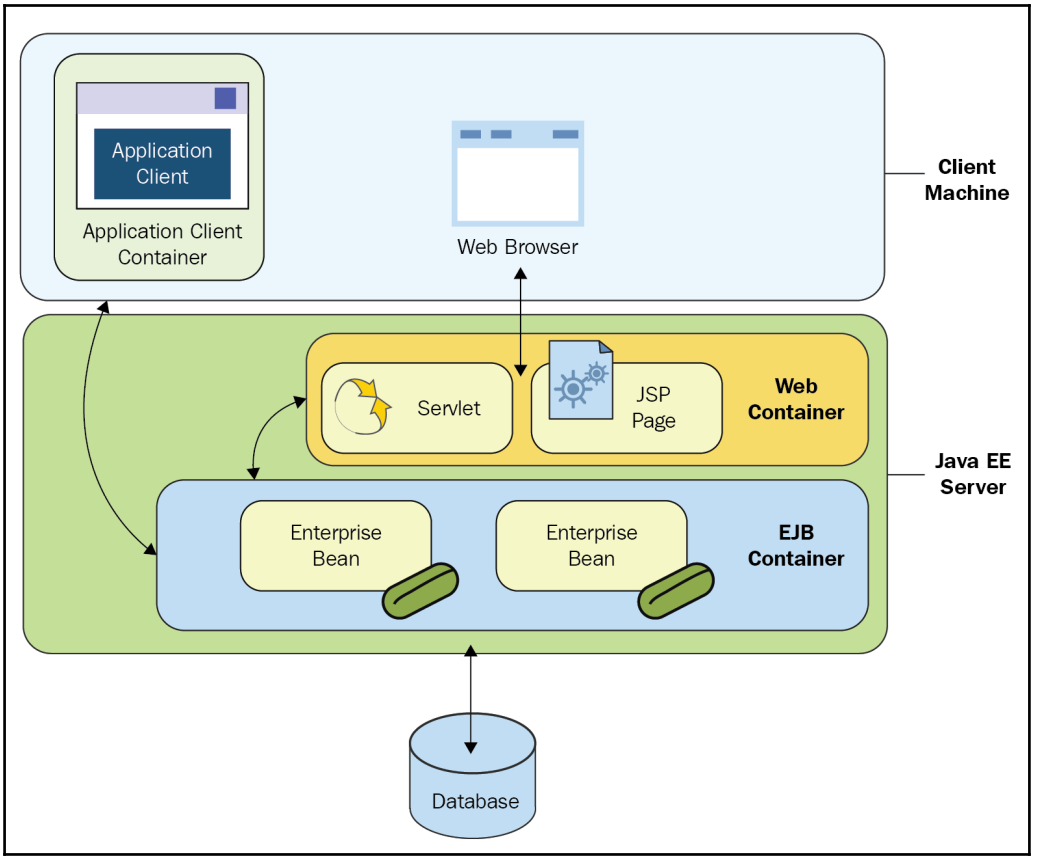

App1
App2
...
App1
App2
...
OS 1
OS 2
...
Operating System
Hardware

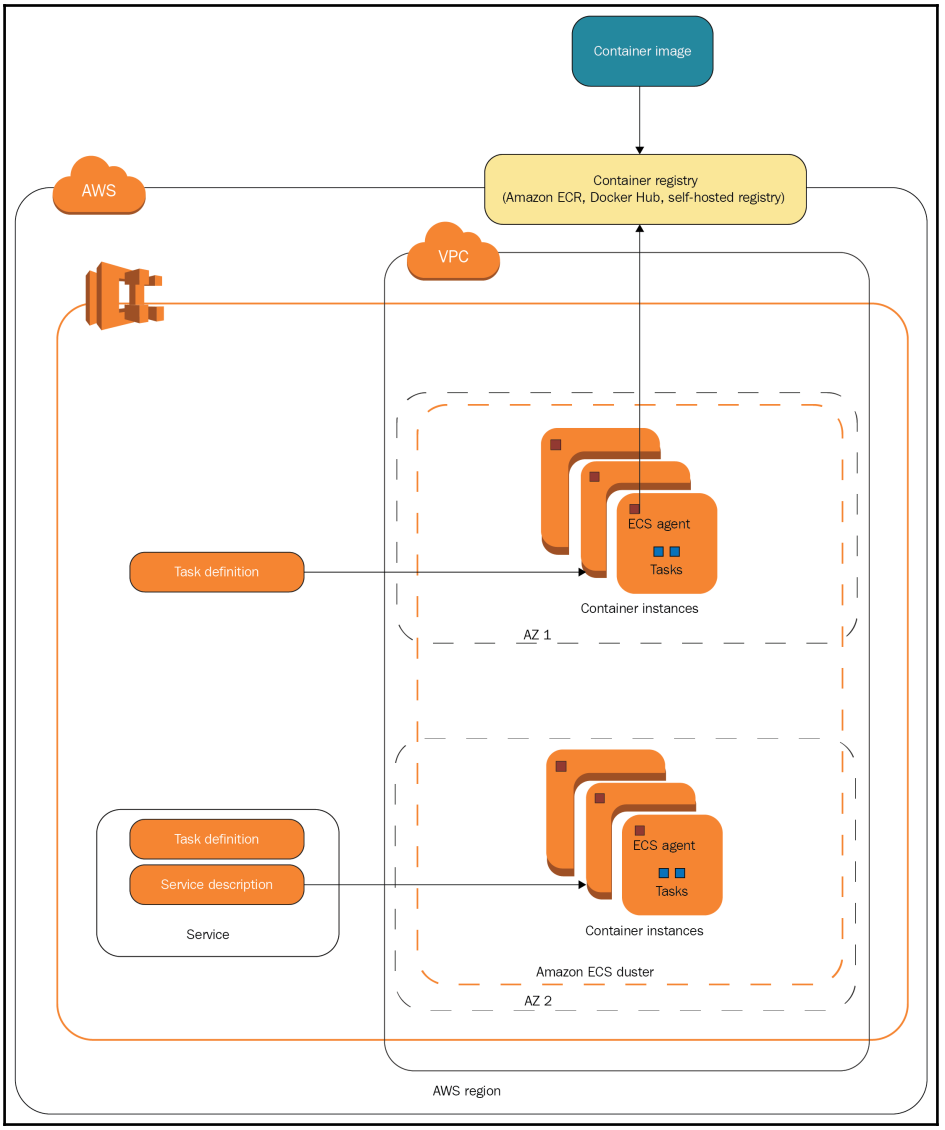

Containers vs. VMs
VM
App A
Bins/ Libs
Guest OS
App A'
Bins/ Libs
Guest OS
App B
Bins/ Libs
Guest OS
Hypervisor (Type 2)
Host OS
Server
Containers are isolated, but share OS and, where appropriate, bins/libraries
Container
App A
App A'
App B
App B'
App B'
App B'
Docker
Bins/Libs
Bins/Libs
Host OS
Server

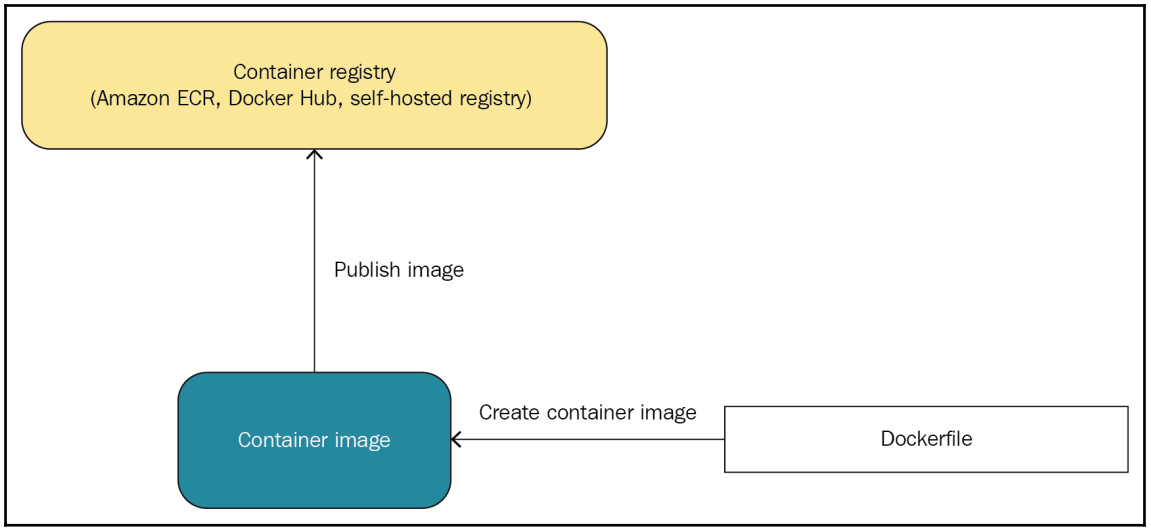

Container1
App1.1
App1.2
...
Container2
App1.1
App1.2
...
...
Operating System
Hardware

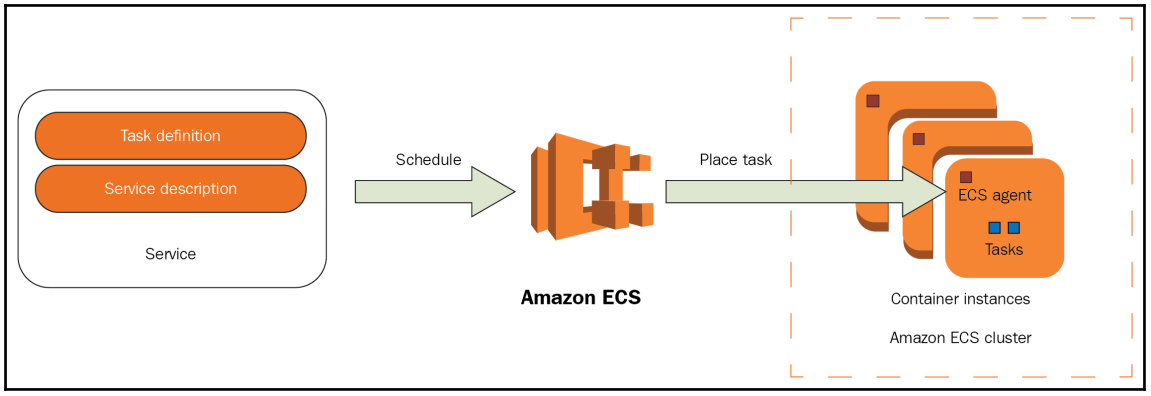

CONTAINER
Tomcat
Java
Debian
CONTAINER
PHP
MySQL
Ubuntu
CONTAINER
Static Binary
Alpine
Kernel

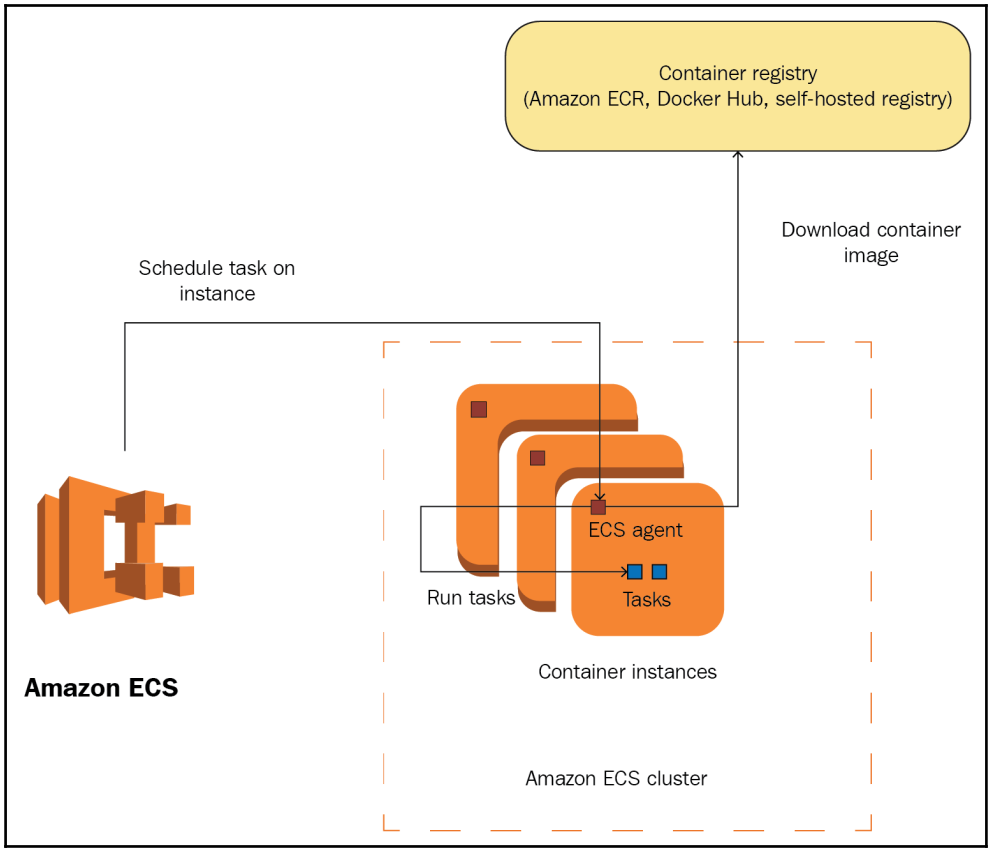

CONTAINER
App A
App B
App C
Bins/Libs
Bins/Libs
Bins/Libs
Docker
Host OS
Infrastructure

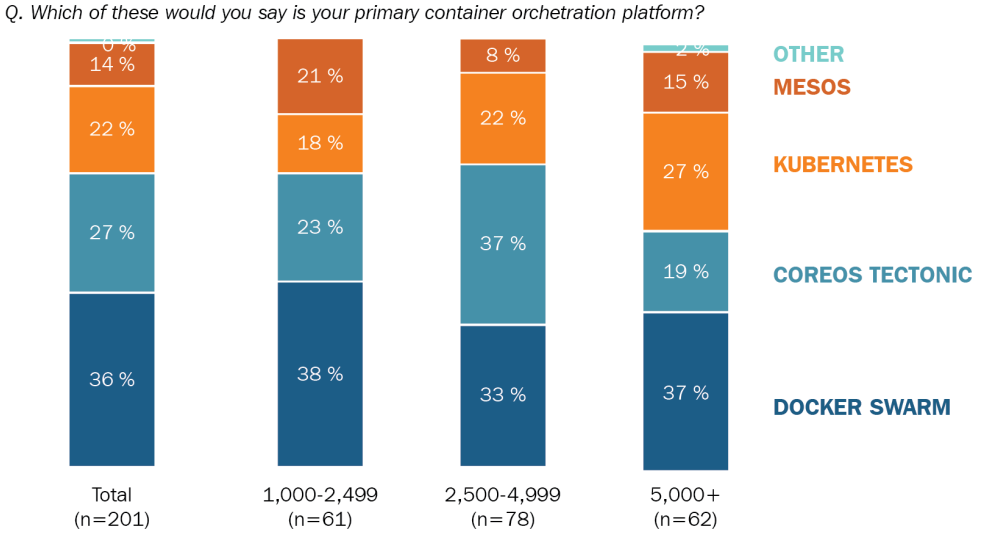

Application Client
Application Client Container
Web Browser
Client Machine
Servlet
JSP Page
Web Container
Enterprise Bean
Enterprise Bean
EJB Container
Java EE Server
Database


Container image
AWS
Container registry
(Amazon ECR, Docker Hub, self-hosted registry)
VPC
ECS agent
Tasks
Task definition
Container instances
AZ 1
ECS agent
Tasks
Task definition
Service description
Service
Container instances
Amazon ECS duster
AZ 2
AWS region

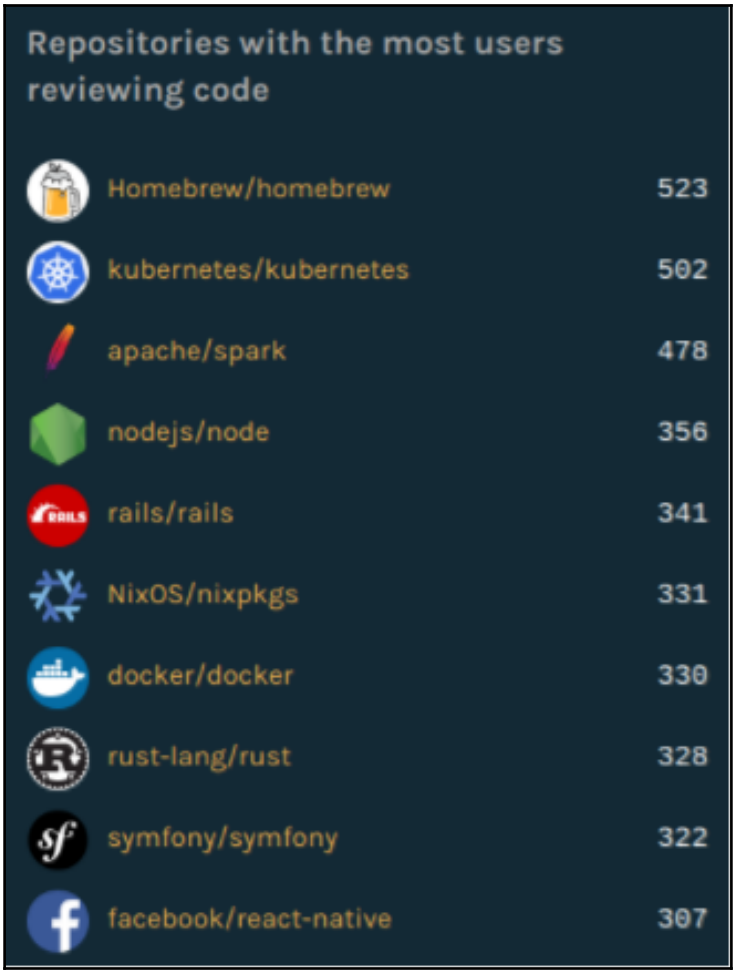

Container registry
(Amazon ECR, Docker Hub, self-hosted registry)
Publish image
Container image
Create container image
Dockerfile

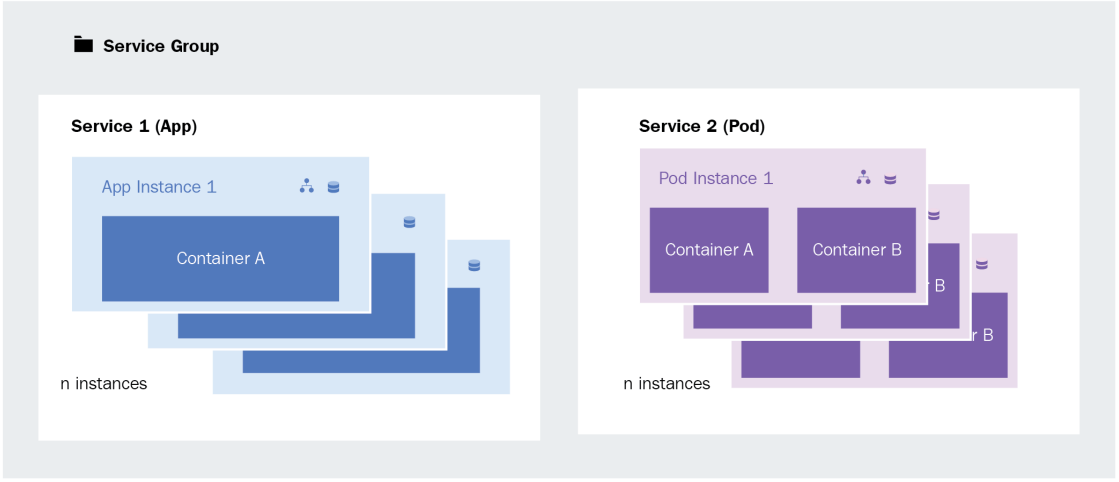

Task definition
Service description
Service
Schedule
Amazon ECS
Place task
ECS agent
Tasks
Container instances
Amazon ECS cluster


Container registry
(Amazon ECR, Docker Hub, self-hosted registry)
Download container image
Schedule task on instance
ECS agent
Run tasks
Tasks
Container instances
Amazon ECS
Amazon ECS cluster

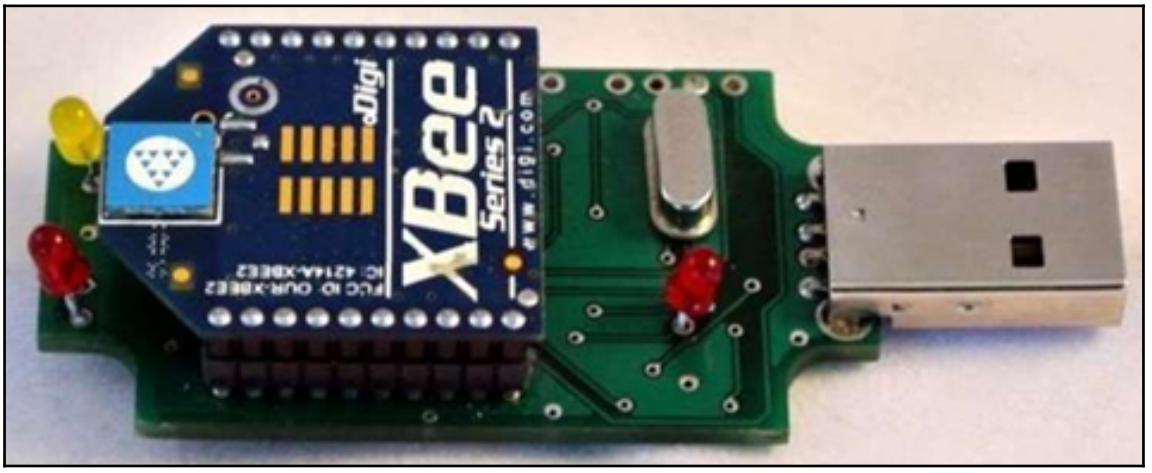


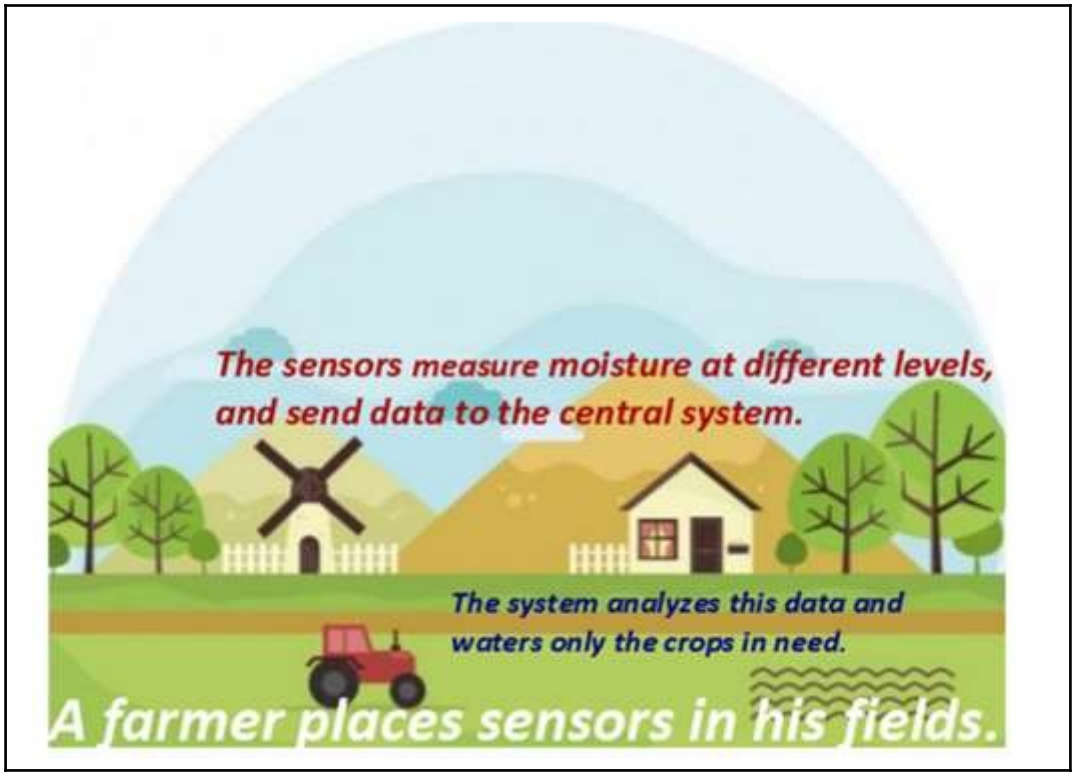
Container Orchetration Adoption by Company Size (source:451 Research)


Repositories with the most users reviewing code
Homebrew/homebrew 523
kubernetes/kubernetes 502
apache/spark 478
nodejs/node 356
rails/rails 341
NixOS/nixpkgs 331
docker/docker 330
rust-lang/rust 328
symfony/symfony 322
facebook/react-native 307

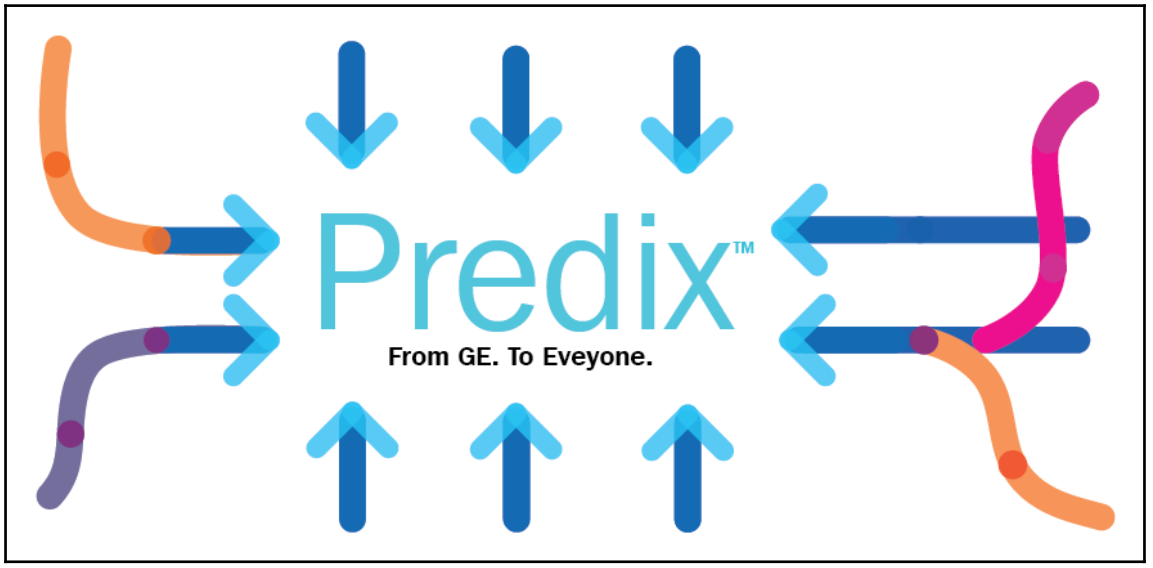


Mesophere DC/OS Pods (Image Credit: Mesosphere Blog)



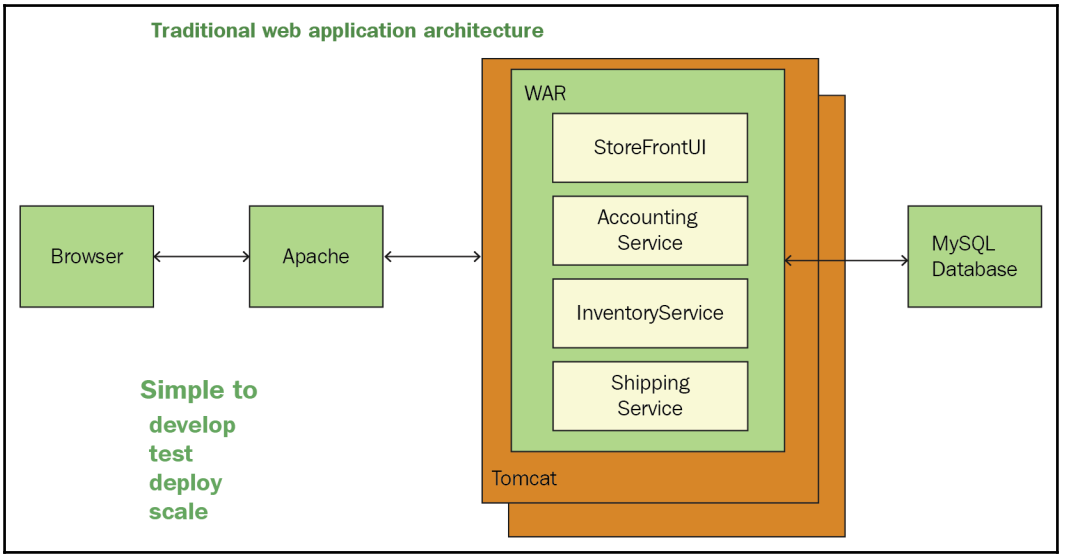

The sensors measure moisture at different levels,
and send data to the central system.
The system analyzes this data and
waters only the crops in need.
A farmer places sensors in his fields.

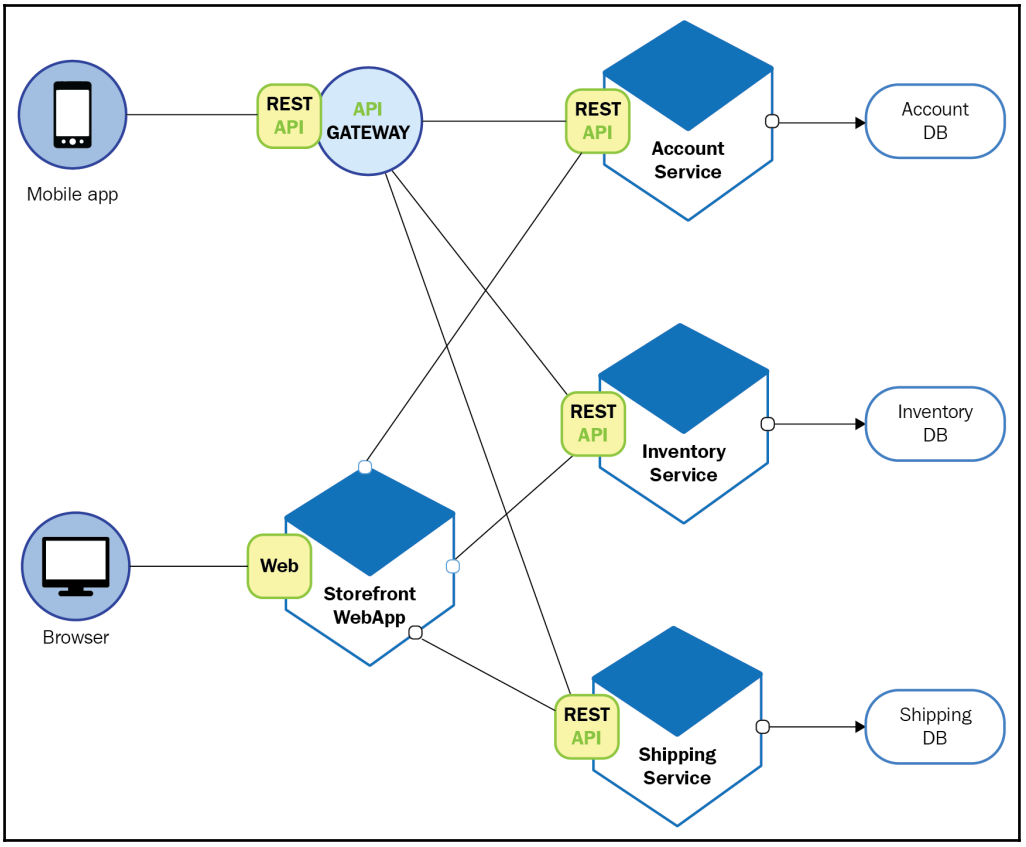

Wi-Fi
4G

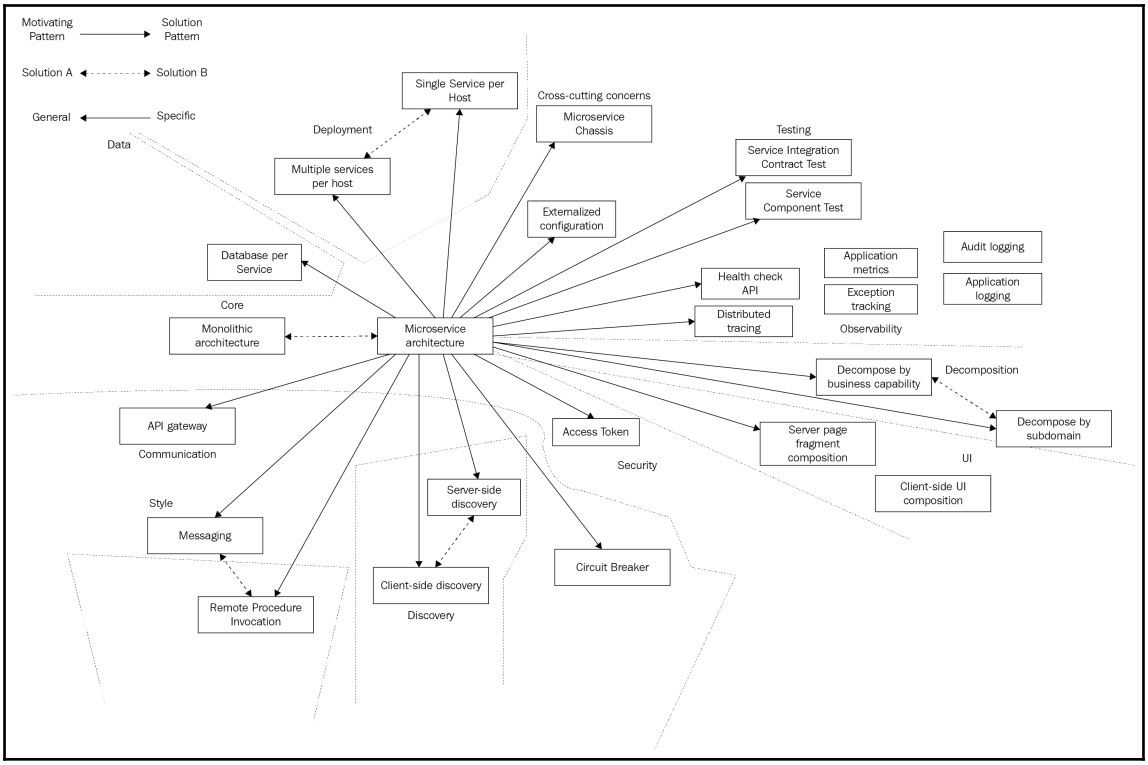

Predix™
From GE. To Eveyone.

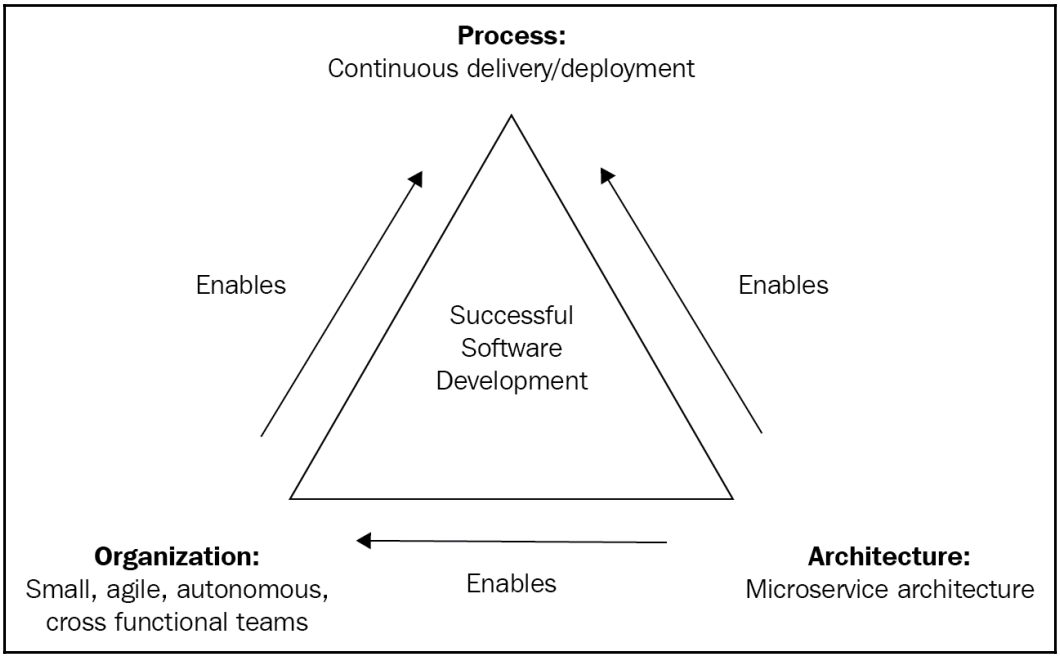

iot
eclipse.org

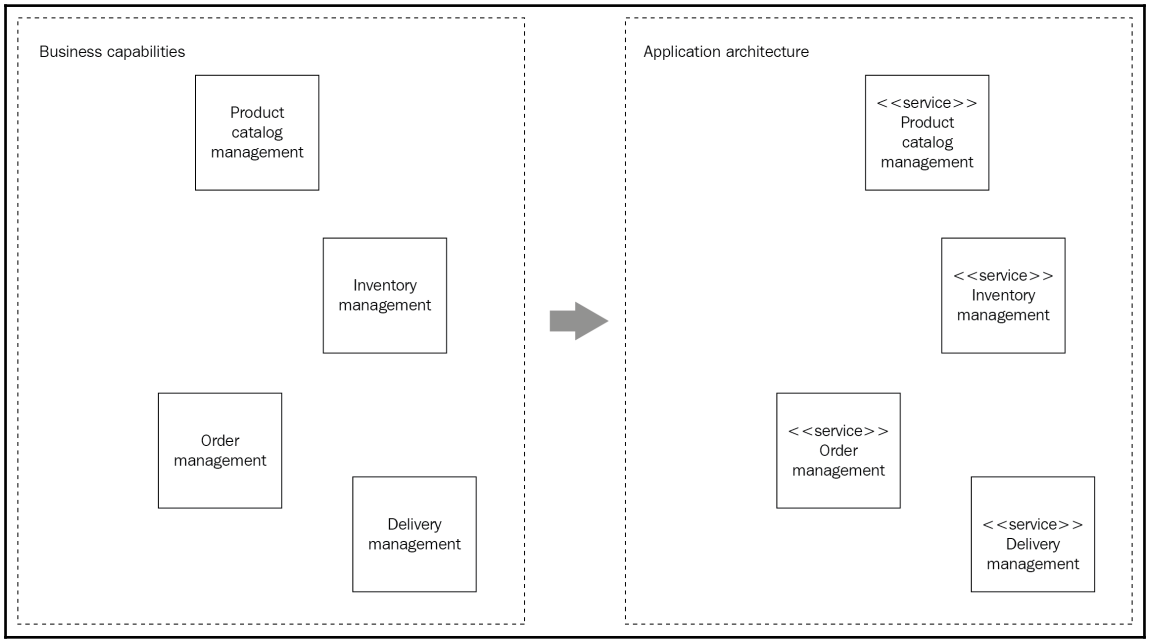

Contiki
The Open Source OS for the Internet of Things

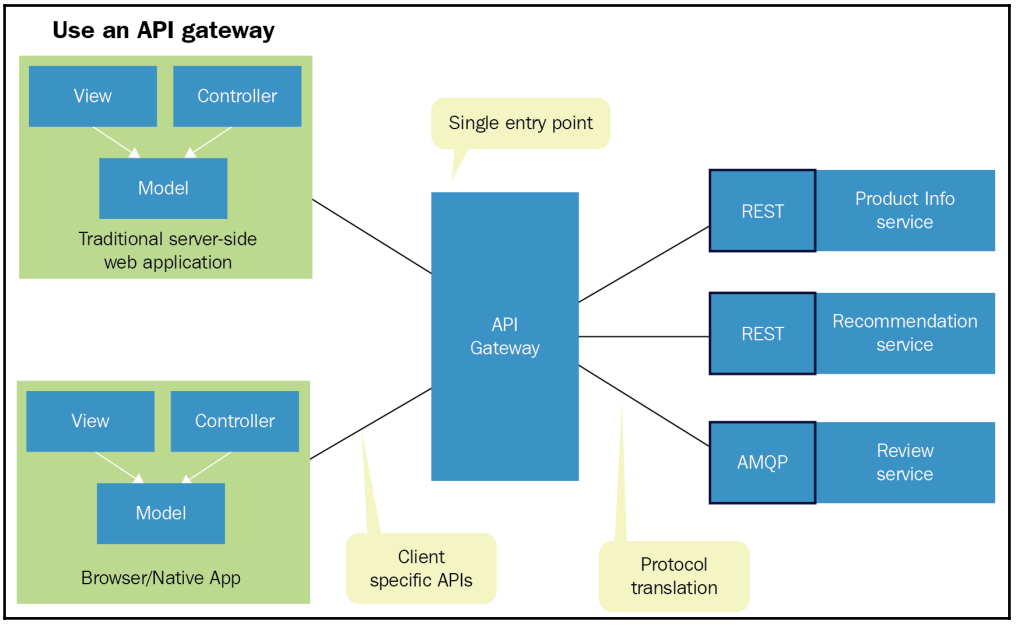

Traditional web application architecture
Browser
Apache
WAR
StoreFrontUI
Accounting Service
InventoryService
Shipping Service
Tomcat
MySQL Database
Simple to
develop
test
deploy
scale

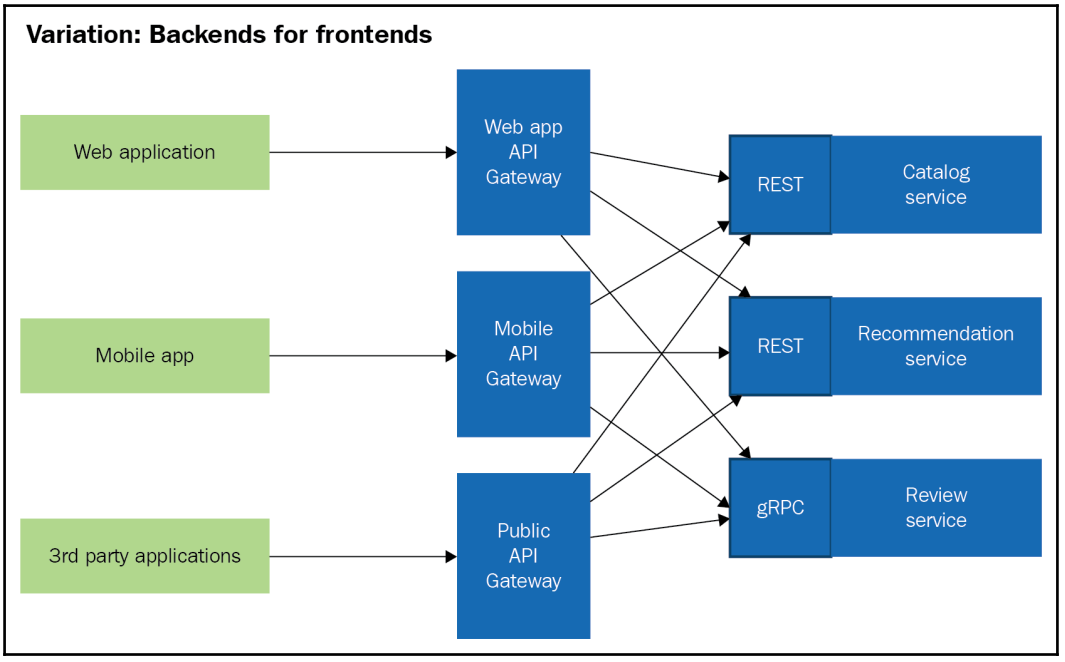

Mobile app
REST API
API GATEWAY
REST API
Account Service
Account DB
REST API
Inventory Service
Inventory DB
Browser
Web
Storefront WebApp
REST API
Shipping Service
Shipping DB

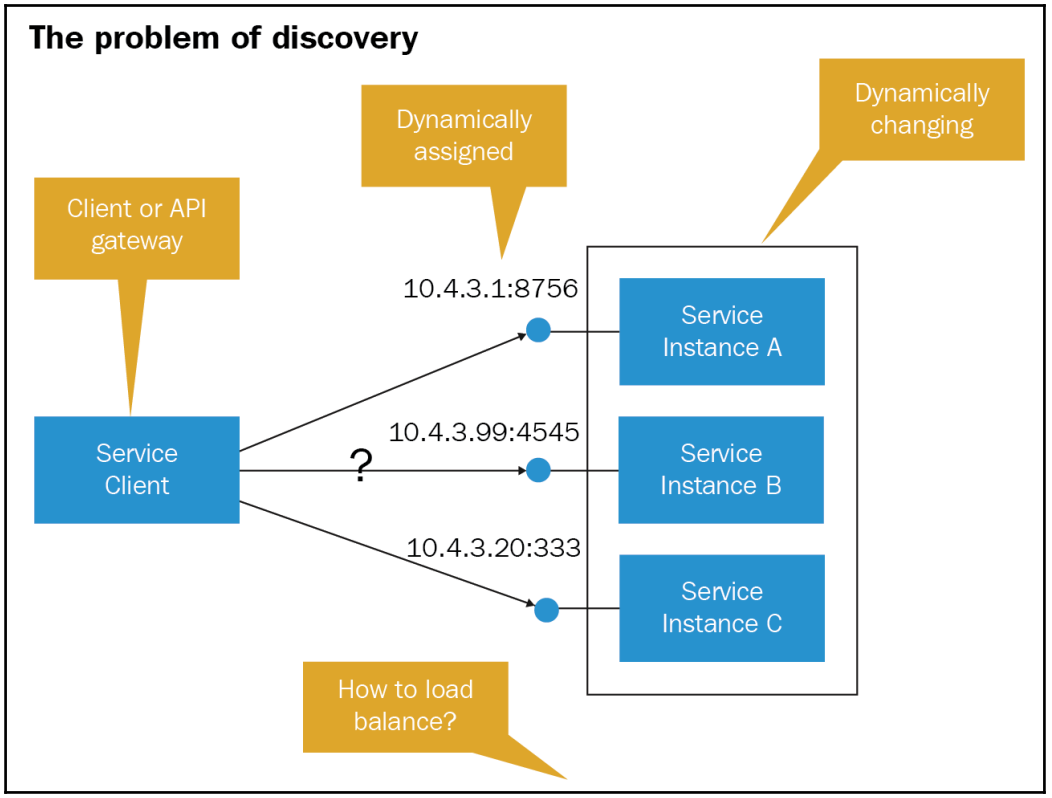

Motivating Pattern
Solution Pattern
Solution A
Solution B
General
Specific
Data
Deployment
Single Service per Host
Multiple services per host
Cross-cutting concerns
Microservice Chassis
Externalized configuration
Testing
Service Integration Contract Test
Service Component Test
Database per Service
Core
Monolithic arcchitecture
Microservice architecture
Health check API
Distributed tracing
Application metrics
Exception tracking
Observability
Audit logging
Application logging
Decompose by business capability
Decomposition
Decompose by subdomain
UI
Client-side UI composition
API gateway
Communication
Access Token
Security
Server page fragment composition
Style
Messaging
Server-side discovery
Client-side discovery
Discovery
Circuit Breaker
Remote Procedure Invocation

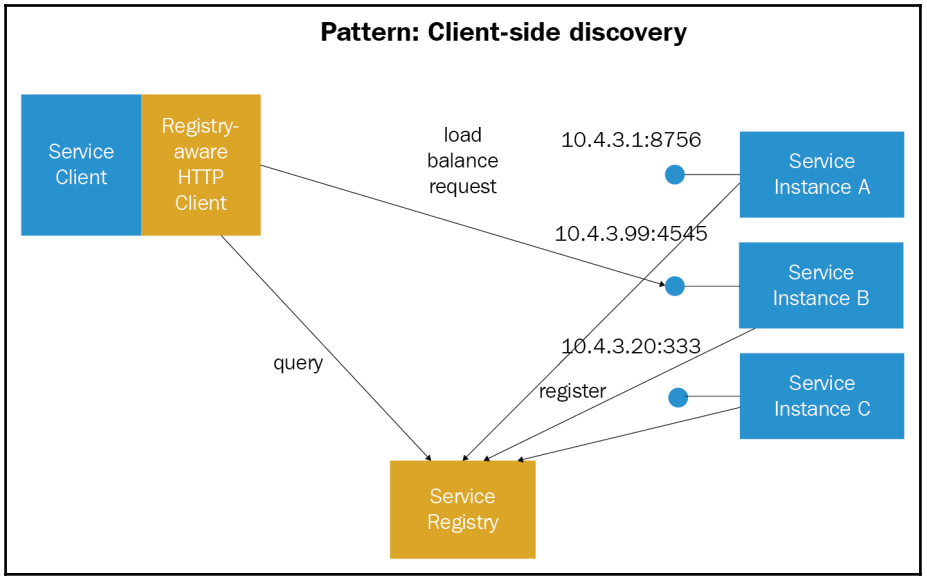

Process:
Continuous delivery/deployment
Enables
Enables
Successful
Software
Development
Organization:
Small, agile, autonomous,
cross functional teams
Enables
Architecture:
Microservice architecture

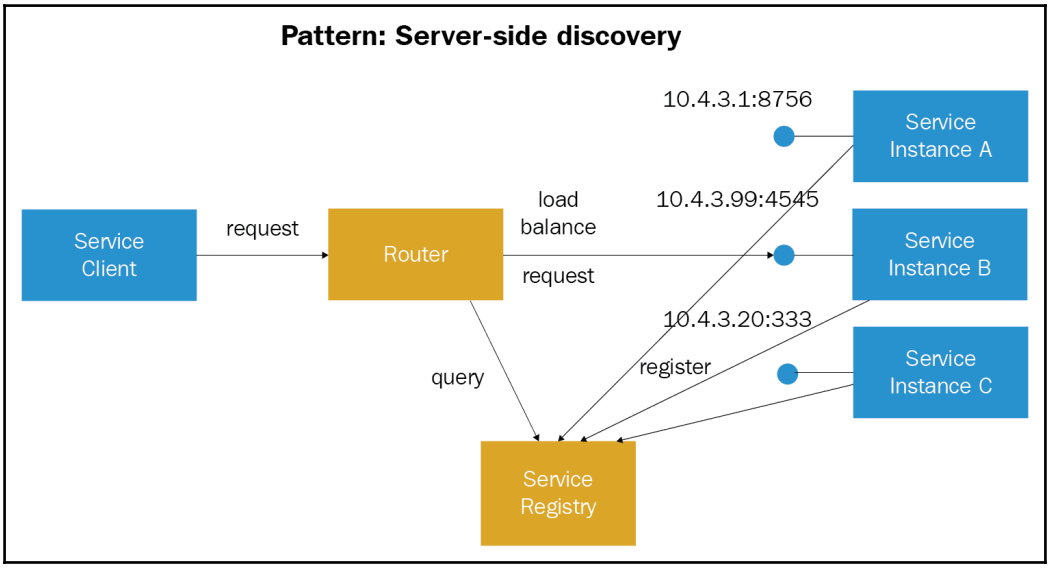

Business capabilities
Product catalog management
Inventory management
Order management
Delivery management
Application architecture
<<service>> Product catalog management
<<service>> Inventory management
<<service>> Order management
<<service>> Delivery management


Use an API gateway
View
Controller
Model
Traditional server-side web application
Single entry point
API Gateway
REST
Product Info service
REST
Recommendation service
AMQP
Review service
View
Controller
Model
Browser/Native App
Client specific APIs
Protocol translation


Variation: Backends for frontends
Web application
Mobile app
3rd party applications
Web app API Gateway
Mobile API Gateway
Public API Gateway
REST
Catalog service
REST
Recommendation service
gRPC
Review service


The problem of discovery
Dynamically assigned
Dynamically changing
Client or API gateway
10.4.3.1:8756
Service Instance A
Service Client
?
10.4.3.99:4545
Service Instance B
10.4.3.20:333
Service Instance C
How to load balance?


Pattern: Client-side discovery
Service Client
Registry-aware HTTP Client
load balance request
10.4.3.1:8756
Service Instance A
10.4.3.99:4545
Service Instance B
10.4.3.20:333
Service Instance C
query
register
Service Registry


Pattern: Server-side discovery
10.4.3.1:8756
Service Instance A
Service Client
request
Router
load balance
10.4.3.99:4545
Service Instance B
request
10.4.3.20:333
query
register
Service Instance C
Service Registry

Chapter 10: DevOps for Digital Transformation

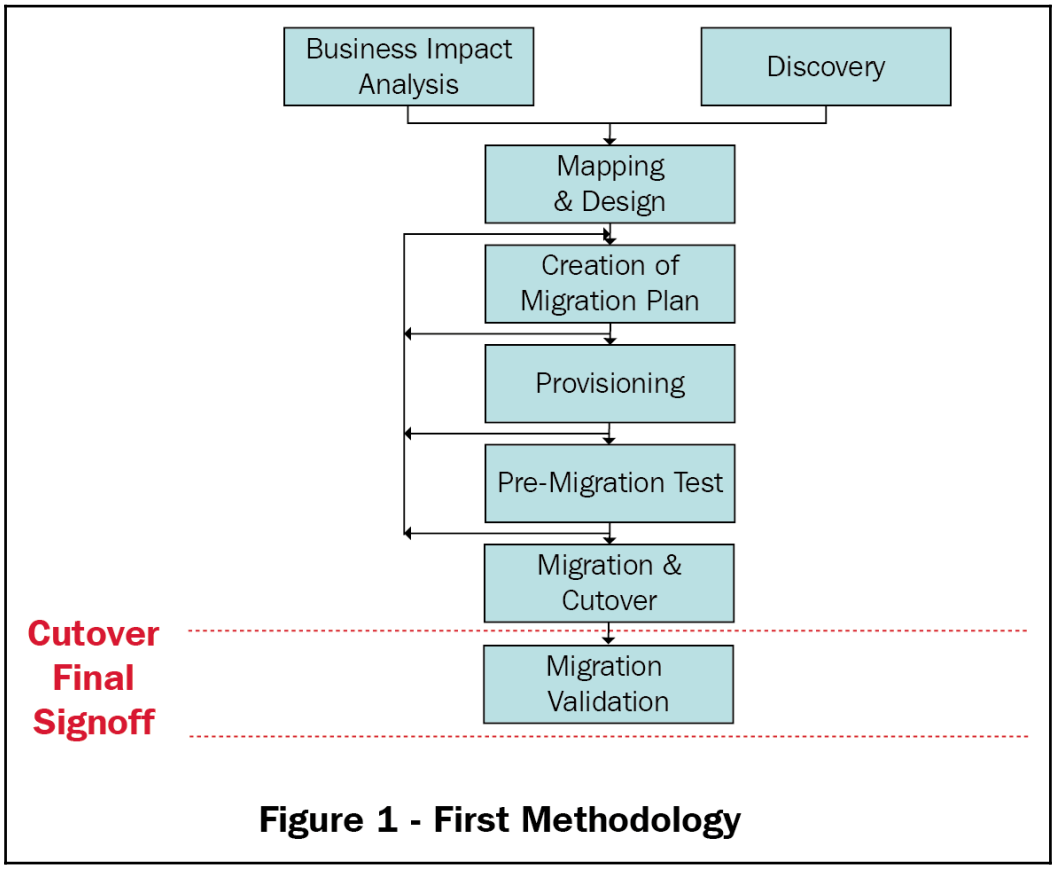


Figure 1 - First Methodology

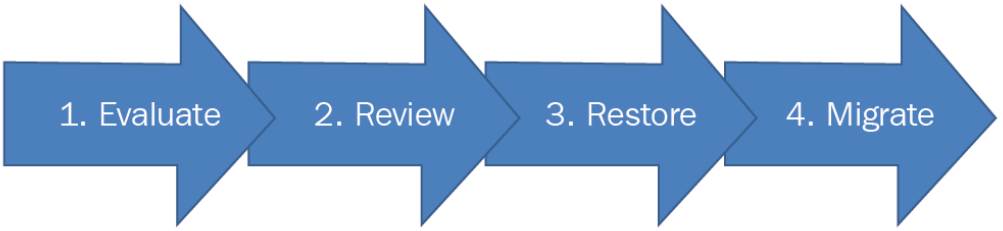


Figure 2 - Second Methodology

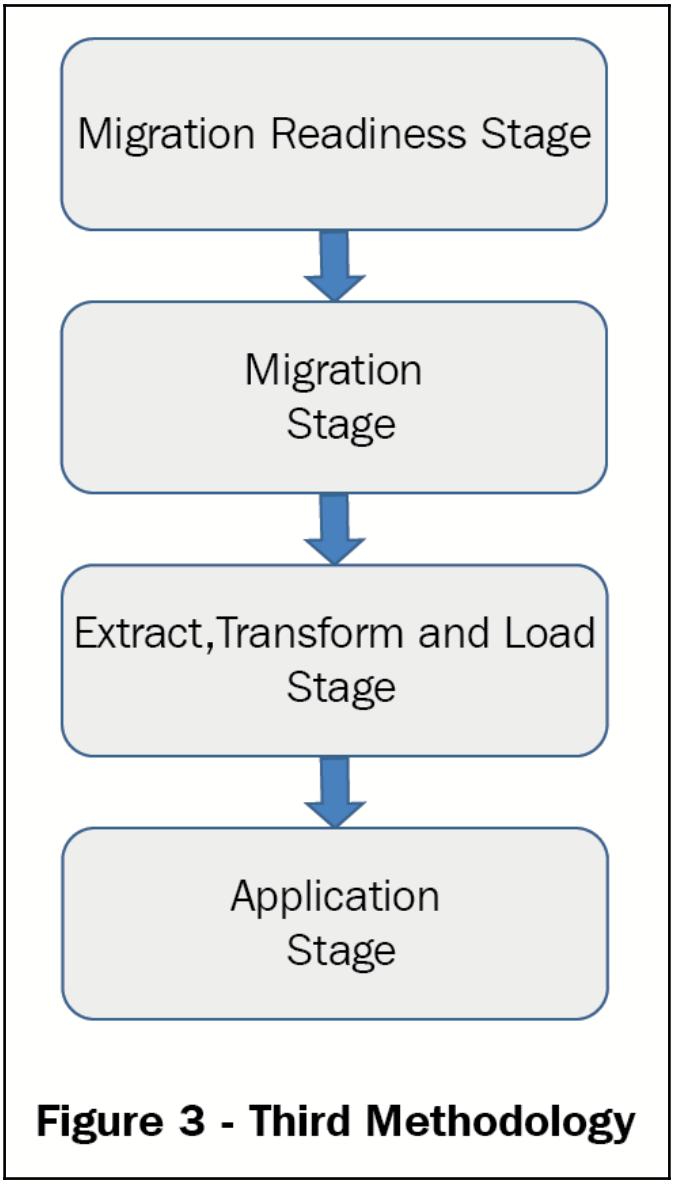


Figure 3 - Third Methodology

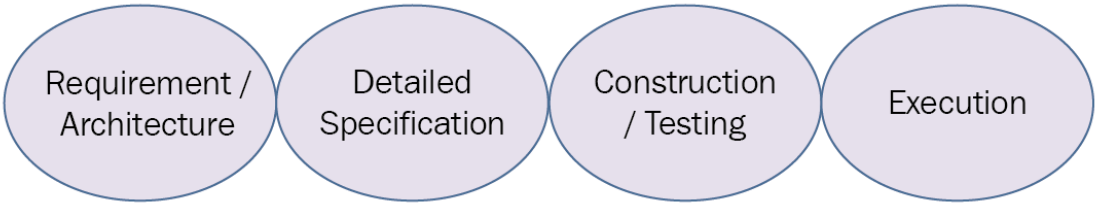


Figure 4 - Fourth Methodology

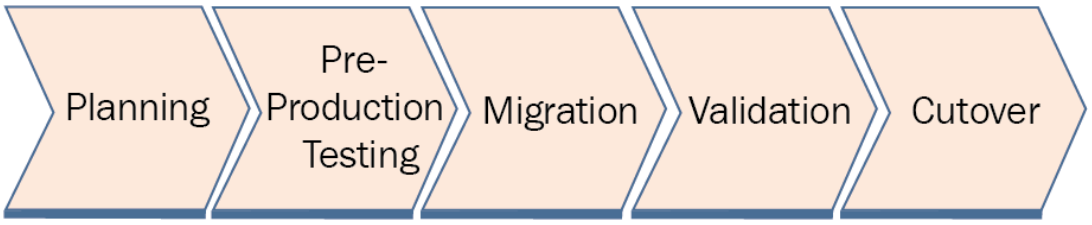


Figure 5 - Fifth Methodology

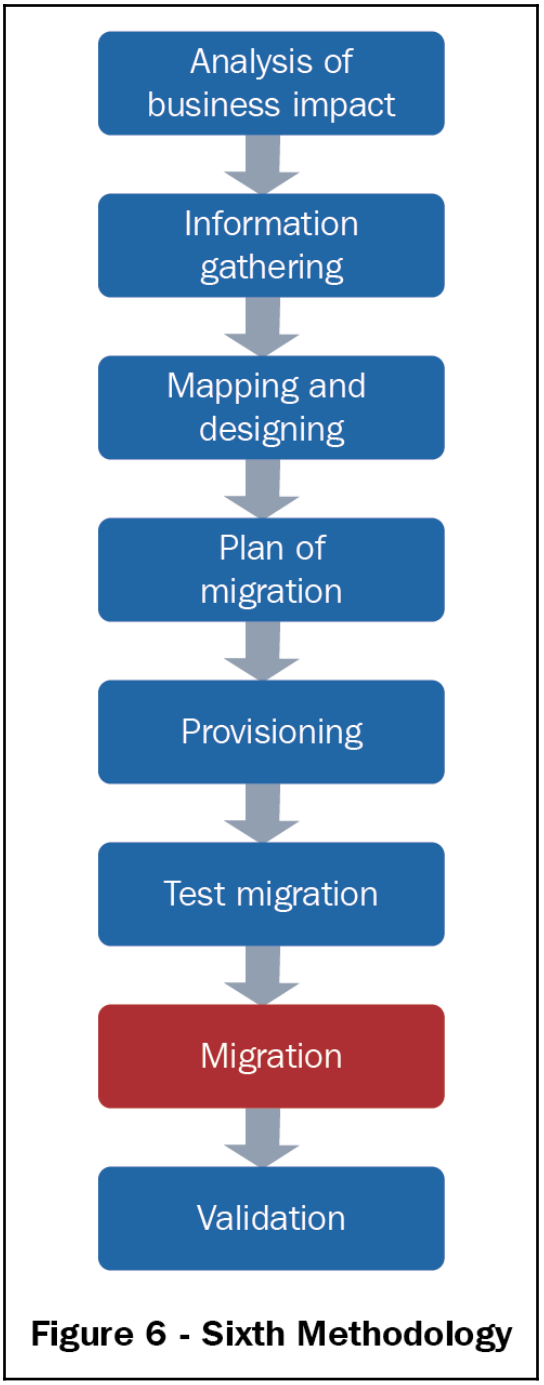
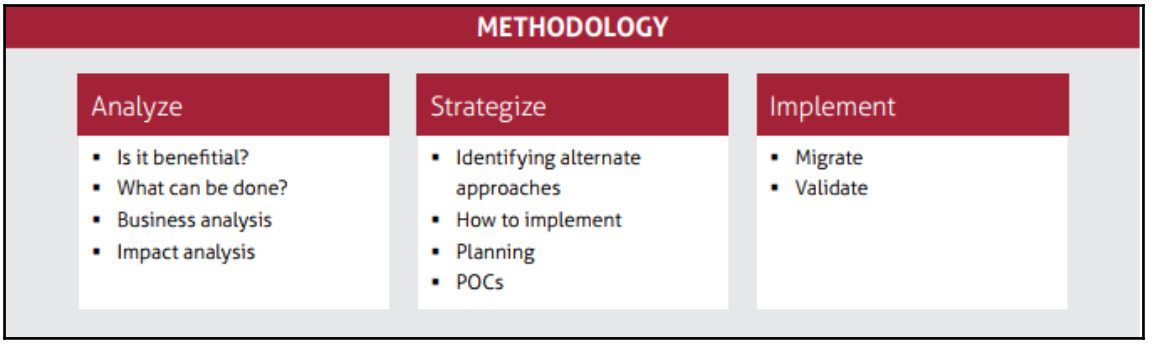
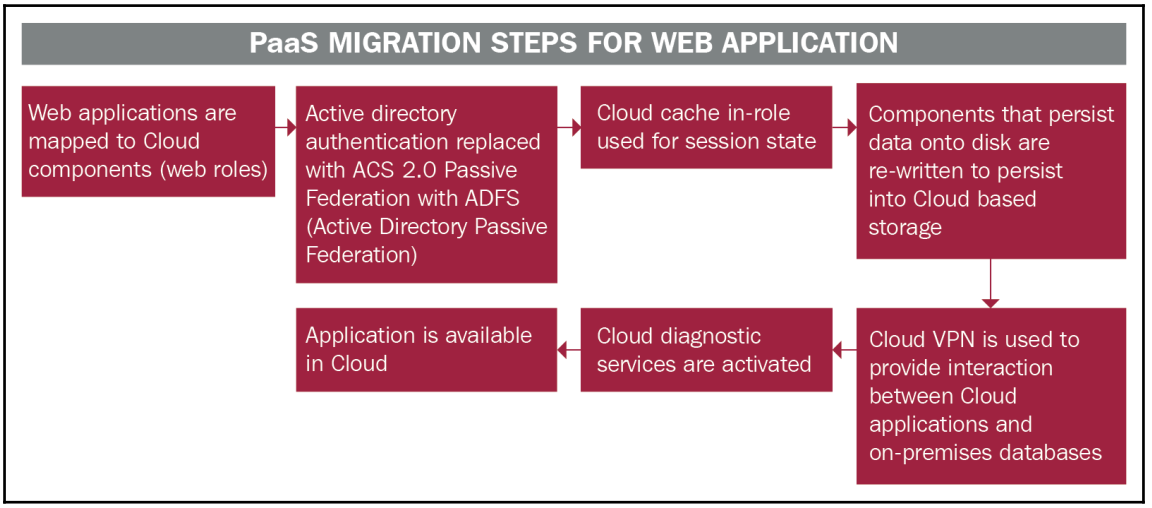
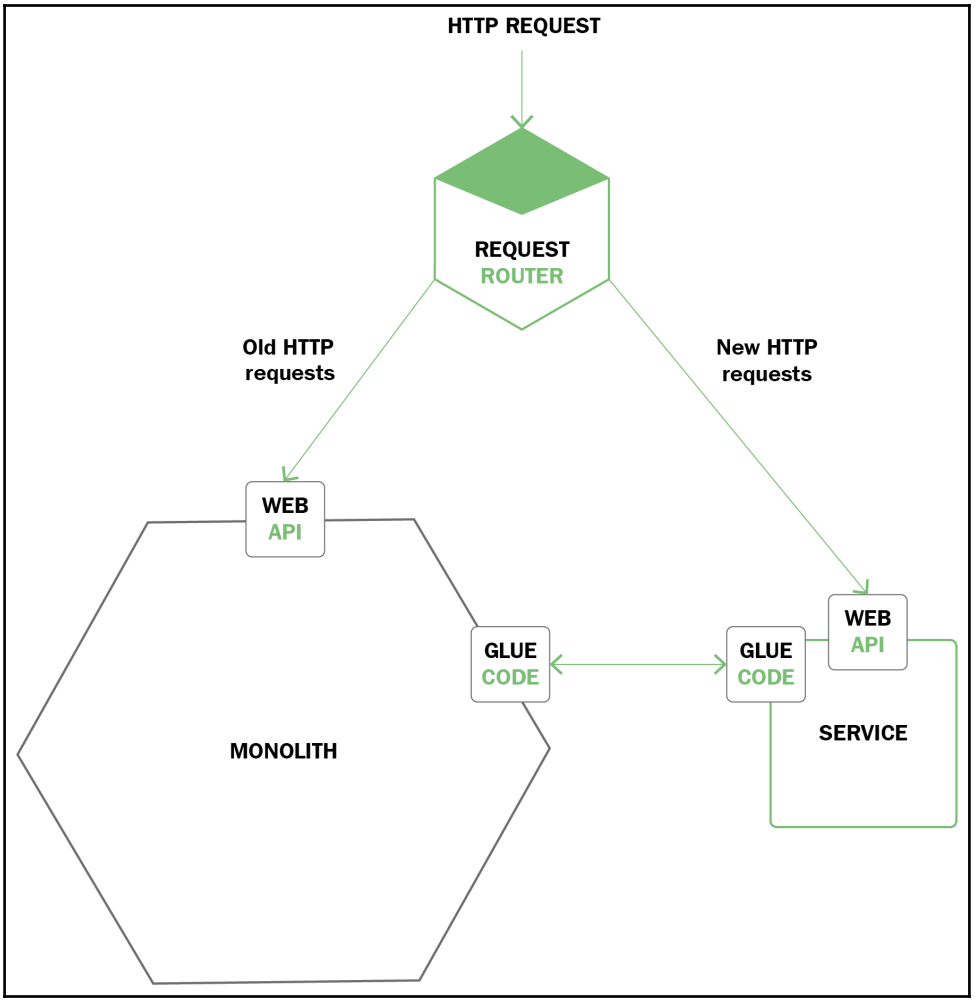
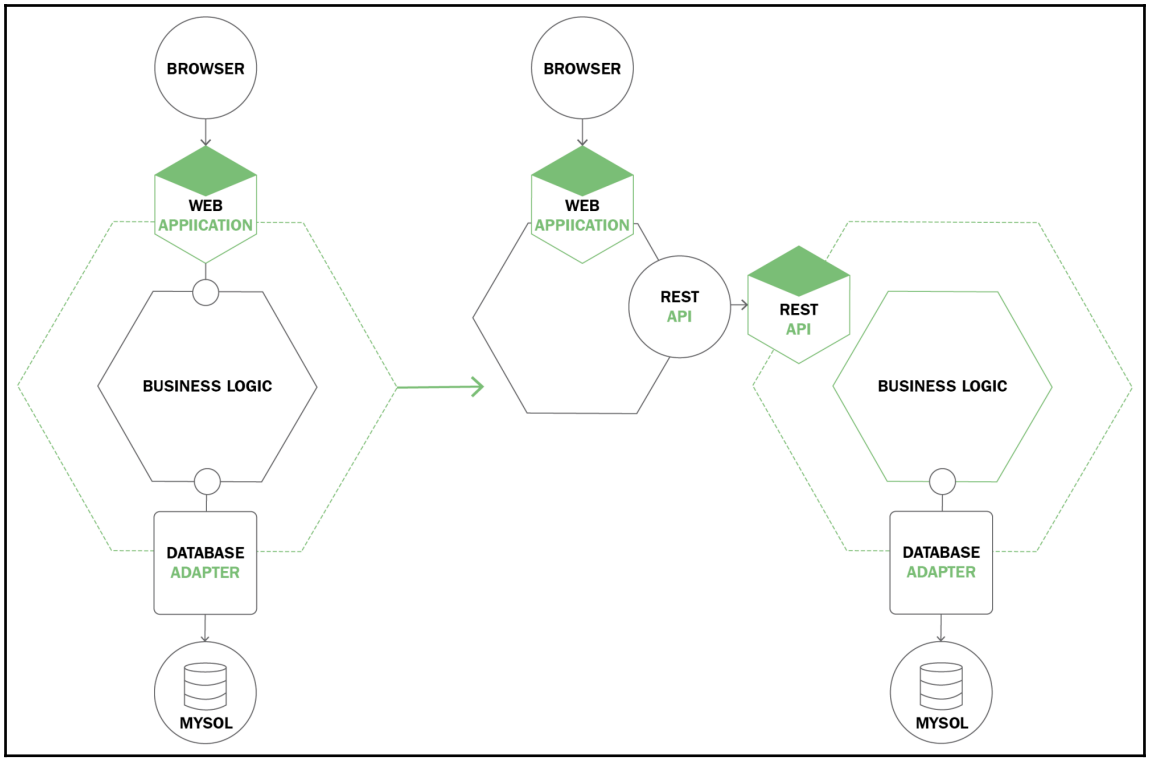


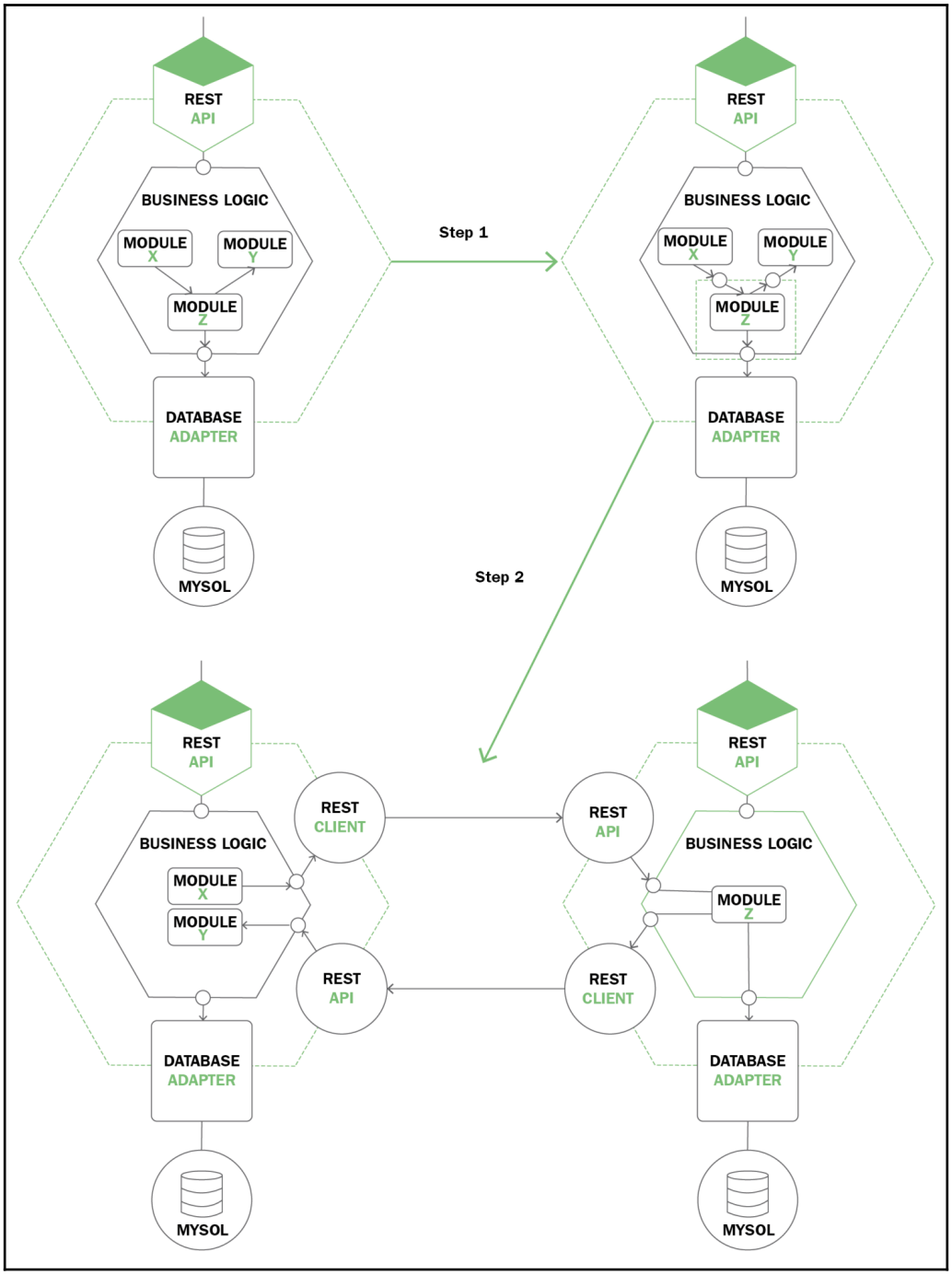
Figure 6 - Sixth Methodology

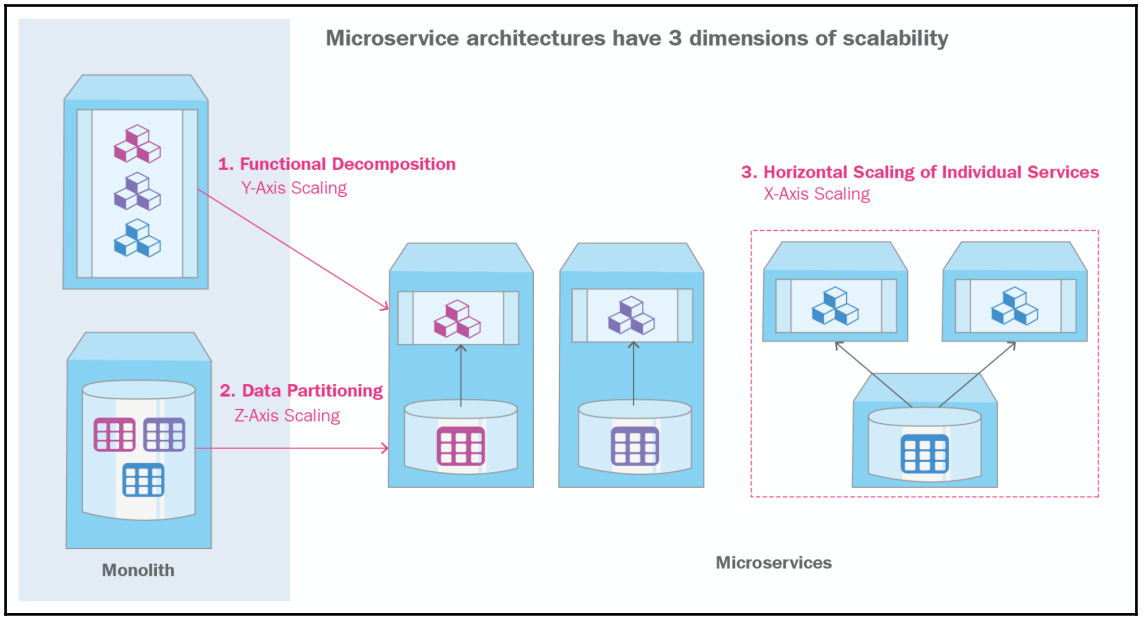

METHODOLOGY
Analyze
Is it benefitial?
What can be done?
Business analysis
Impact analysis
Strategize
Identifying alternate approaches
How to implement
Planning
POCs
Implement
Migrate
Validate

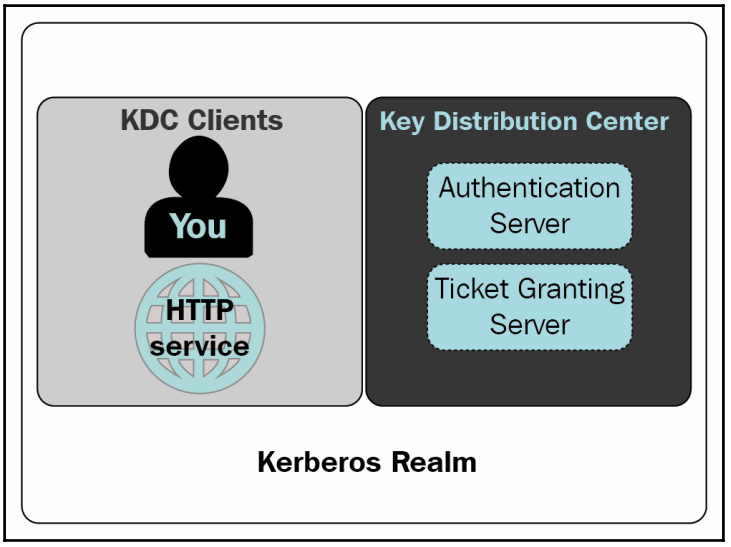

PaaS MIGRATION STEPS FOR WEB APPLICATION
Web applications are mapped to Cloud components (web roles)
Active directory authentication replaced with ACS 2.0 Passive Federation with ADFS (Active Directory Passive Federation)
Cloud cache in-role used for session state
Components that persist data onto disk are re-written to persist into Cloud based storage
Cloud VPN is used to provide interaction between Cloud applications and on-premises databases
Cloud diagnostic services are activated
Application is available in Cloud

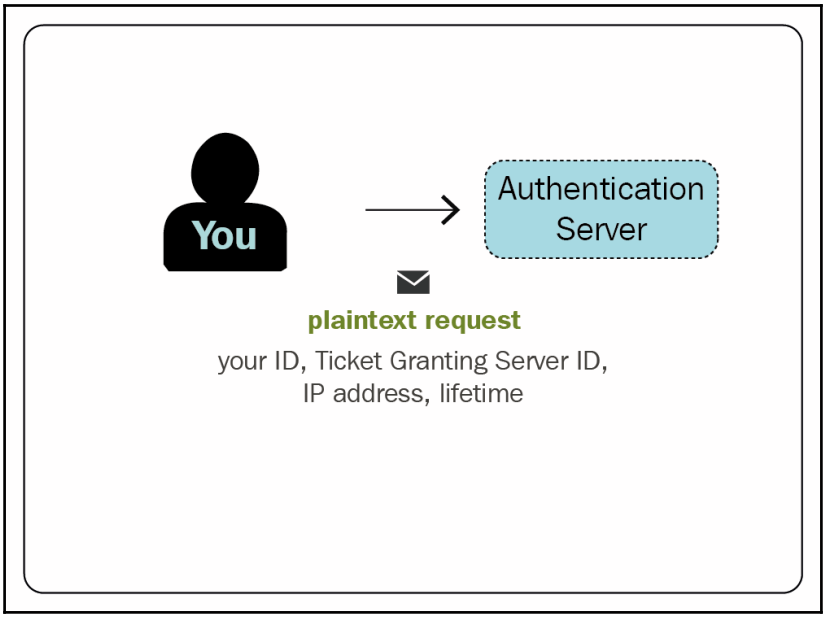

HTTP REQUEST
REQUEST
ROUTER
Old HTTP
requests
New HTTP
requests
WEB
API
GLUE
CODE
GLUE
CODE
WEB
API
MONOLITH
SERVICE

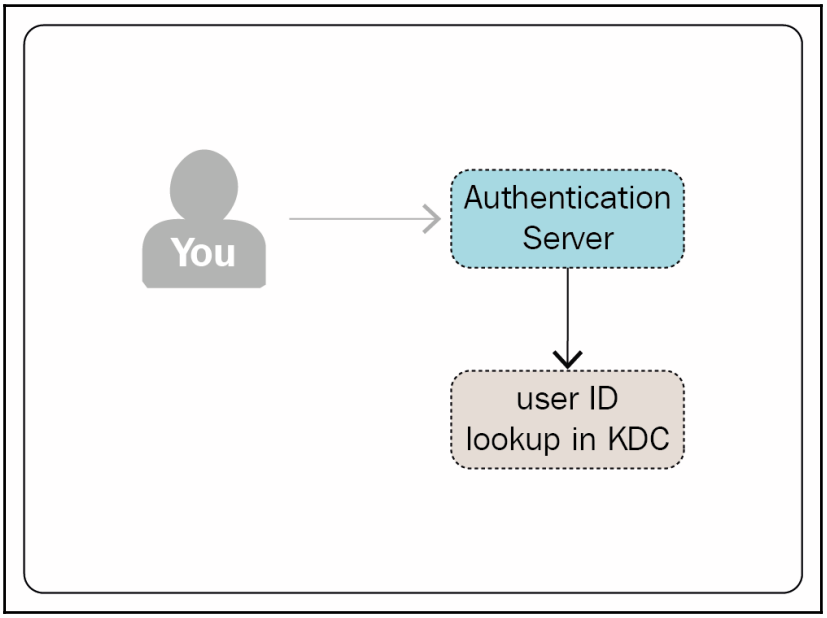

BROWSER
WEB
APPIICATION
BUSINESS LOGIC
DATABASE
ADAPTER
MYSOL
BROWSER
WEB
APPIICATION
REST
API
REST
API
BUSINESS LOGIC
DATABASE
ADAPTER
MYSOL

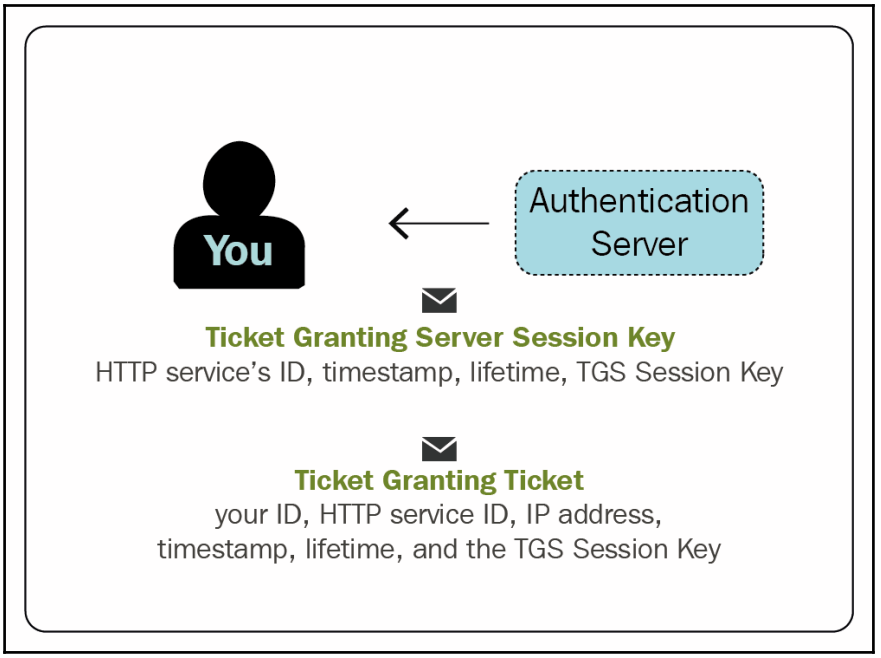

REST
API
BUSINESS LOGIC
MODULE
X
MODULE
Y
MODULE
Z
DATABASE
ADAPTER
MYSOL
Step 1
Step 2
REST
CLIENT

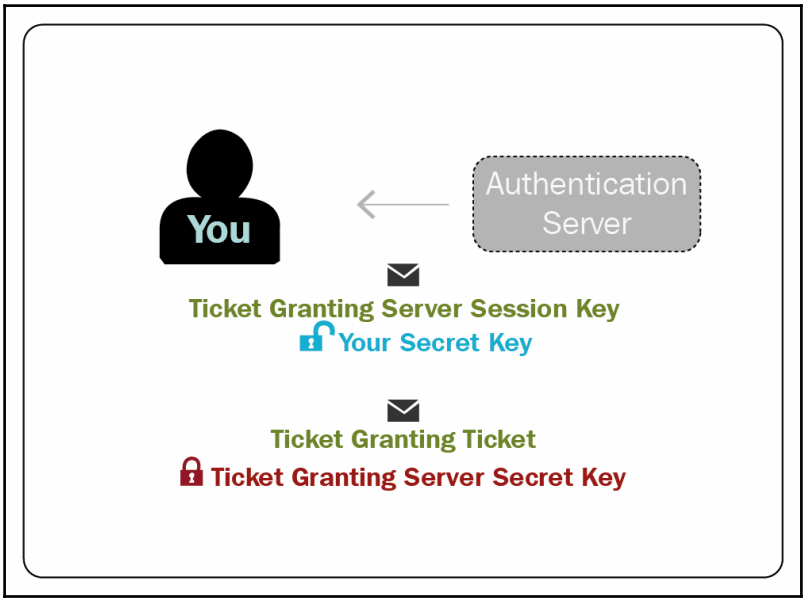

Microservice architectures have 3 dimensions of scalability
1. Functional Decomposition
Y-Axis Scaling
2. Data Partitioning
Z-Axis Scaling
3. Horizontal Scaling of Individual Services
X-Axis Scaling
Monolith
Microservices

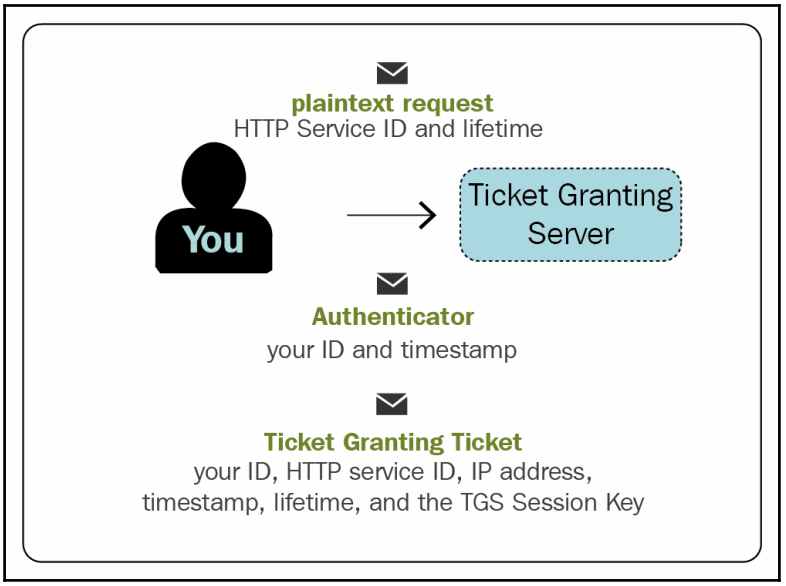

KDC Clients
You
HTTP service
Key Distribution Center
Authentication Server
Ticket Granting Server
Kerberos Realm

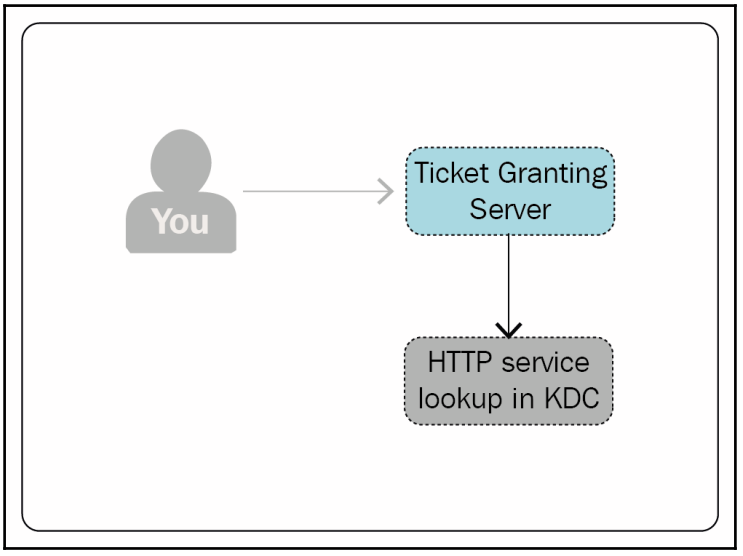

You
Authentication Server
plaintext request
your ID, Ticket Granting Server ID,
IP address, lifetime

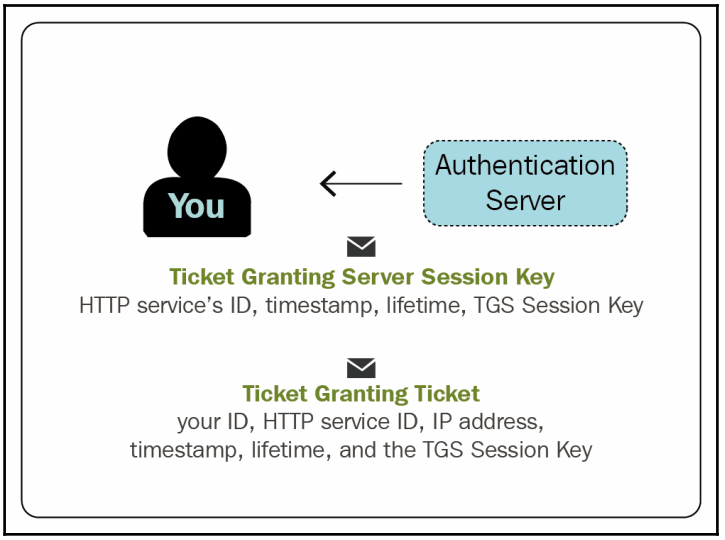

You
Authentication Server
user ID
lookup in KDC

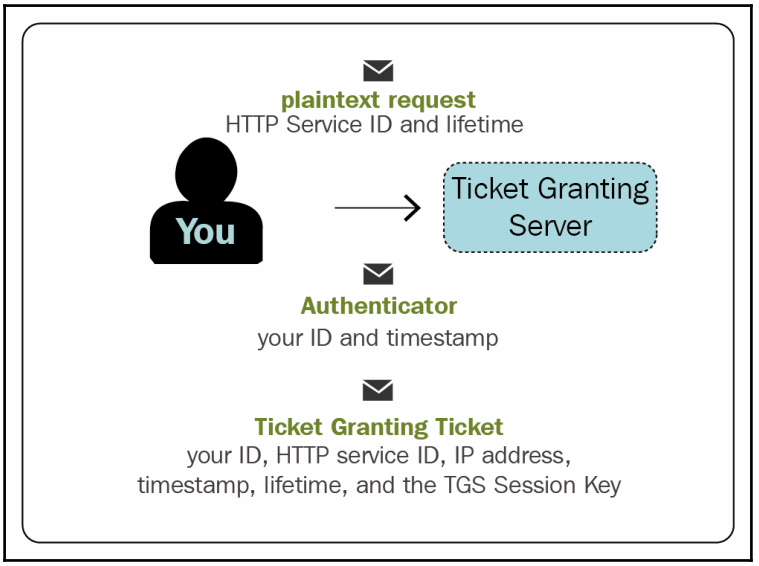

You
Authentication Server
Ticket Granting Server Session Key
HTTP service's ID, timestamp, lifetime, TGS Session Key
Ticket Granting Ticket
your ID, HTTP service ID, IP address,
timestamp, lifetime, and the TGS Session Key

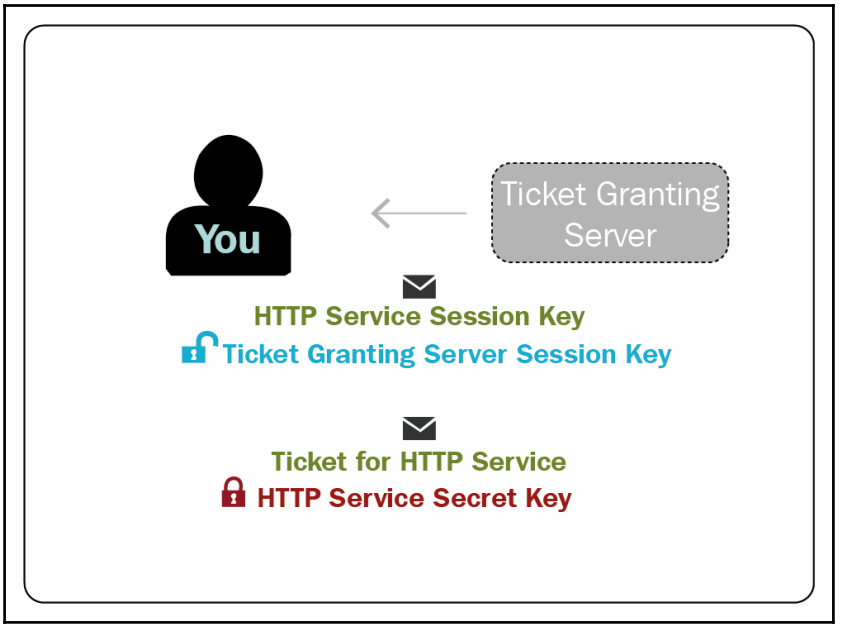

You
Authentication Server
Ticket Granting Server Session Key
Your Secret Key
Ticket Granting Ticket
Ticket Granting Server Secret Key

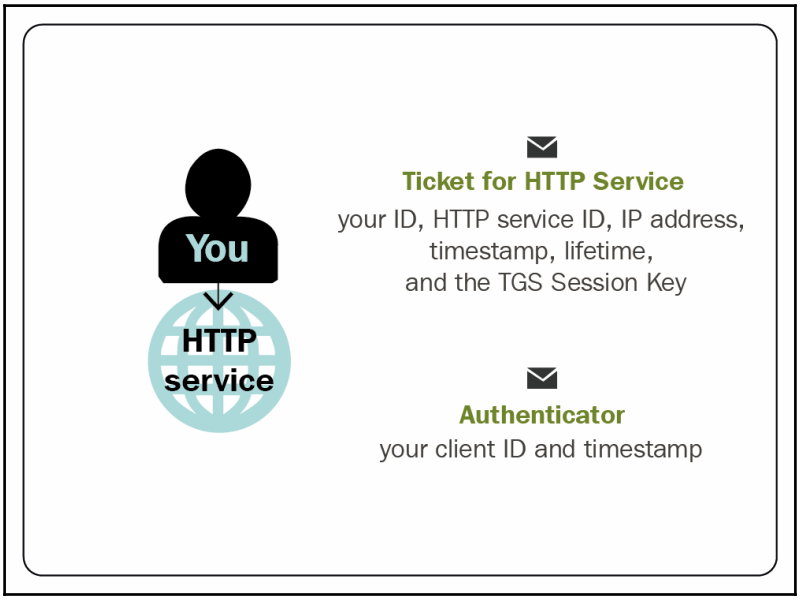

plaintext request
HTTP Service ID and lifetime
You
Ticket Granting Server
Authenticator
your ID and timestamp
Ticket Granting Ticket
your ID, HTTP service ID, IP address,
timestamp, lifetime, and the TGS Session Key

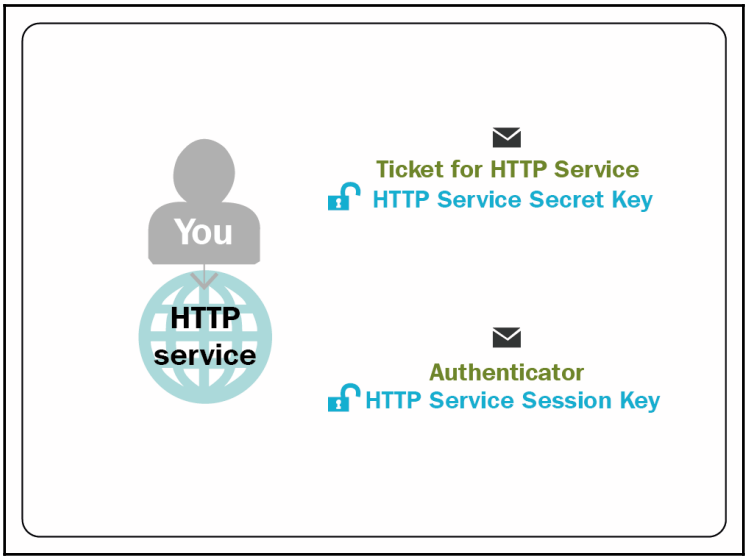

You
Ticket Granting Server
HTTP service lookup in KDC

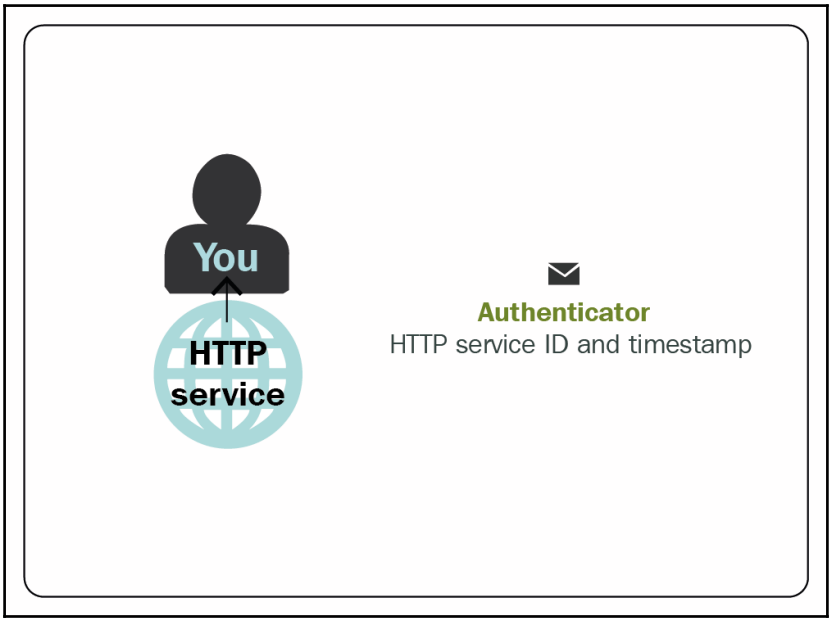

You
Authentication Server
Ticket Granting Server Session Key
HTTP service's ID, timestamp, lifetime, TGS Session Key
Ticket Granting Ticket
your ID, HTTP service ID, IP address,
timestamp, lifetime, and the TGS Session Key

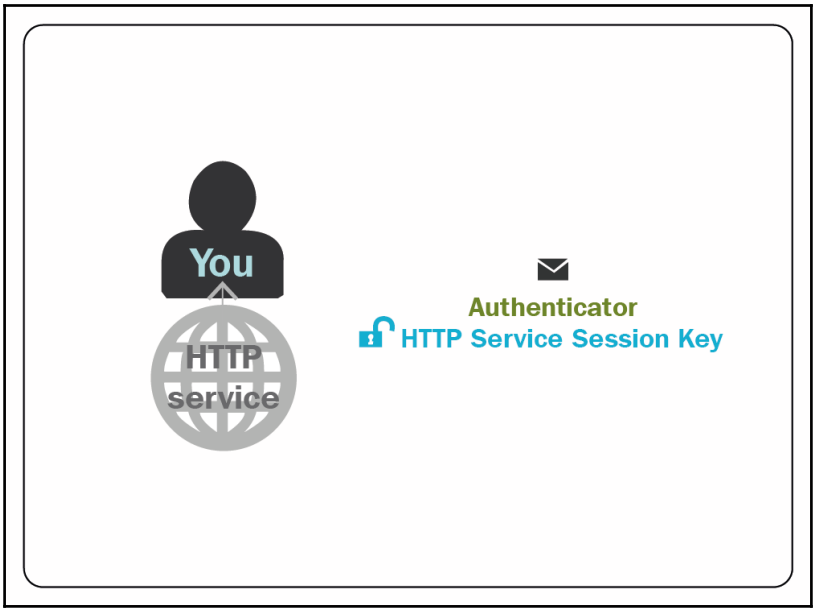

plaintext request
HTTP Service ID and lifetime
You
Ticket Granting Server
Authenticator
your ID and timestamp
Ticket Granting Ticket
your ID, HTTP service ID, IP address,
timestamp, lifetime, and the TGS Session Key

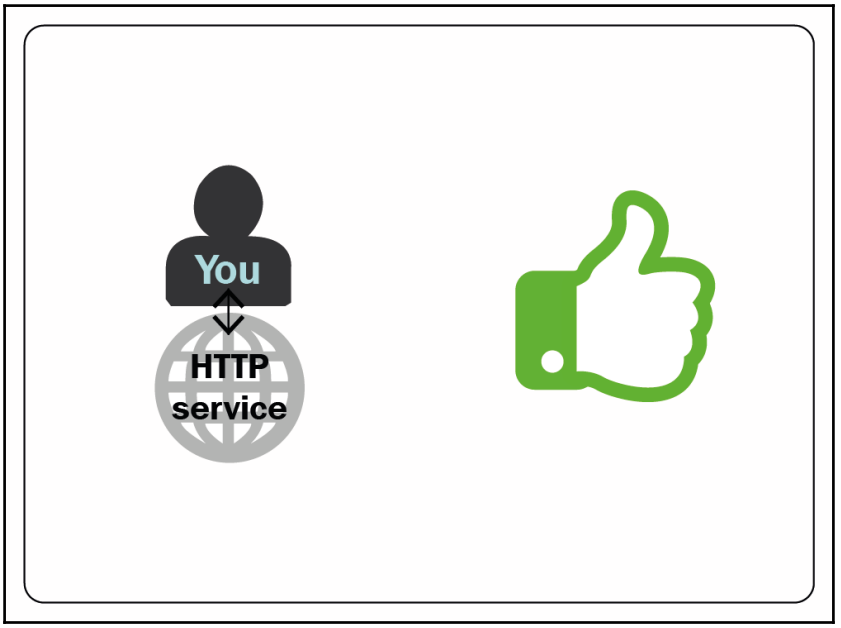

You
Ticket Granting Server
HTTP Service Session Key
Ticket Granting Server Session Key
Ticket for HTTP Service
HTTP Service Secret Key


You
HTTP service
Ticket for HTTP Service
your ID, HTTP service ID, IP address, timestamp, lifetime, and the TGS Session Key
Authenticator
your client ID and timestamp

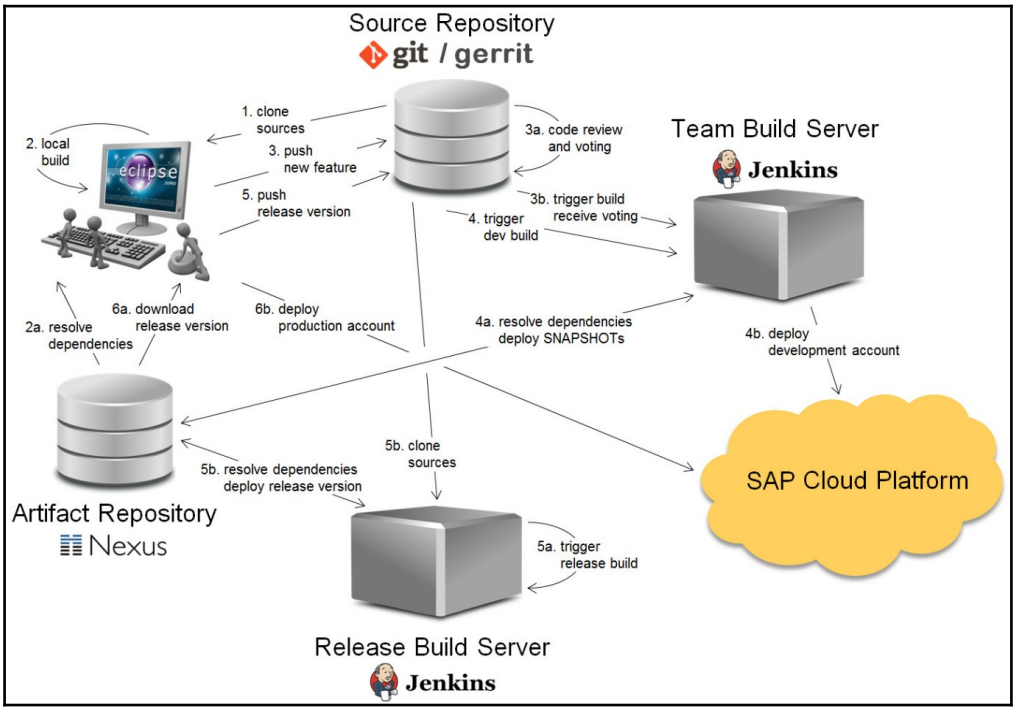

You
HTTP service
Ticket for HTTP Service
HTTP Service Secret Key
Authenticator
HTTP Service Session Key


You
HTTP service
Authenticator
HTTP service ID and timestamp

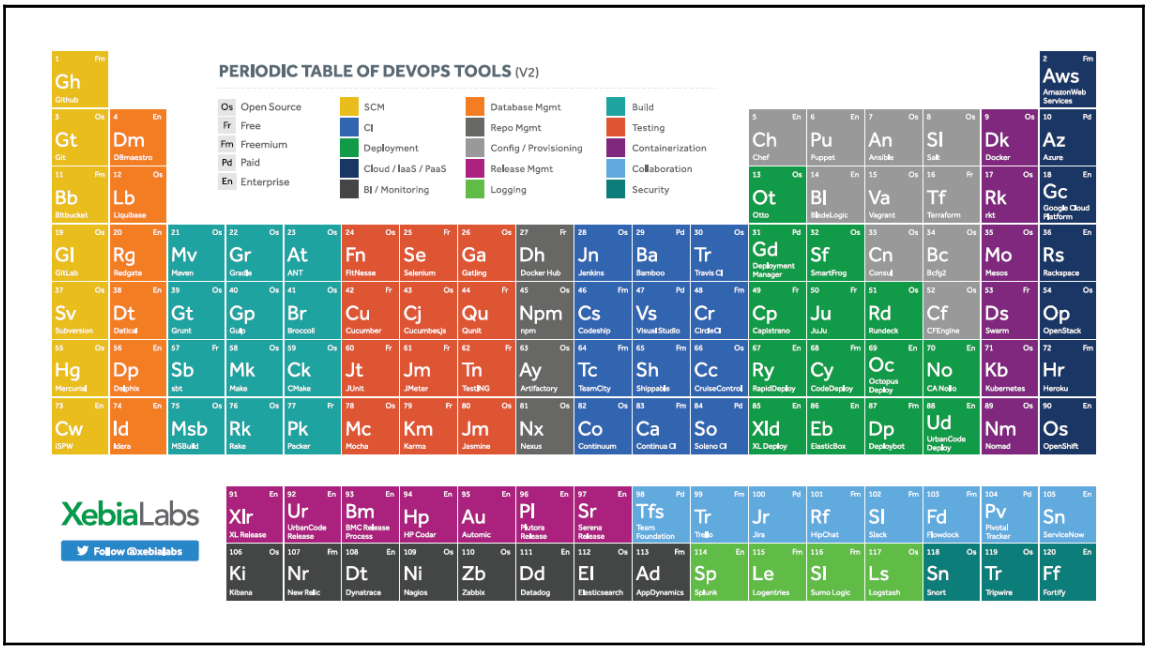

You
HTTP
service
Authenticator
HTTP Service Session Key


You
HTTP
service

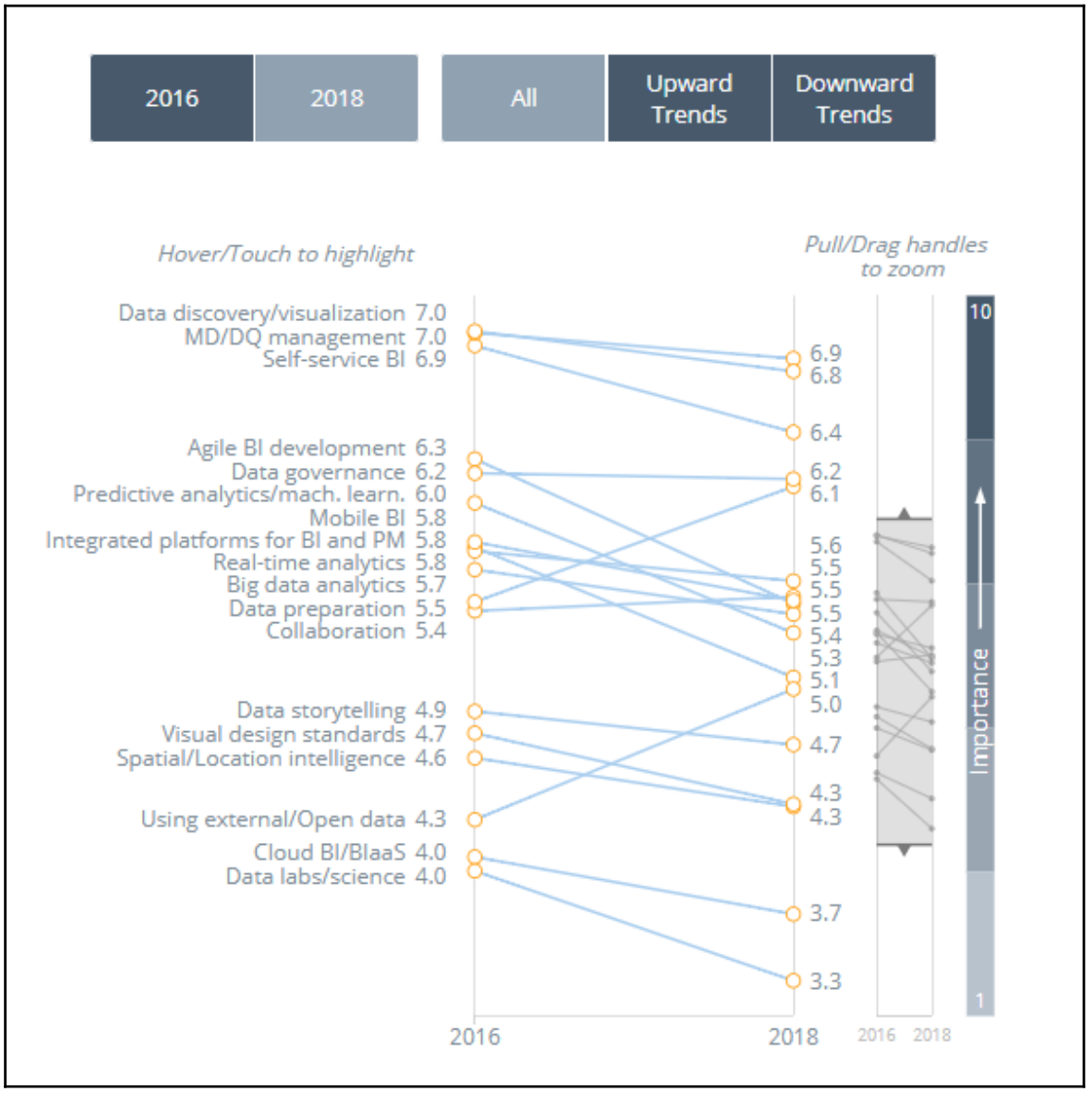
Appendix A: DevOps Adoption by ERP Systems

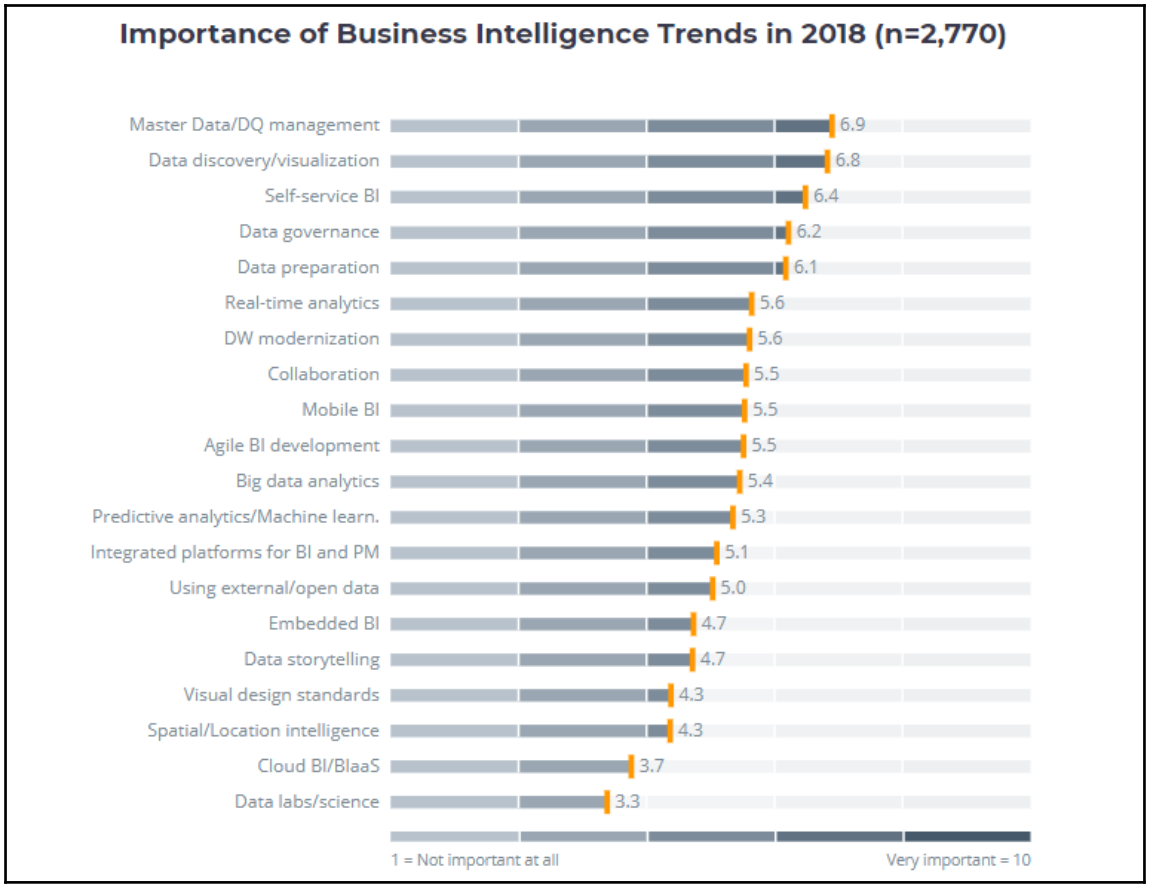


Appendix B: DevOps Periodic Table

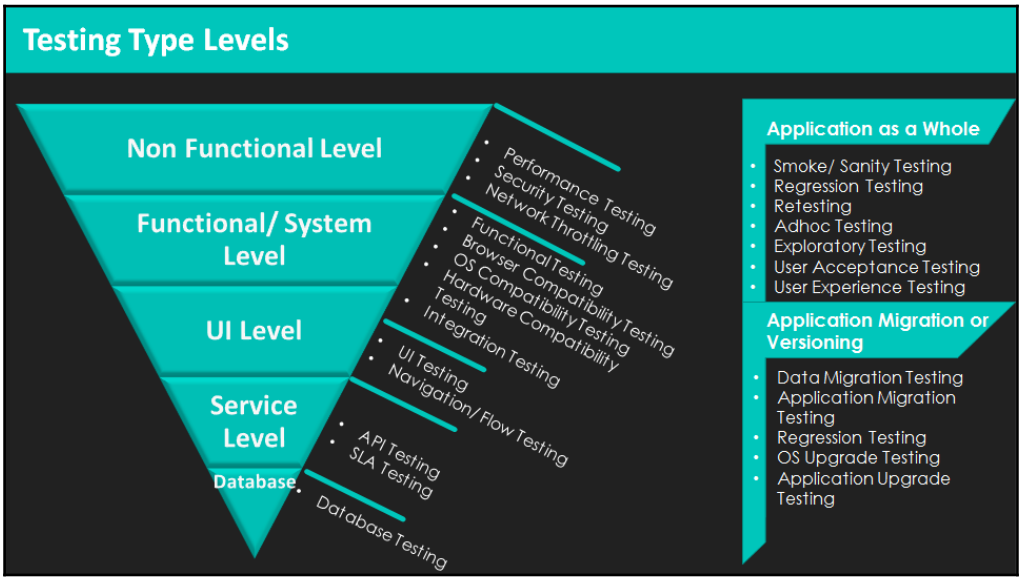


Appendix C: Business Intelligence Trends




Importance of Business Intelligence Trends in 2018 (n=2,770)
Master Data/DQ management 6.9
Data discovery/visualization 6.8
Self-service BI 6.4
Data governance 6.2
Data preparation 6.1
Real-time analytics 5.6
DW modernization 5.6
Collaboration 5.5
Mobile BI 5.5
Agile BI development 5.5
Big data analytics 5.4
Predictive analytics/Machine learn. 5.3
Integrated platforms for BI and PM 5.1
Using external/open data 5.0
Embedded BI 4.7
Data storytelling 4.7
Visual design standards 4.3
Spatial/Location intelligence 4.3
Cloud BI/BlaaS 3.7
Data labs/science 3.3
1 = Not important at all
Very important = 10

Appendix D: Testing Types and Levels



Appendix E: Java Platform SE 8