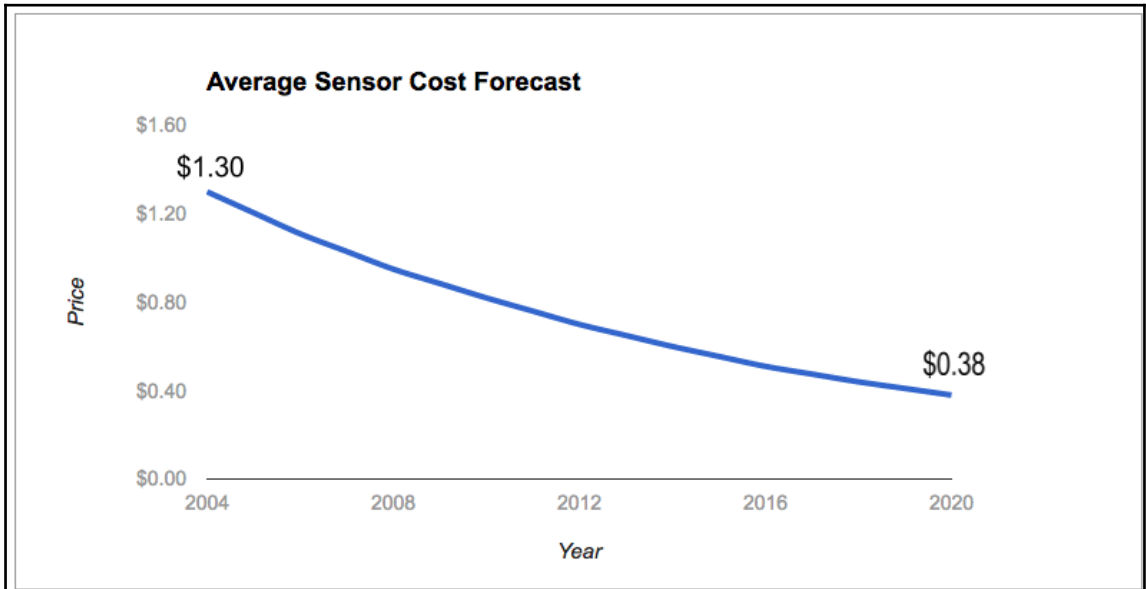
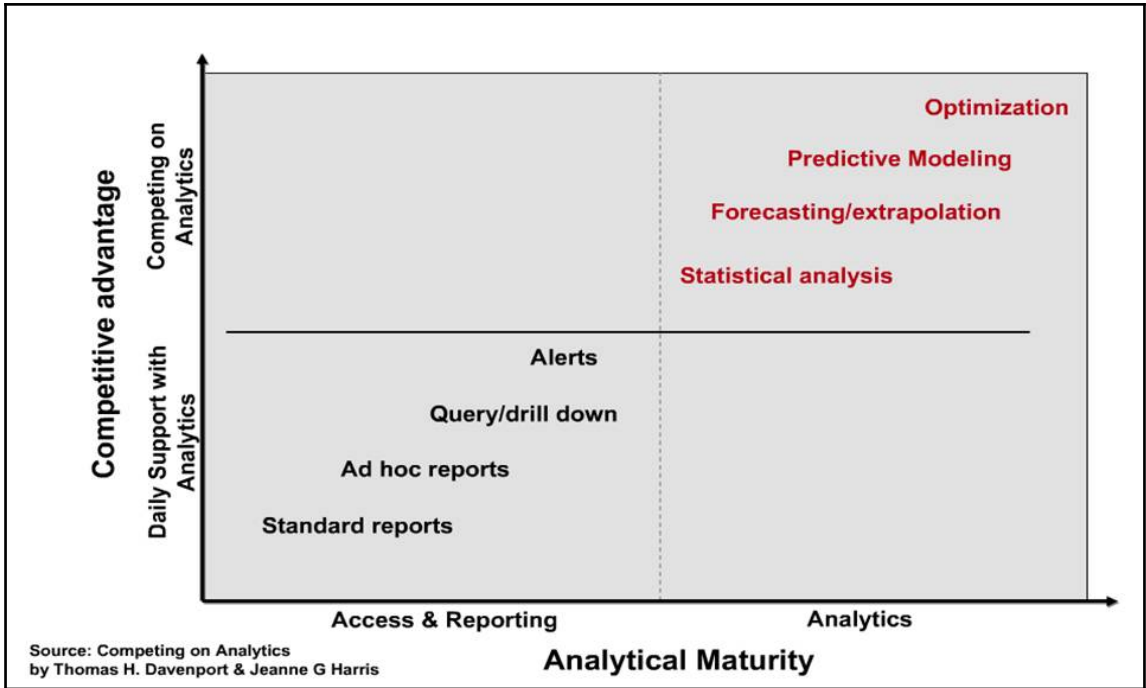


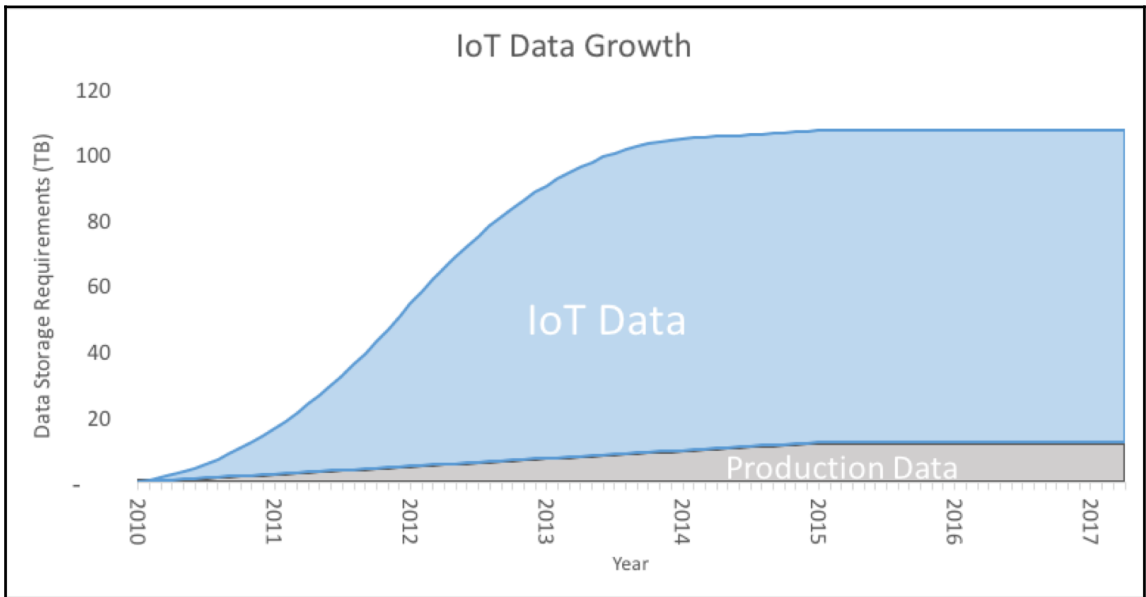
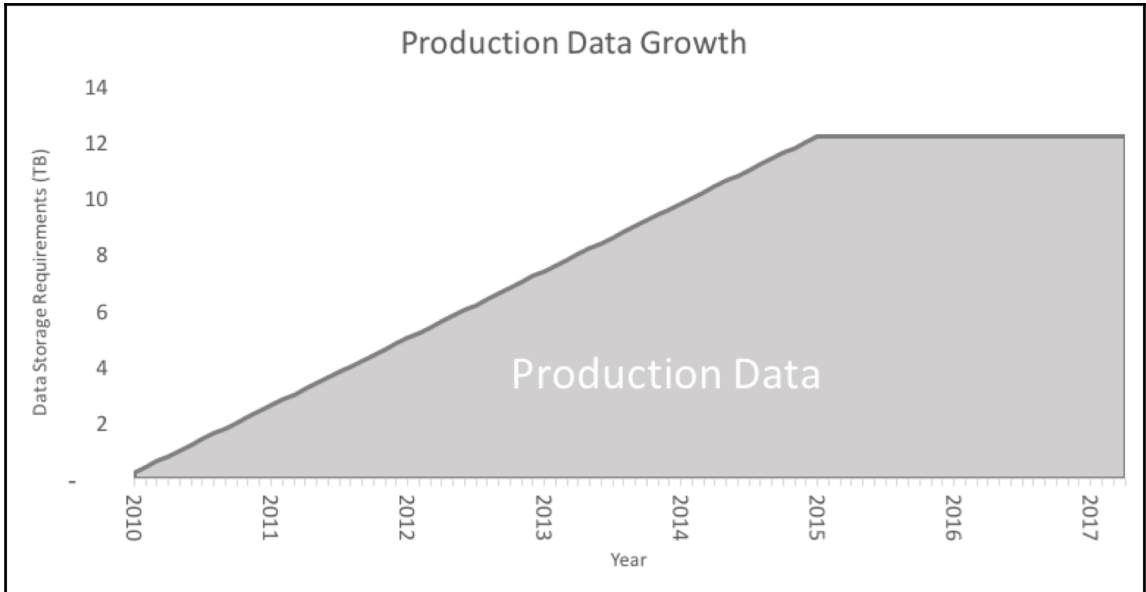
Graphic Bundle

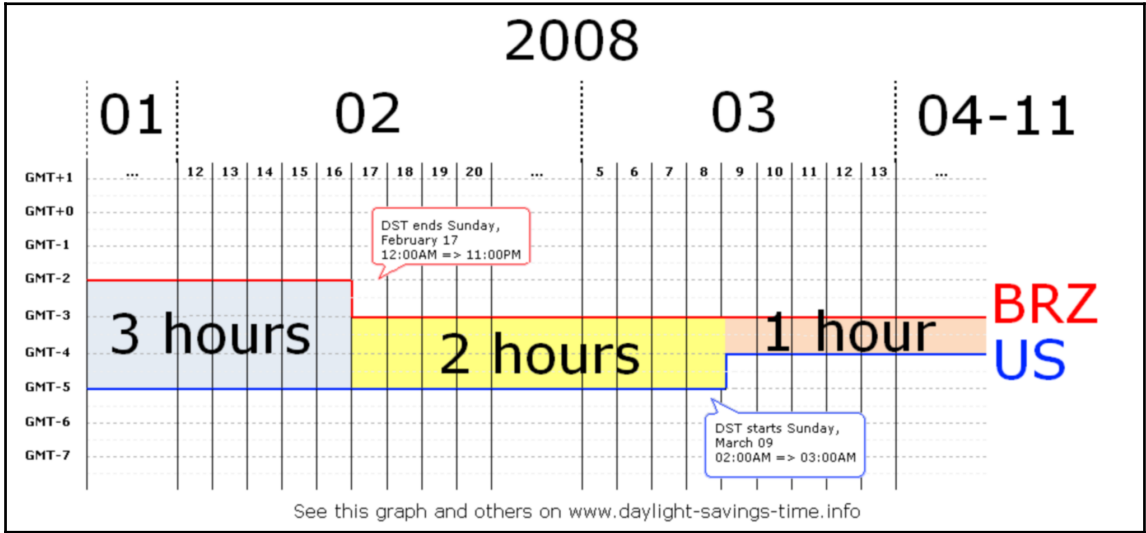
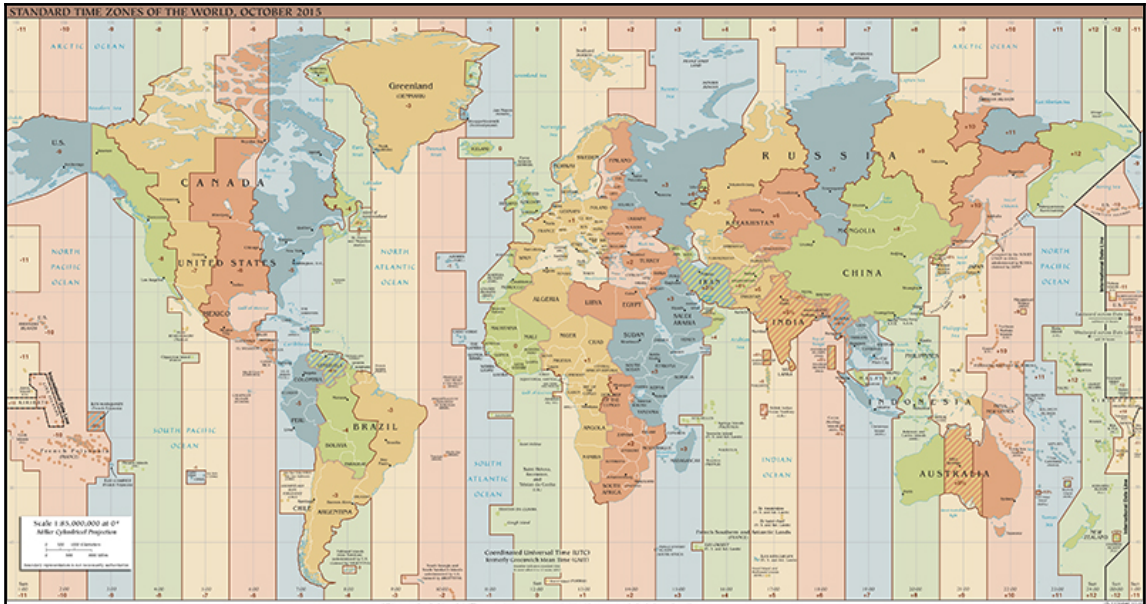
Chapter 1: Defining IoT Analytics and Challenges

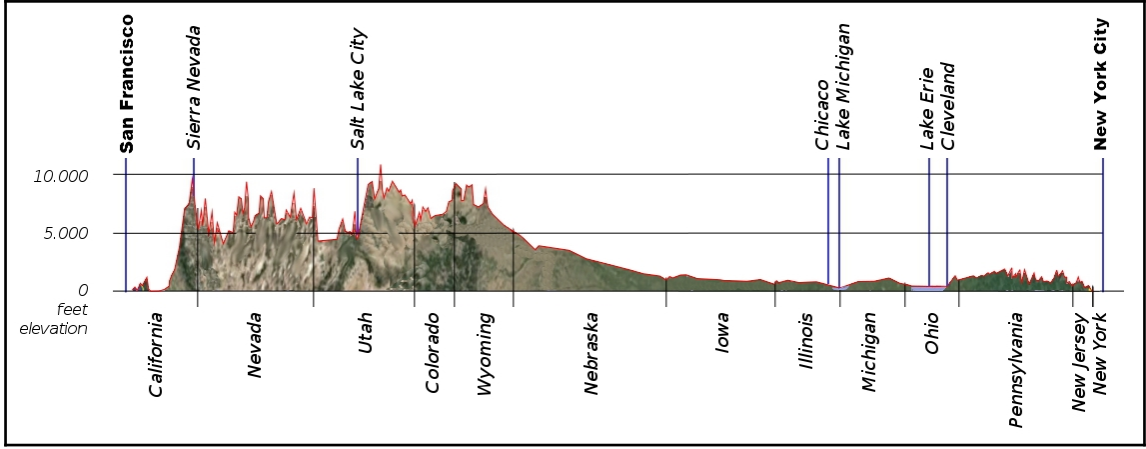
Name	Type	Compressed size	Password ...	Size	Ratio
20081023055305.plt	PLT File	13 KB	No	61 KB	80%
20081023234104.plt	PLT File	27 KB	No	135 KB	80%
20081024234405.plt	PLT File	83 KB	No	449 KB	82%
20081025231428.plt	PLT File	43 KB	No	231 KB	82%
20081026081229.plt	PLT File	37 KB	No	204 KB	83%
20081027111634.plt	PLT File	12 KB	No	53 KB	79%
20081027233029.plt	PLT File	8 KB	No	32 KB	78%
200810272335802.plt	PLT File	2 KB	No	7 KB	77%
20081028102805.plt	PLT File	10 KB	No	41 KB	78%
20081028233053.plt	PLT File	6 KB	No	22 KB	77%
20081028235048.plt	PLT File	4 KB	No	17 KB	77%
20081029110529.plt	PLT File	11 KB	No	47 KB	79%
20081029234123.plt	PLT File	26 KB	No	126 KB	80%
20081030233959.plt	PLT File	21 KB	No	94 KB	79%
20081101004235.plt	PLT File	44 KB	No	234 KB	82%
20081102030834.plt	PLT File	24 KB	No	122 KB	81%
20081102233452.plt	PLT File	8 KB	No	34 KB	78%
20081103133204.plt	PLT File	7 KB	No	31 KB	78%
20081103233729.plt	PLT File	10 KB	No	42 KB	78%
20081104054859.plt	PLT File	24 KB	No	120 KB	80%
20081104234436.plt	PLT File	11 KB	No	48 KB	79%
20081105110052.plt	PLT File	58 KB	No	360 KB	85%
20081106051423.plt	PLT File	4 KB	No	17 KB	78%
20081106133604.plt	PLT File	8 KB	No	35 KB	78%
20081106233404.plt	PLT File	37 KB	No	184 KB	81%
20081108034358.plt	PLT File	46 KB	No	240 KB	81%

39. 984702,116. 318417,0,492,39744.1201851852,2008-10-23,02:53:04
39. 984683,116. 31845,0,492,39744.1202546296,2008-10-23,02:53:10
39. 984686,116. 318417,0,492,39744.1203125,2008-10-23,02:53:15
39. 984688,116. 318385,0,492,39744.1203703704,2008-10-23,02:53:20
39. 984655,116. 318263,0,492,39744.1204282407,2008-10-23,02:53:25
39. 984611,116. 318026,0,493,39744.1204861111,2008-10-23,02:53:30
39. 984608,116. 317761,0,493,39744.1205439815,2008-10-23,02:53:35
39. 984563,116. 317517,0,496,39744.1206018519,2008-10-23,02:53:40
39. 984539,116. 317294,0,500,39744.1206597222,2008-10-23,02:53:45
39. 984606,116. 317065,0,505,39744.1207175926,2008-10-23,02:53:50
39. 984568,116. 316911,0,510,39744.120775463,2008-10-23,02:53:55
39. 984586,116. 316716,0,515,39744.1208333333,2008-10-23,02:54:00
39. 984561,116. 316527,0,520,39744.1208912037,2008-10-23,02:54:05
39. 984536,116. 316354,0,525,39744.1209490741,2008-10-23,02:54:10
39. 984523,116. 316188,0,531,39744.1210069444,2008-10-23,02:54:15
39. 984516,116. 315963,0,536,39744.1210648148,2008-10-23,02:54:20
39. 984523,116. 315823,0,541,39744.1211226852,2008-10-23,02:54:25
39. 984574,116. 315611,0,546,39744.1211805556,2008-10-23,02:54:30
39. 984568,116. 315407,0,551,39744.1212384259,2008-10-23,02:54:35
39. 984538,116. 315148,0,556,39744.1212962963,2008-10-23,02:54:40
39. 984501,116. 314907,0,560,39744.1213541667,2008-10-23,02:54:45
39. 984532,116. 314808,0,564,39744.121412037,2008-10-23,02:54:50
39. 984504,116. 314625,0,569,39744.1214699074,2008-10-23,02:54:55
39. 984485,116. 314426,0,574,39744.1215277778,2008-10-23,02:55:00
39. 984427,116. 31424,0,579,39744.1215856481,2008-10-23,02:55:05
39. 984485,116. 314042,0,584,39744.1216435185,2008-10-23,02:55:10
39. 98448,116. 313818,0,589,39744.1217013889,2008-10-23,02:55:15
39. 984501,116. 313659,0,595,39744.1217592593,2008-10-23,02:55:20
39. 984618,116. 314323,0,113,39744.1218171296,2008-10-23,02:55:25
39. 984649,116. 314107,0,117,39744.121875,2008-10-23,02:55:30
39. 984621,116. 313941,0,121,39744.1219328704,2008-10-23,02:55:35
39. 984655,116. 313724,0,126,39744.1219907407,2008-10-23,02:55:40
39. 984681,116. 313521,0,129,39744.1220486111,2008-10-23,02:55:45
39. 984708,116. 313311,0,133,39744.1221064815,2008-10-23,02:55:50
39. 984708,116. 313099,0,137,39744.1221643519,2008-10-23,02:55:55
39. 984696,116. 312921,0,144,39744.1222222222,2008-10-23,02:56:00
39. 984677,116. 312746,0,153,39744.1222800926,2008-10-23,02:56:05
39. 984682,116. 312525,0,155,39744.122337963,2008-10-23,02:56:10
39. 984649,116. 312332,0,158,39744.1223958333,2008-10-23,02:56:15
39. 984641,116. 312123,0,164,39744.1224537037,2008-10-23,02:56:20
39. 984647,116. 311917,0,170,39744.1225115741,2008-10-23,02:56:25
39. 984654,116. 31172,0,178,39744.1225694444,2008-10-23,02:56:30
39. 984631,116. 311569,0,180,39744.1226273148,2008-10-23,02:56:35
39. 984647,116. 31138,0,184,39744.1226851852,2008-10-23,02:56:40
39. 984653,116. 311189,0,194,39744.1227430556,2008-10-23,02:56:45
39. 984628,116. 311026,0,206,39744.1228009259,2008-10-23,02:56:50
39. 984652,116. 310854,0,214,39744.1228587963,2008-10-23,02:56:55

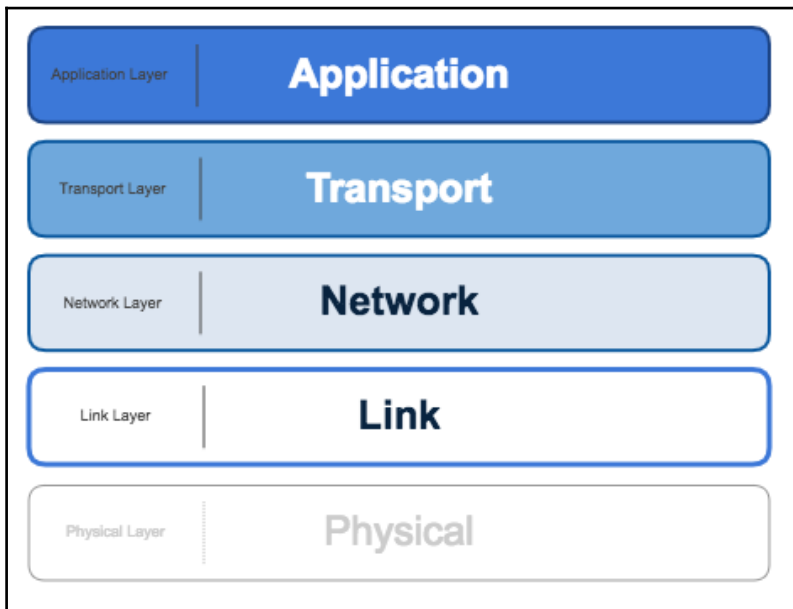


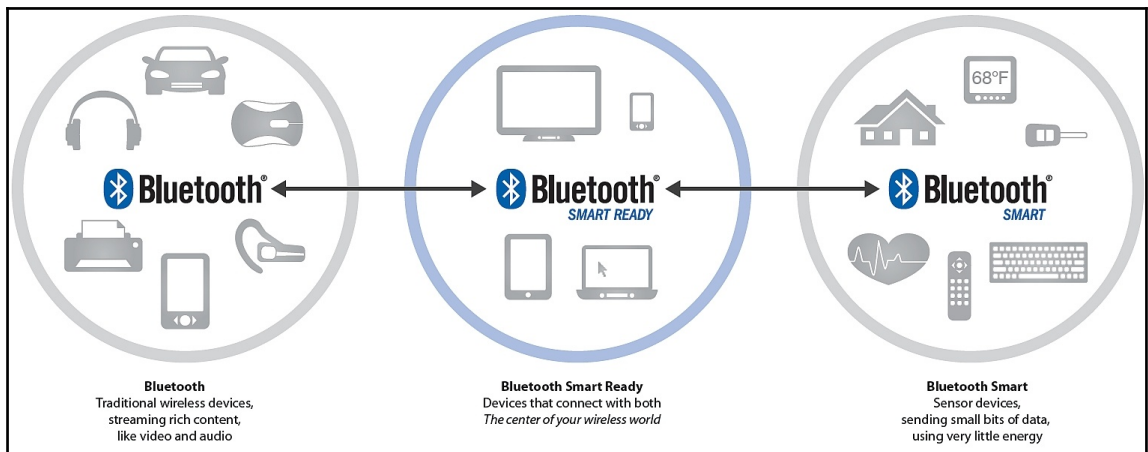
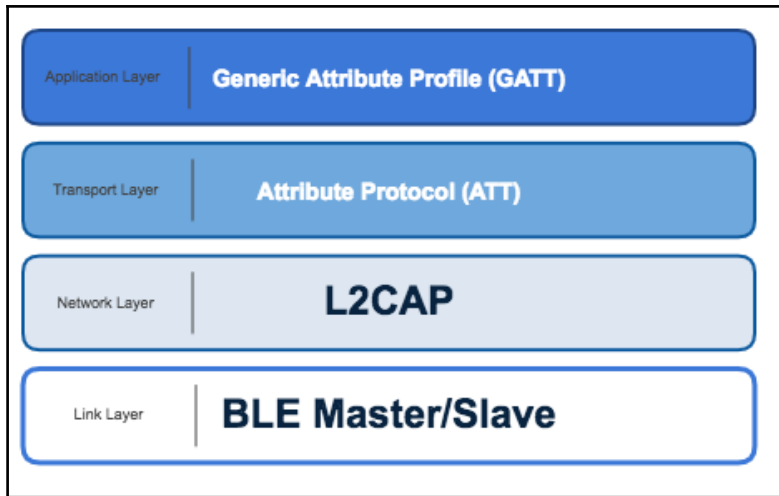


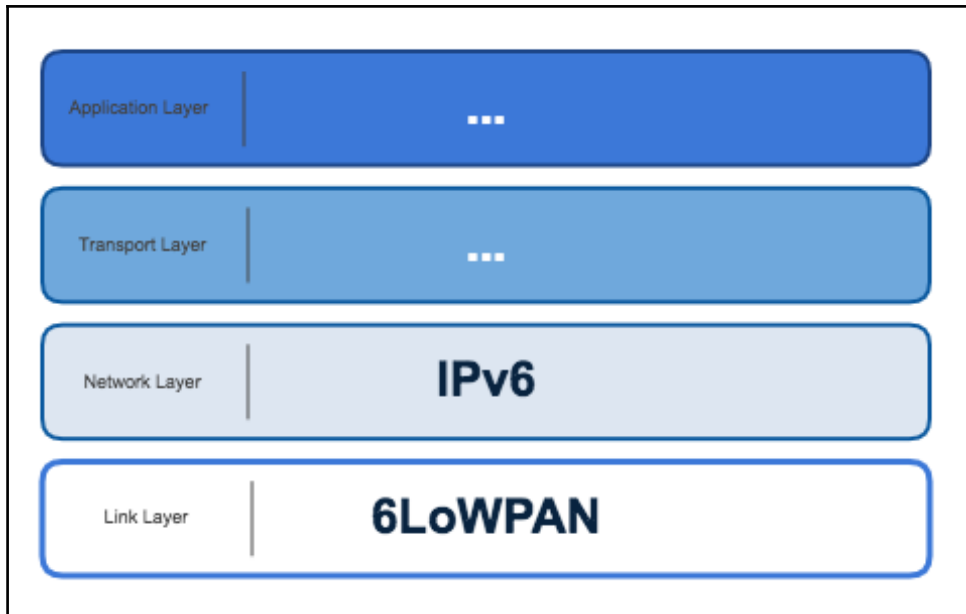


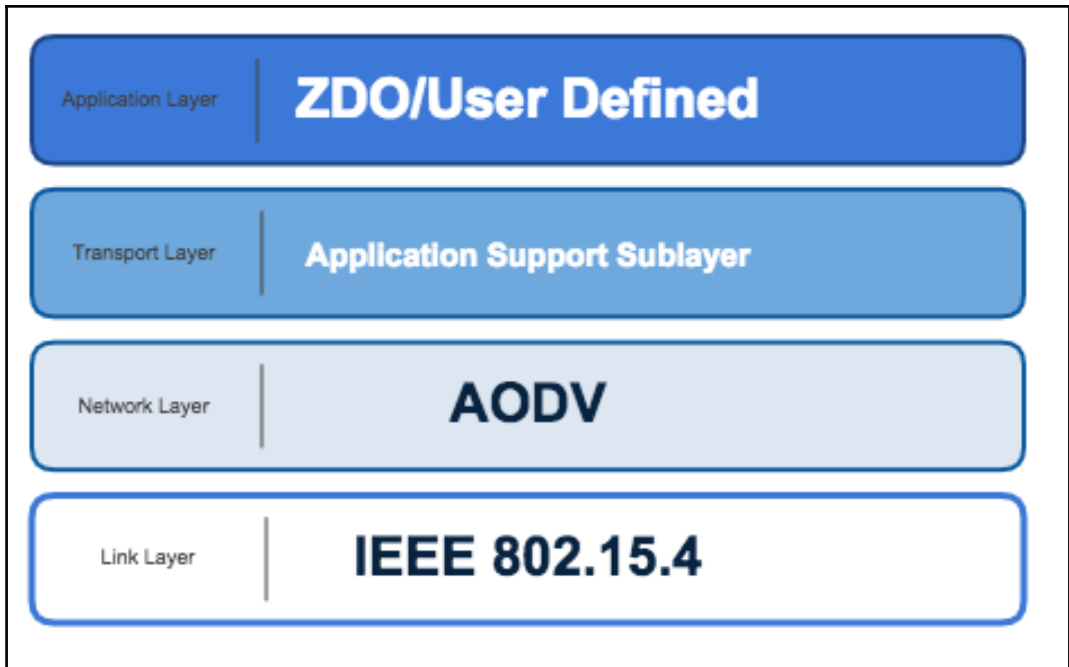


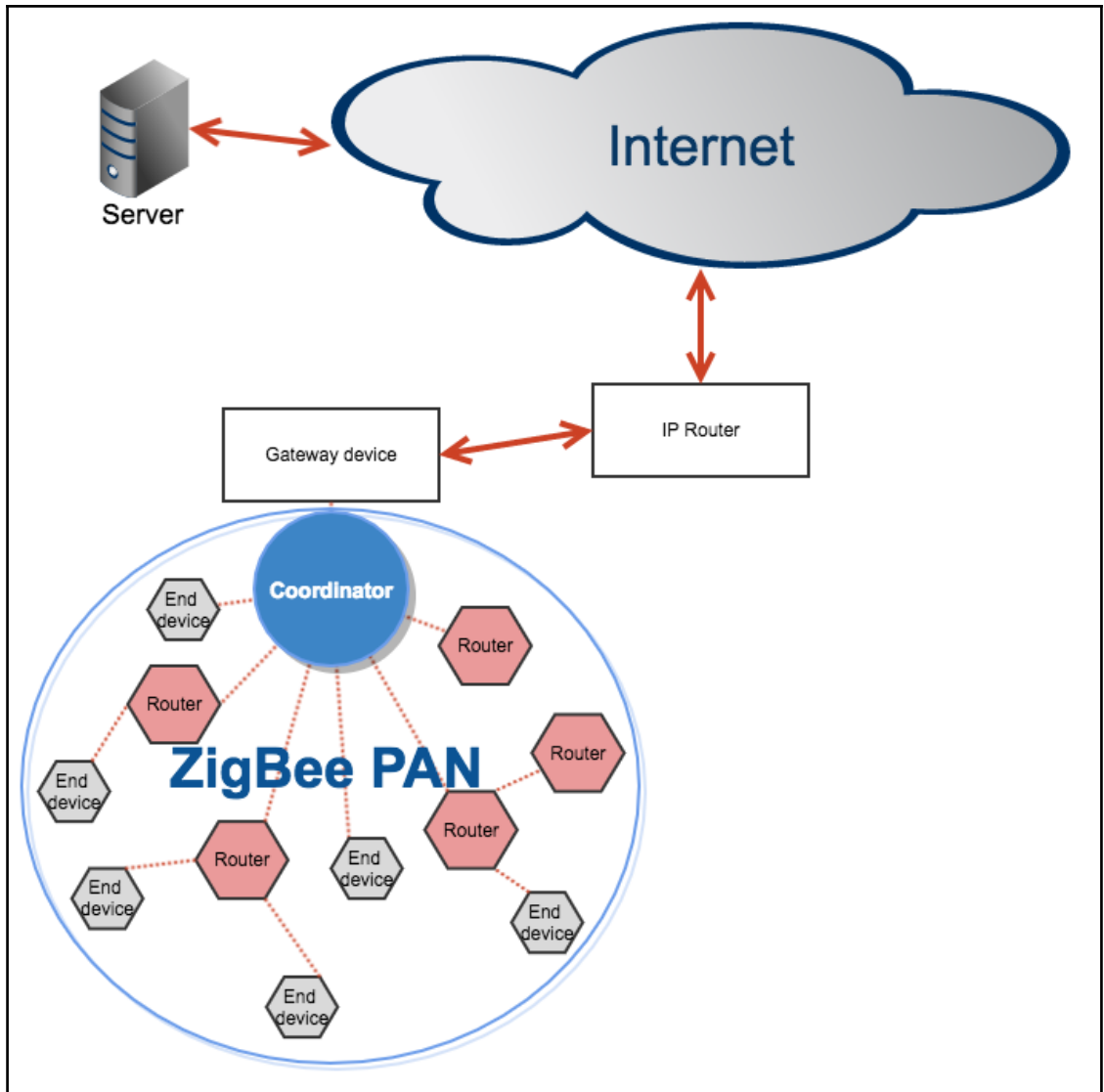
Chapter 2: IoT Devices and Networking Protocols



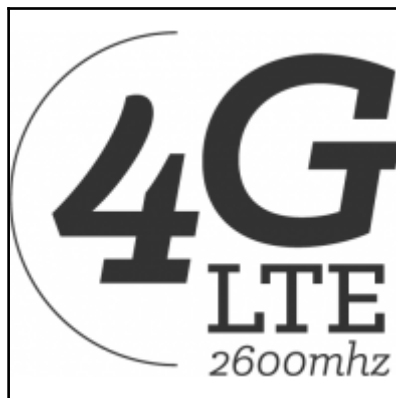
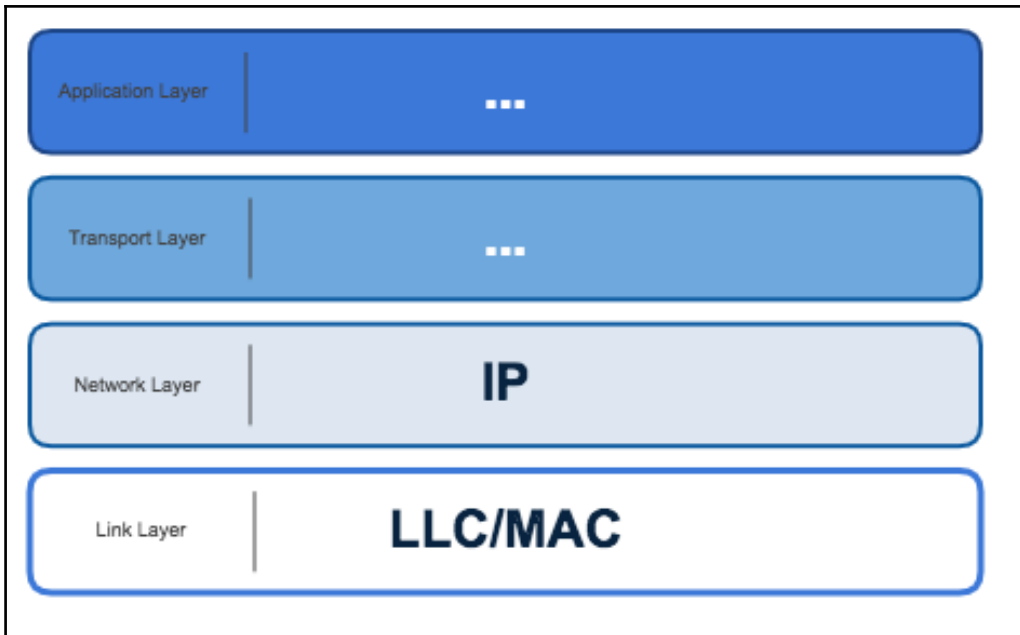


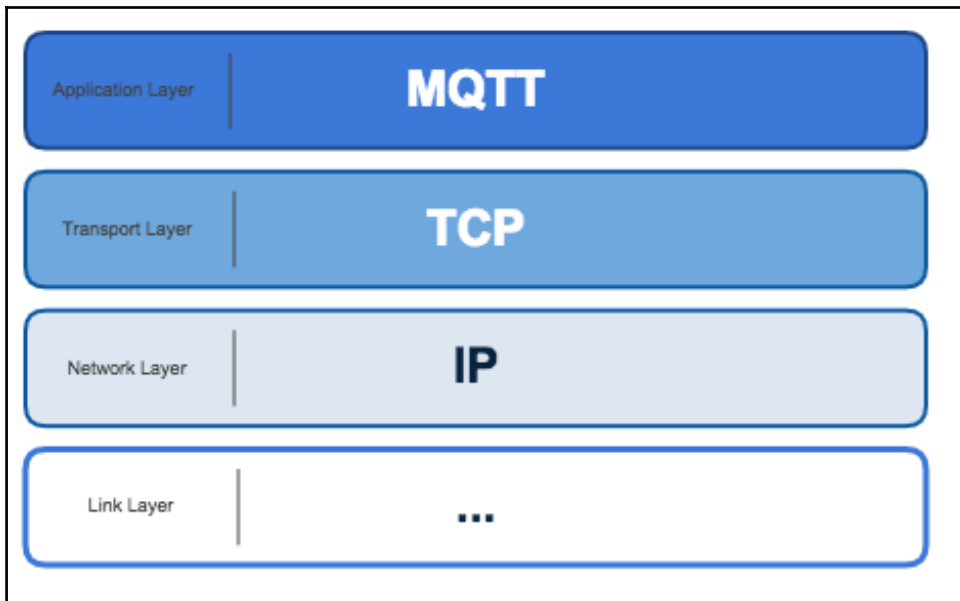
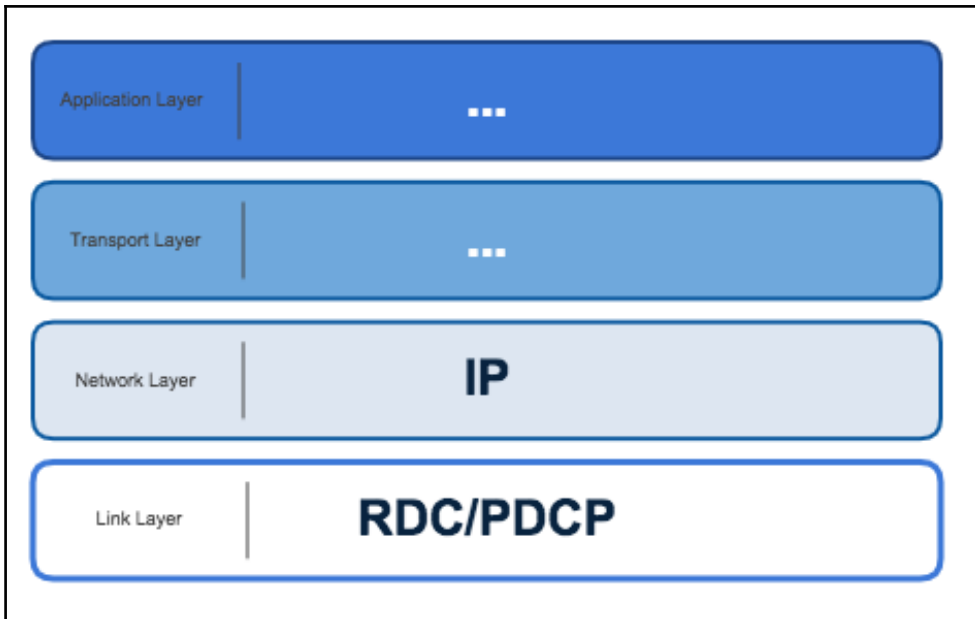




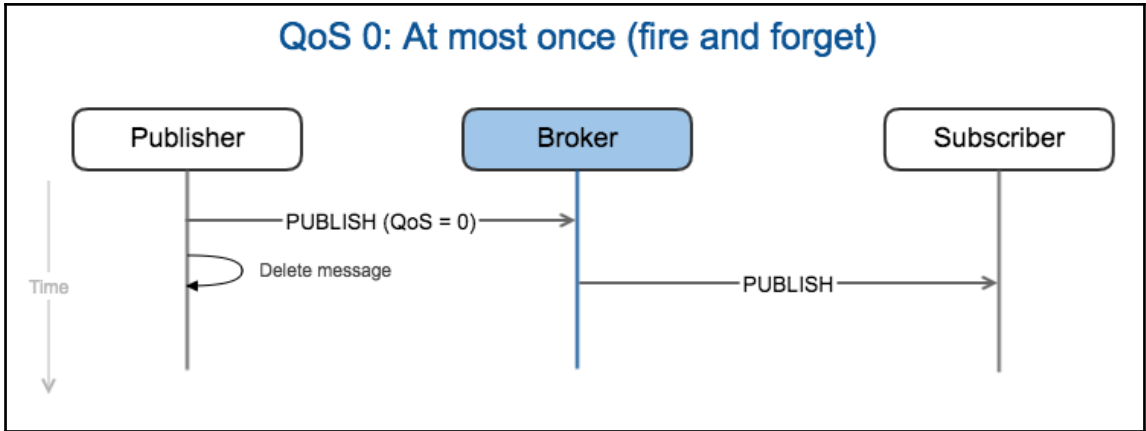




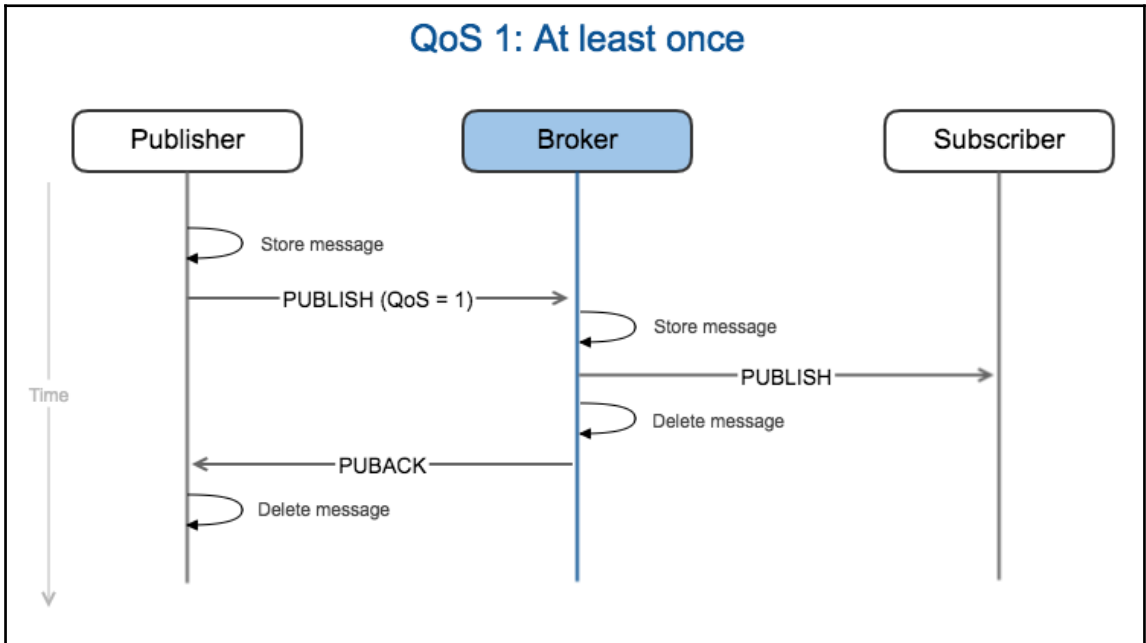




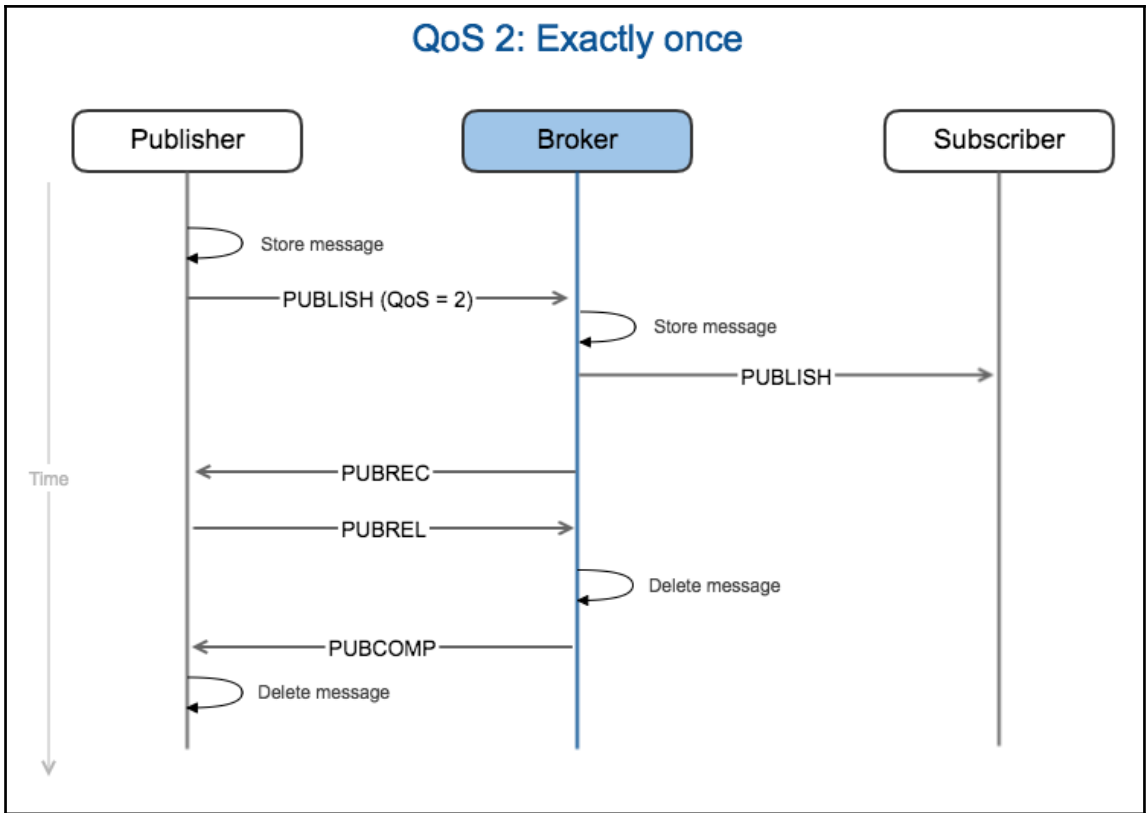
QoS 0: At most once (fire and forget)

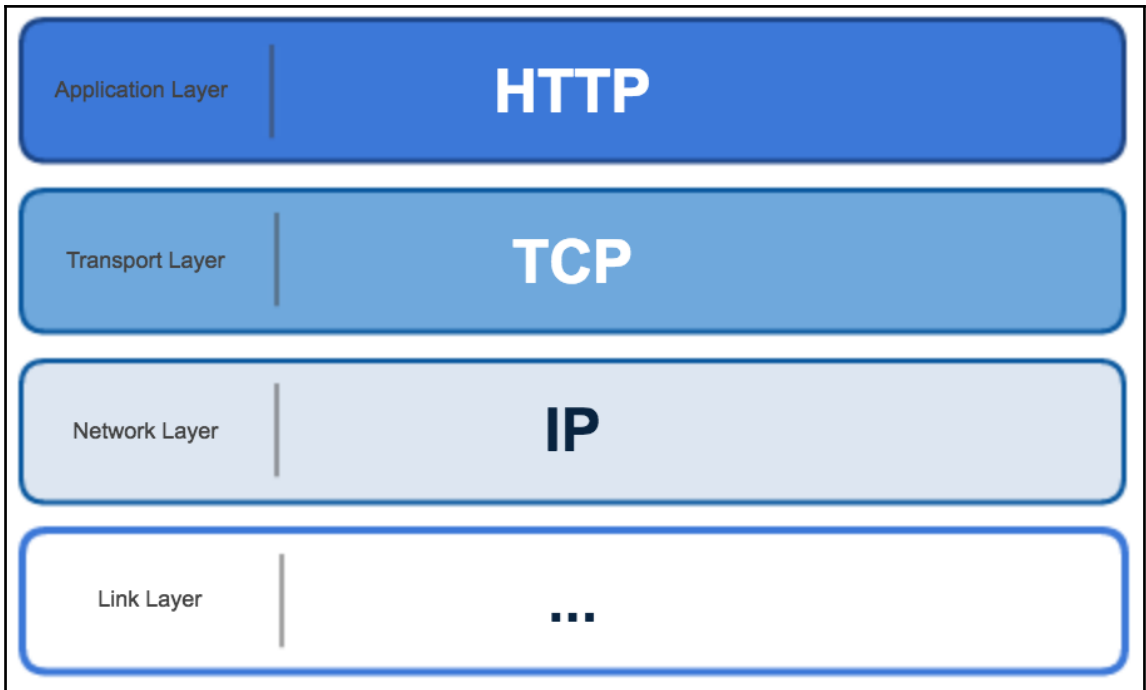


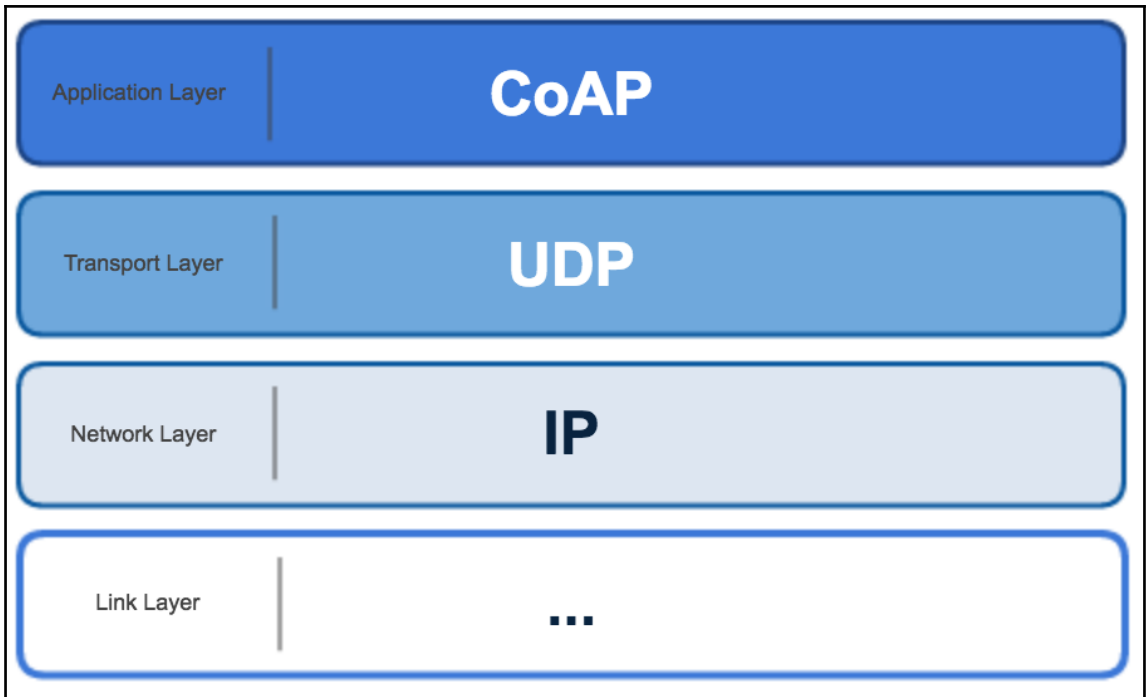
QoS 1: At least once

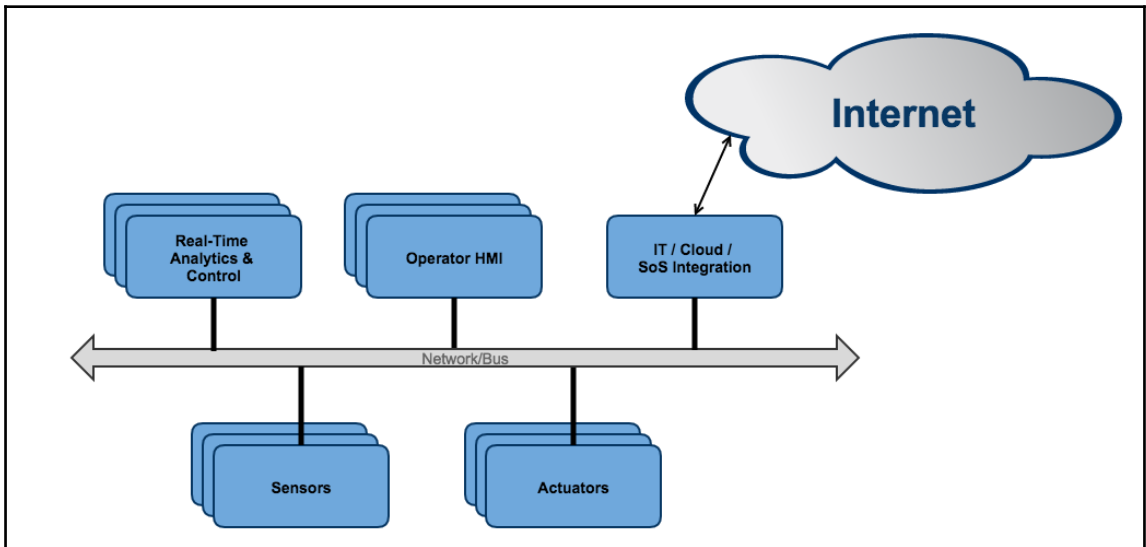
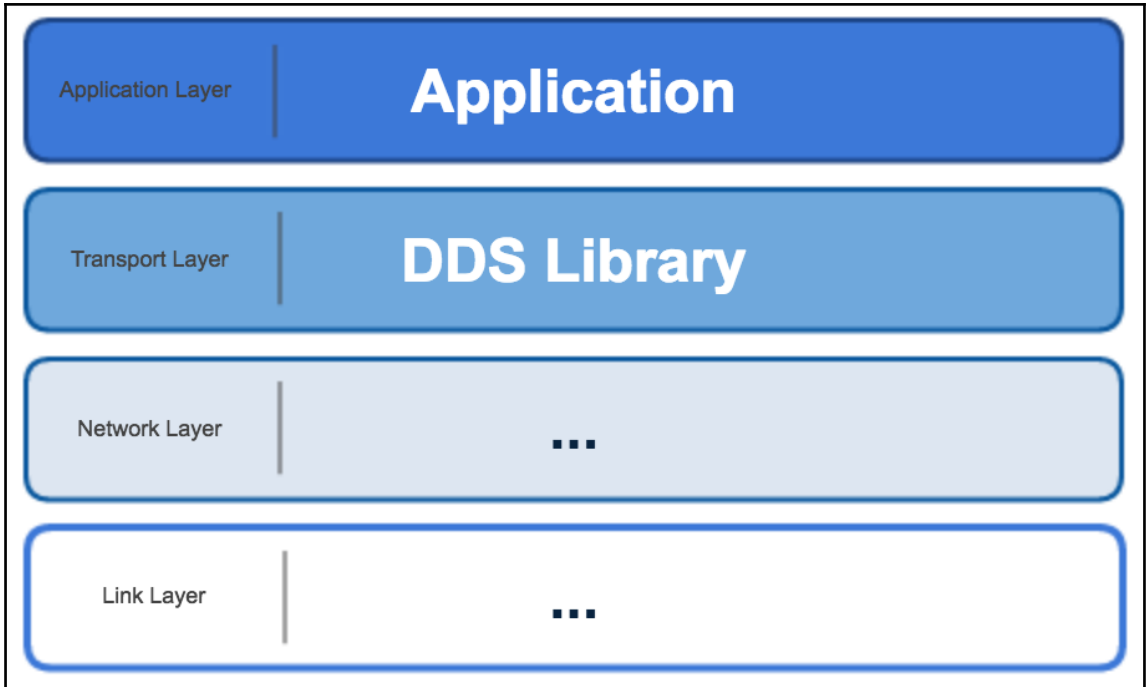


QoS 2: Exactly once

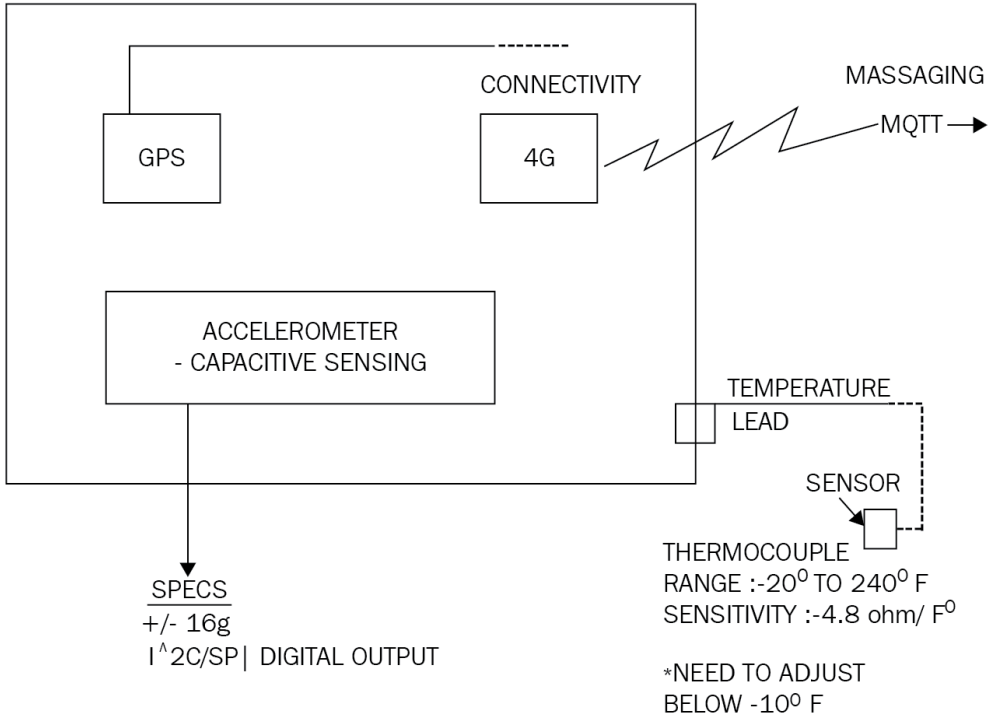








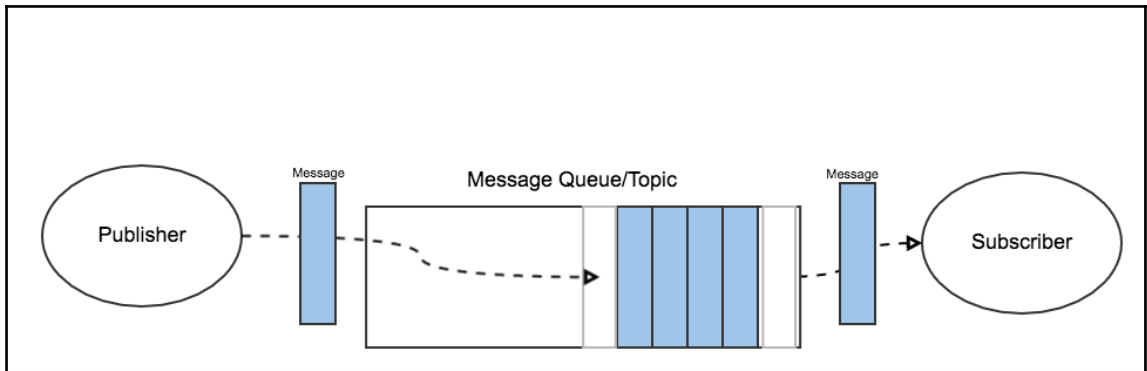
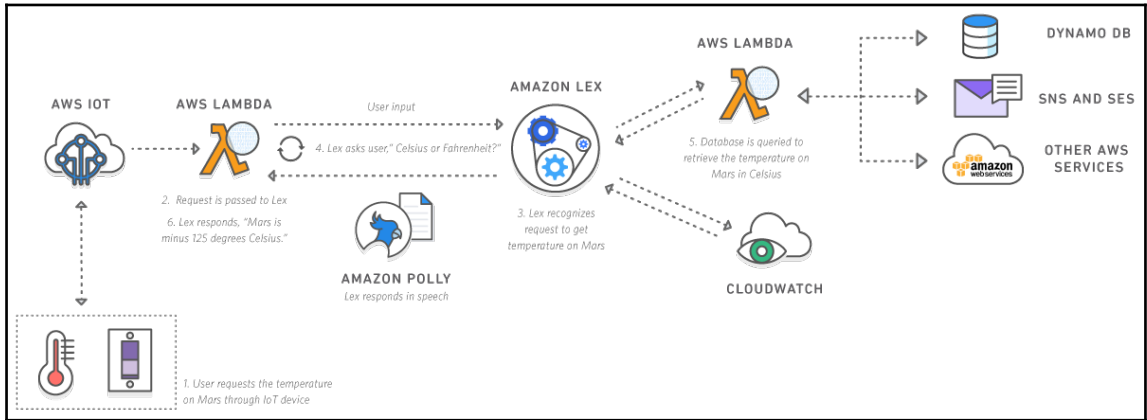
MY IOT DEVICE

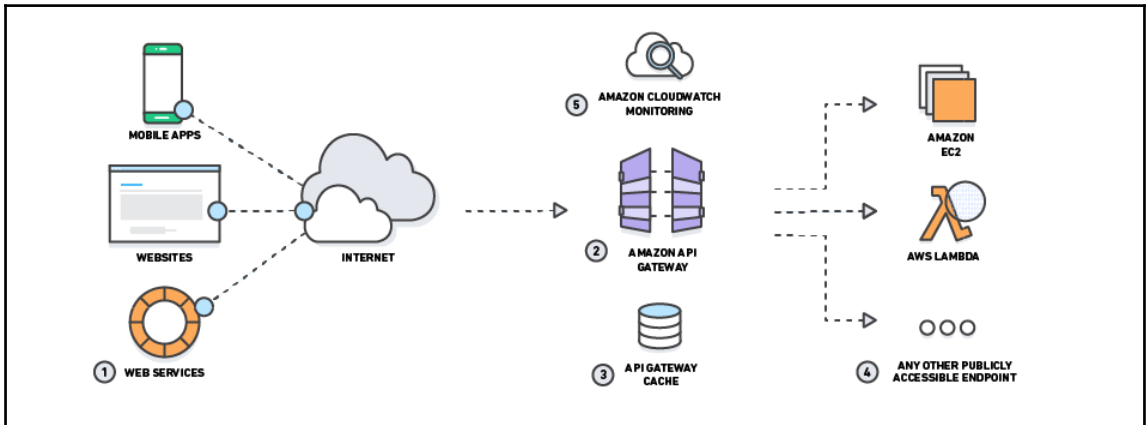
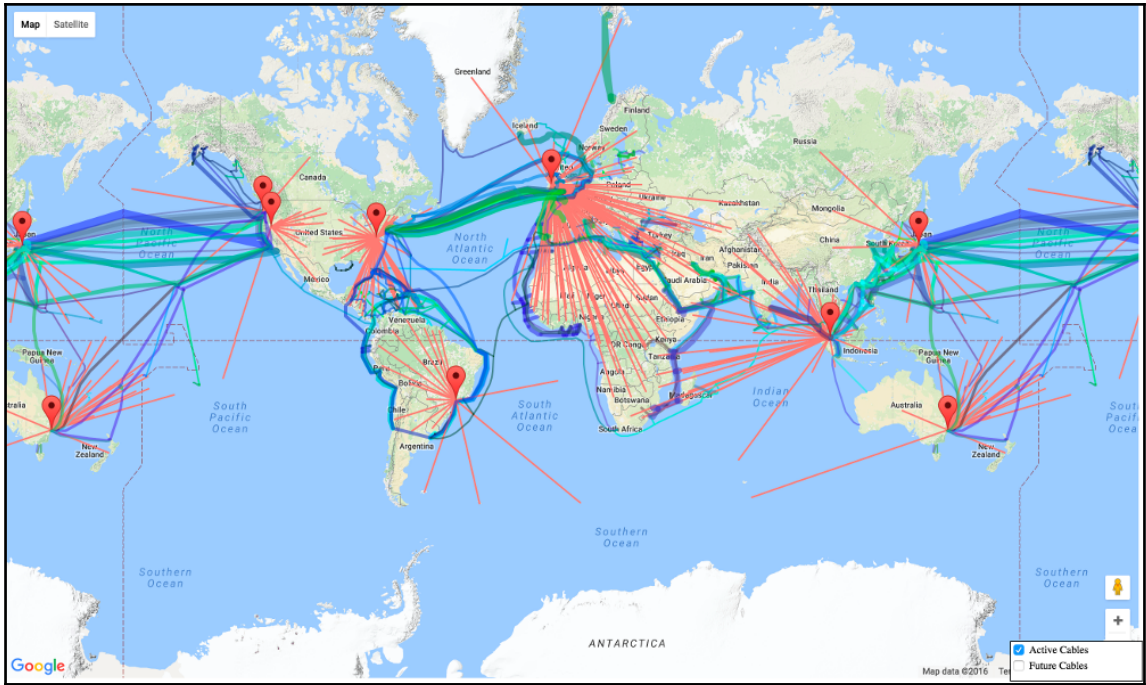




IoT Box Installed Here

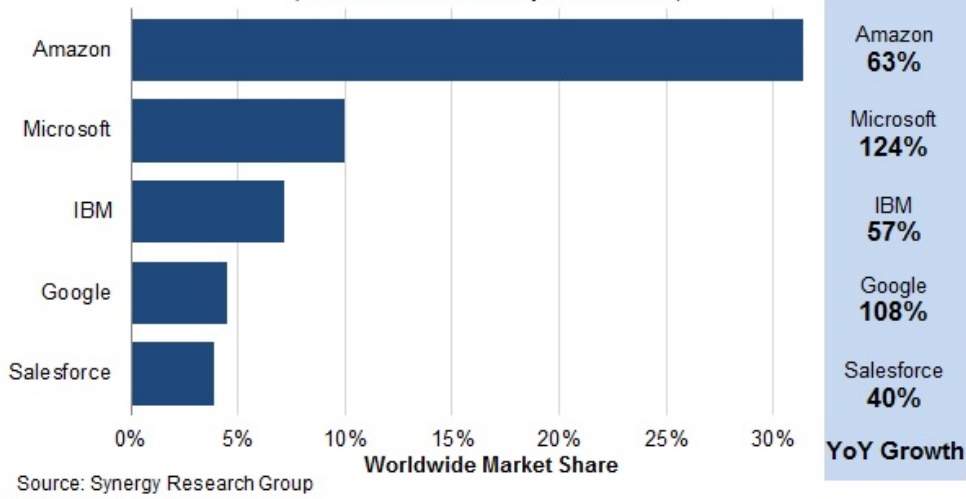
Chapter 3: IoT Analytics for the Cloud





Cloud Infrastructure Services - Q4 2015 Market Share & Revenue Growth

(IaaS, PaaS, Private & Hybrid combined)



Compute

Amazon EC2
Amazon EC2 Container Registry
Amazon EC2 Container Service
Amazon Lightsail
Amazon VPC
AWS Batch
AWS Elastic Beanstalk
AWS Lambda
Auto Scaling
Elastic Load Balancing

Storage

Amazon Simple Storage Service (S3)
Amazon Elastic Block Storage (EBS)
Amazon Elastic File System (EFS)
Amazon Glacier
AWS Storage Gateway
AWS Snowball
AWS Snowball Edge
AWS Snowmobile

Database

Amazon Aurora
Amazon RDS
Amazon DynamoDB
Amazon ElastiCache
Amazon Redshift
AWS Database Migration Service

Migration

AWS Database Migration Service
AWS Server Migration Service
AWS Snowball
AWS Snowball Edge
AWS Snowmobile

Networking & Content Delivery

Amazon VPC
Amazon CloudFront
Amazon Route 53
AWS Direct Connect
Elastic Load Balancing

Developer Tools

AWS CodeCommit
AWS CodeBuild
AWS CodeDeploy
AWS CodePipeline
AWS X-Ray
AWS Command Line Interface

Management Tools

Amazon CloudWatch
Amazon EC2 Systems Manager
AWS CloudFormation
AWS CloudTrail
AWS Config
AWS OpsWorks
AWS Service Catalog
AWS Trusted Advisor
AWS Personal Health Dashboard
AWS Command Line Interface
AWS Management Console
AWS Managed Services

Security & Identity, Compliance

AWS Identity and Access Management (IAM)
Amazon Inspector
AWS Certificate Manager
AWS CloudHSM
AWS Directory Service
AWS Key Management Service
AWS Organizations
AWS Shield
AWS WAF
AWS Artifact

Analytics

Amazon Athena
Amazon EMR
Amazon CloudSearch
Amazon Elasticsearch Service
Amazon Kinesis
Amazon Redshift
Amazon QuickSight
AWS Data Pipeline
AWS Glue

Artificial Intelligence

Amazon Lex
Amazon Polly
Amazon Rekognition
Amazon Machine Learning

Mobile Services

AWS Mobile Hub
Amazon API Gateway
Amazon Cognito
Amazon Pinpoint
AWS Device Farm
AWS Mobile SDK

Application Services

AWS Step Functions
Amazon API Gateway
Amazon Elastic Transcoder
Amazon AppStream

Messaging

Amazon SQS
Amazon Pinpoint
Amazon SES
Amazon SNS

Business Productivity

Amazon WorkDocs
Amazon WorkMail

Desktop & App Streaming

Amazon WorkSpaces
Amazon AppStream 2.0

Software

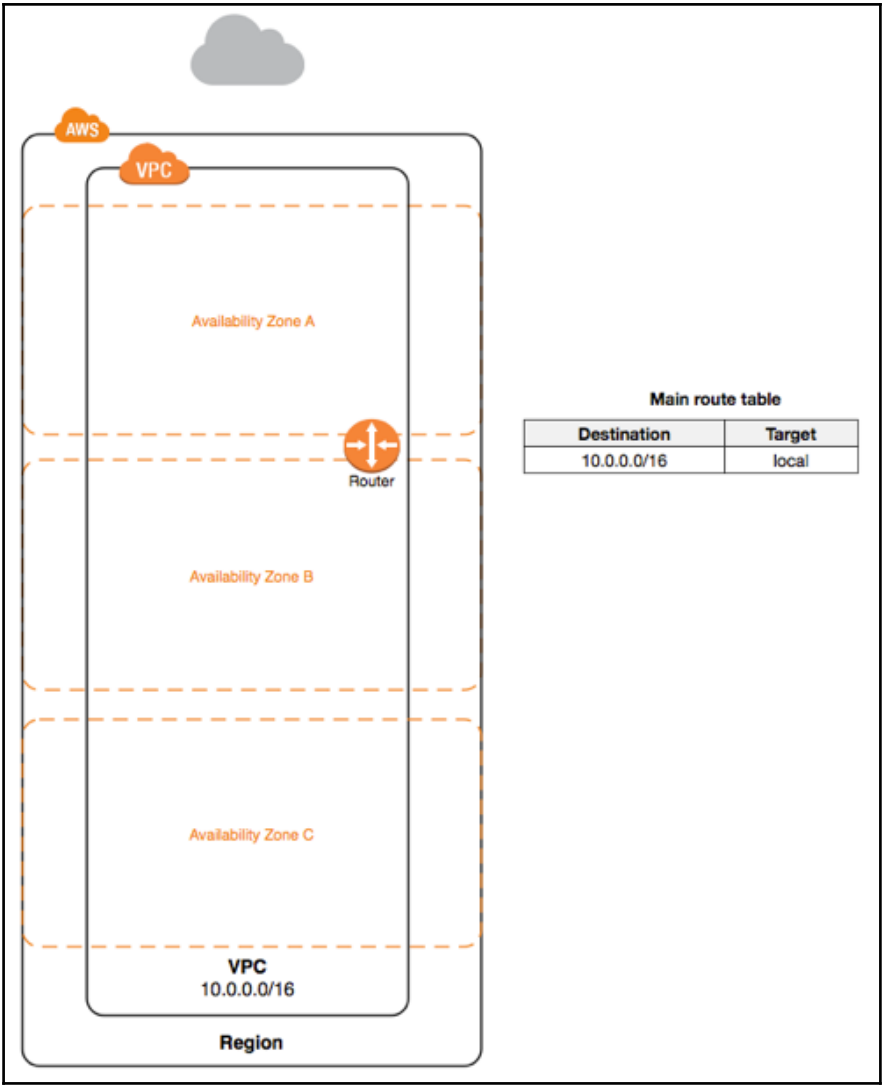
AWS Marketplace

Internet of Things

AWS IoT Platform
AWS Greengrass
AWS IoT Button

Game Development

Amazon Lumberyard



Main route table

Destination	Target
10.0.0.0/16	local

M4



M4 instances are the latest generation of General Purpose Instances. This family provides a balance of compute, memory, and network resources, and it is a good choice for many applications.

Features:

- 2.3 GHz Intel Xeon® E5-2686 v4 (Broadwell) processors or 2.4 GHz Intel Xeon® E5-2676 v3 (Haswell) processors
- EBS-optimized by default at no additional cost
- Support for Enhanced Networking
- Balance of compute, memory, and network resources

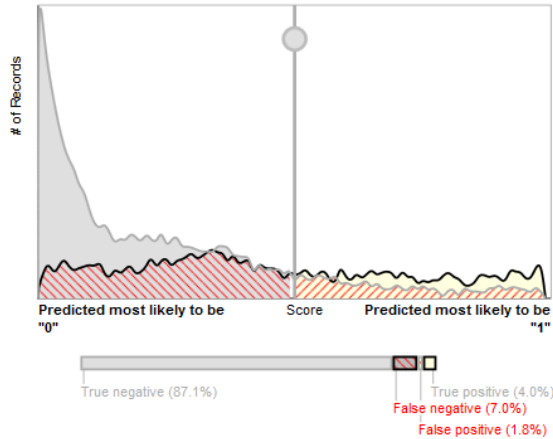
Model	vCPU	Mem (GiB)	SSD Storage (GB)	Dedicated EBS Bandwidth (Mbps)
m4.large	2	8	EBS-only	450
m4.xlarge	4	16	EBS-only	750
m4.2xlarge	8	32	EBS-only	1,000
m4.4xlarge	16	64	EBS-only	2,000
m4.10xlarge	40	160	EBS-only	4,000
m4.16xlarge	64	256	EBS-only	10,000

ML model performance

This chart shows the distributions of your predicted answers for the actual "1" and "0" records in your evaluation data. Any overlap of the actual "1"  & "0"  is where your ML model guesses wrong. [Learn more.](#)

Adjust the slider to indicate how much error you can tolerate from your ML model based on your needs. Moving the score threshold to the right decreases the number of false positives and increases the number of false negatives.

Explain this chart



Trade-off based on score threshold

[Reset score threshold \(0.5\)](#)

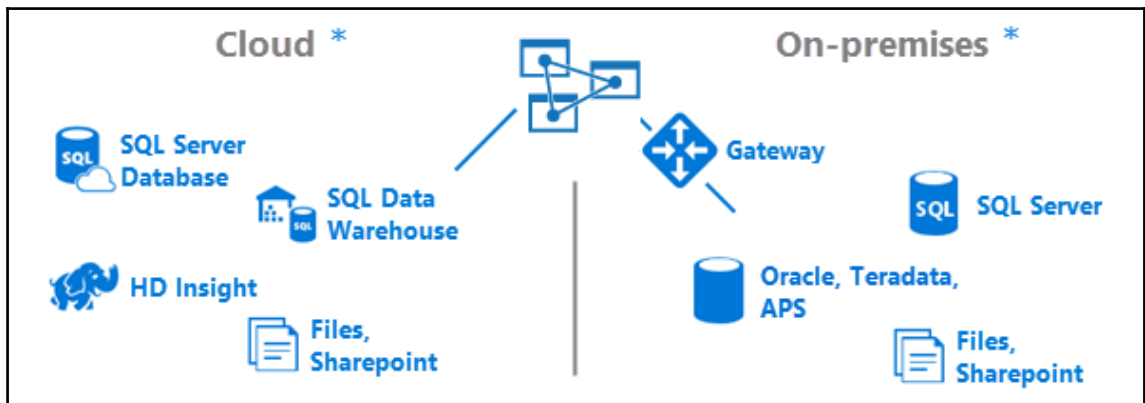
- **91% are correct**
500 true positive
10,766 true negative
- **9% are errors**
226 false positive
863 false negative

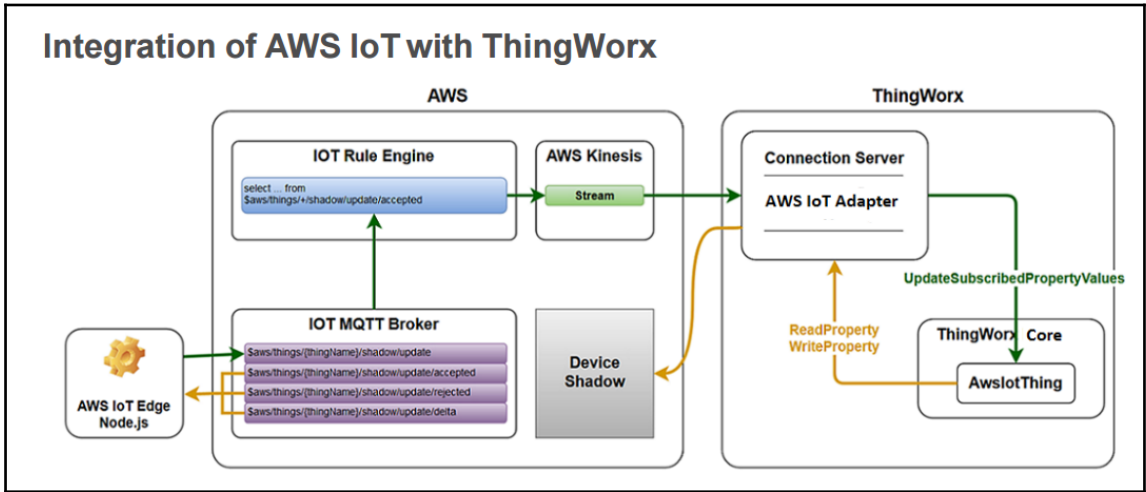
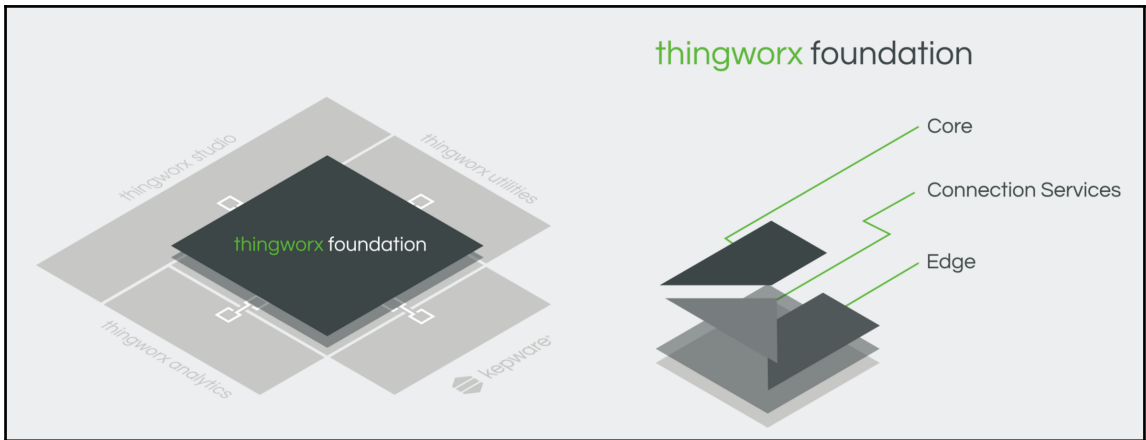
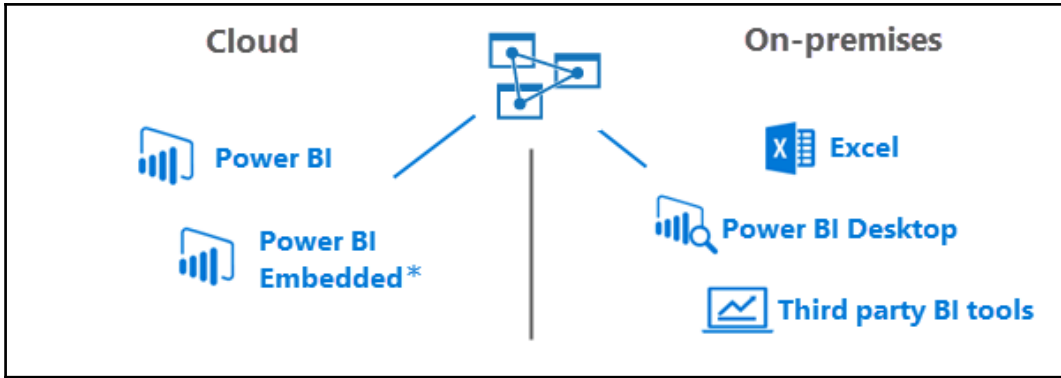
- 6% of the records are predicted as "1"
- 94% of the records are predicted as "0"

Save score threshold at 0.50

Advanced metrics

Accuracy 0.9119	0	<input type="range"/>	1
False positive rate 0.0206	0	<input type="range"/>	1
Precision 0.6887	0	<input type="range"/>	1
Recall 0.3668	0	<input type="range"/>	1





Chapter 4: Creating an AWS Cloud Analytics Environment

The screenshot displays the AWS CloudFormation console for a template named 'LAMP_Multi_AZ.template'. On the left, a 'Resource types' sidebar lists categories like AutoScaling, CloudFormation, CloudFront, CloudTrail, and CloudWatch. The main area shows a dependency graph with icons for IAM KeyPairs, IAM Roles, AutoScaling Groups, and EC2 instances. Below the diagram, the 'Parameters' tab is active, showing the following JSON snippet:

```
1- {
2-   "Parameters": {
3-     "KeyName": {
4-       "Description": "Name of an existing EC2 KeyPair to enable SSH access to the instances",
5-       "Type": "AWS::EC2::KeyPair::KeyName",
6-       "ConstraintDescription": "must be the name of an existing EC2 KeyPair."
7-     },
8-     "DBName": {
```

Security Status

5 out of 5 complete.

<input checked="" type="checkbox"/>	Delete your root access keys	▼
<input checked="" type="checkbox"/>	Activate MFA on your root account	▼
<input checked="" type="checkbox"/>	Create individual IAM users	▼
<input checked="" type="checkbox"/>	Use groups to assign permissions	▼
<input checked="" type="checkbox"/>	Apply an IAM password policy	▼

Services ▾ Resource Groups ▾ ☆ Oregon ▾ Support ▾

AWS services

Find a service by name (for example, EC2, S3, Elastic Beanstalk).

Recently visited services

- VPC
- EC2
- IAM
- CloudFormation

> All services

Build a solution

Featured next steps

- Manage your costs**
Get real-time billing alerts based on your cost and usage budgets. [Start now](#)
- Get best practices**
Use AWS Trusted Advisor for security, performance, cost and availability best practices. [Start now](#)

What's new?

Services ▾ Resource Groups ▾ ☆ Oregon ▾

AWS services

Find a service by name (for example, EC2, S3, Elastic Beanstalk).

Recently visited services

- VPC
- EC2
- IAM

Featured next steps

- Manage your costs**
Get real-time billing alerts based on your usage budgets. [Start now](#)

Services ▾ Resource Groups ▾ ☆ Oregon ▾

History

- Console Home
- Billing
- VPC
- EC2
- IAM
- CloudFormation

Search services

Compute	Developer Tools	Analytics	Application Services
EC2	CodeCommit	Athena	Step Functions
EC2 Container Service	CodeBuild	EMR	SWF
Lightsail	CodeDeploy	CloudSearch	API Gateway
Elastic Beanstalk	CodePipeline	Elasticsearch Service	Elastic Transcoder
Lambda		Kinesis	
Batch		Data Pipeline	
		QuickSight	
Storage	Management Tools	Artificial Intelligence	Messaging
S3	CloudWatch		SQS
	CloudFormation		SNS
	CloudTrail		SES

Services ▾ Resource Groups ▾ ★

EC2 Dashboard

- Events
- Tags
- Reports
- Limits
- INSTANCES
- Instances
- Spot Requests
- Reserved Instances

Resources

You are using the following Amazon EC2 resources in the US West (Oregon) region:

0 Running Instances	0 Elastic IPs
0 Dedicated Hosts	0 Snapshots
0 Volumes	0 Load Balancers
0 Key Pairs	0 Security Groups
0 Placement Groups	

Services ▾ Resource Groups ▾ ★

EC2 Dashboard

- Events
- Tags
- Reports

Create Key Pair Import Key Pair Delete

Filter by attributes or search by keyword

You do not have any Key Pairs in this region.

ated Hosts

S

Tasks

IC BLOCK STORE

es

shots

DRK & SECURITY

Create Key Pair

Key pair name:

Cancel Create

Services Resource Groups Oregon

History

Search services

Group

Compute

- EC2
- EC2 Container Service
- Lightsail
- Elastic Beanstalk
- Lambda
- Batch

Storage

- S3**
- EFS
- Glacier
- Storage Gateway

Developer Tools

- CodeCommit
- CodeBuild
- CodeDeploy
- CodePipeline

Management Tools

- CloudWatch
- CloudFormation
- CloudTrail
- Config
- OpsWorks
- Service Catalog

Analytics

- Athena
- EMR
- CloudSearch
- Elasticsearch Service
- Kinesis
- Data Pipeline
- QuickSight

Artificial Intelligence

- Lex
- Polly
- Rekognition

Application Services

- Step Functions
- SWF
- API Gateway
- Elastic Transcoder

Messaging

- SQS
- SNS
- SES

Business Productivity

- WorkDocs

Services Resource Groups

Create Bucket Actions

Create a Bucket - Select a Bucket Name and Region Cancel

A bucket is a container for objects stored in Amazon S3. When creating a bucket, you can choose a Region to optimize for latency, minimize costs, or address regulatory requirements. For more information regarding bucket naming conventions, please visit the [Amazon S3 documentation](#).

Bucket Name: analyticsforiot20170201

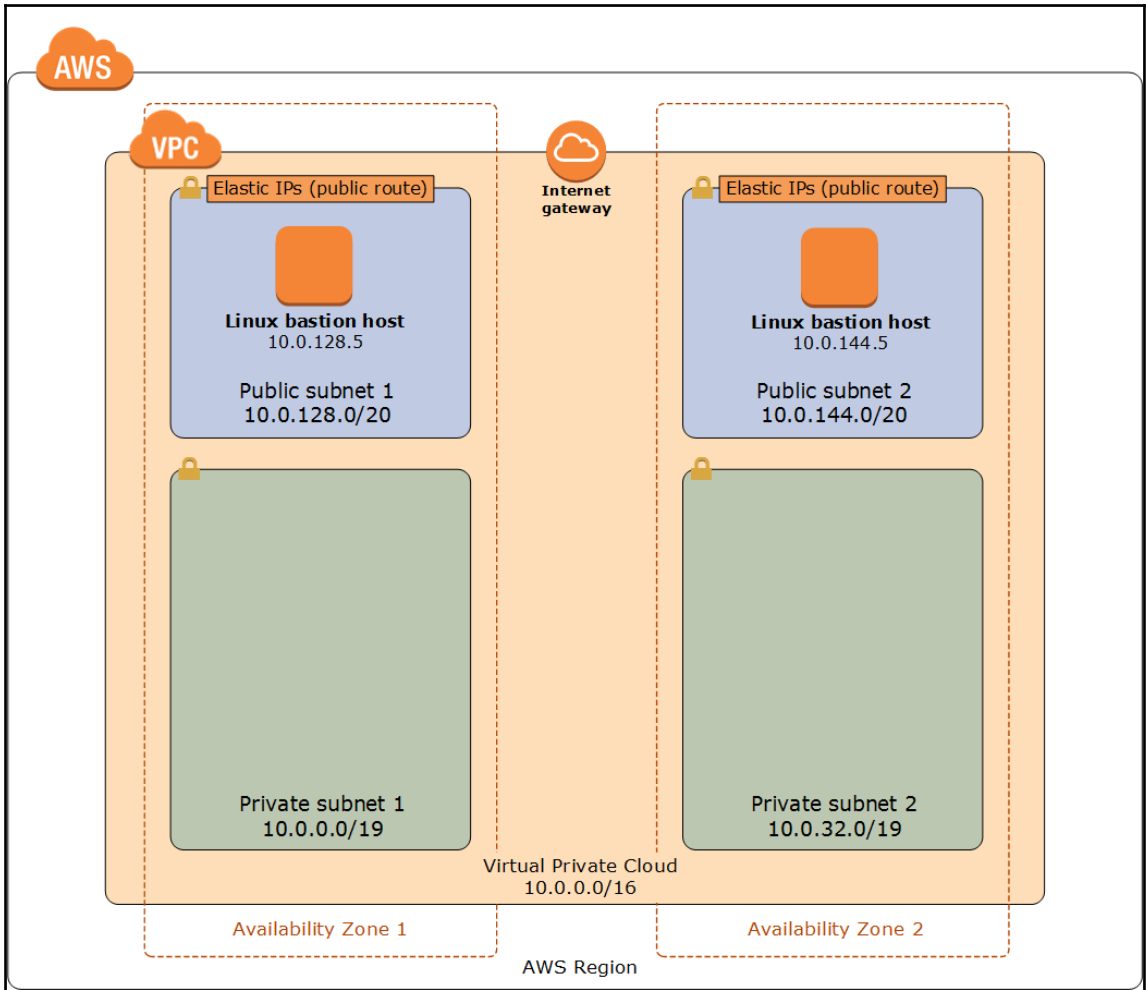
Region: Oregon

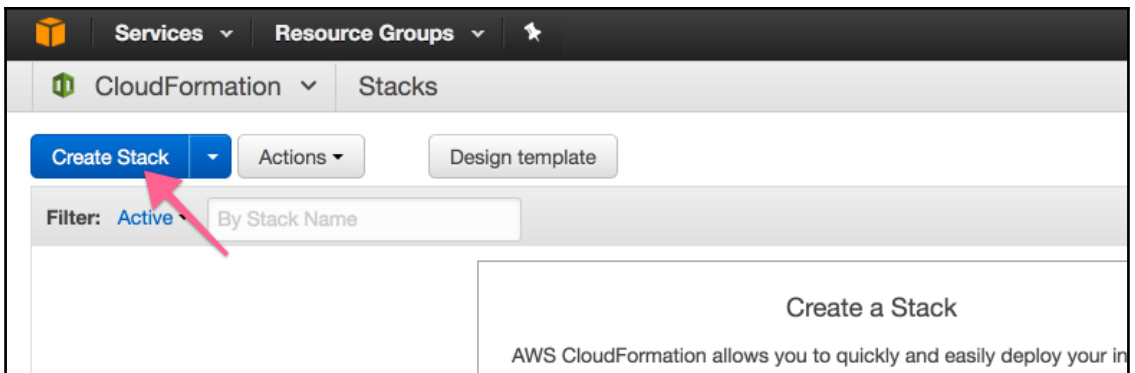
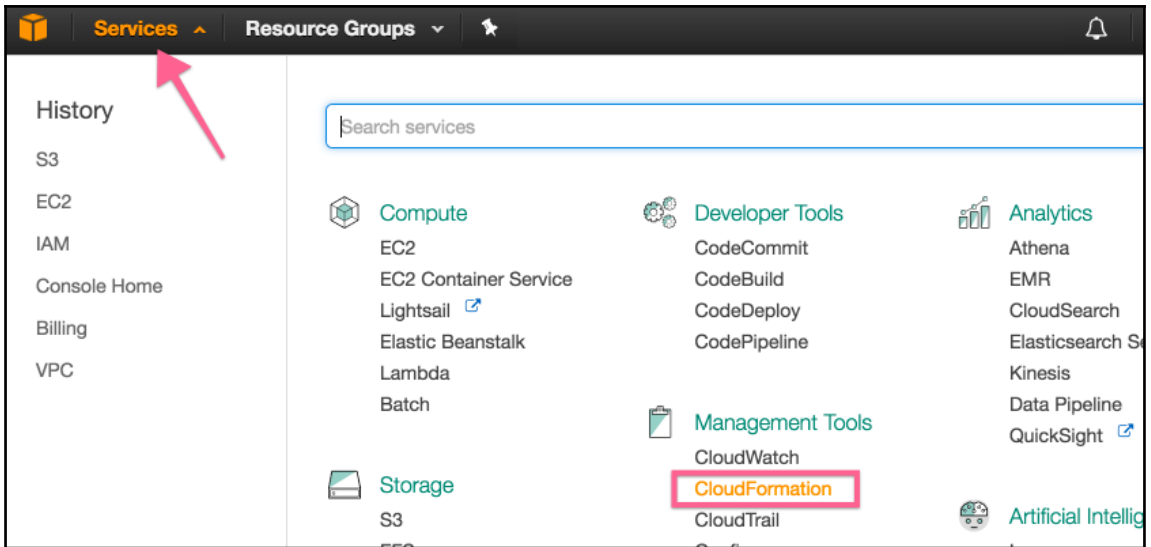
Set Up Logging > **Create** Cancel

Buttons: **Create Key Pair** | Import Key Pair | Delete

Filter by attributes or search by keyword

Key pair name	Fingerprint
vpc_keypair	██████████





Services ▾ Resource Groups ▾ ⌵ Andrew.Minteer @ minteer ▾ Oregon ▾ Support ▾

CloudFormation ▾ Stacks > Create Stack

Create stack

Select Template
Specify Details
Options
Review

Select Template

Select the template that describes the stack that you want to create. A stack is a group of related resources that you manage as a single unit.

Design a template Use AWS CloudFormation Designer to create or modify an existing template. [Learn more.](#)

Choose a template A template is a JSON/YAML-formatted text file that describes your stack's resources and their properties. [Learn more.](#)

Select a sample template

Upload a template to Amazon S3
 No file chosen

Specify an Amazon S3 template URL
 [View/Edit template in Designer](#)

Create stack

Select Template
Specify Details
Options
Review

Specify Details

Specify a stack name and parameter values. You can use or change the default parameter [Learn more.](#)

Stack name

Parameters

Network Configuration

Availability Zones are used for this deployment

- us-west-2a
- us-west-2b
- us-west-2c

VPC CIDR CIDR block for private subnet 1 located in Availability Zone 1.

Private Subnet 1 CIDR

Parameters

Network Configuration

Availability Zones List of Availability Zones to use for the subnets in the VPC. Note: The logical order is preserved and only 2 AZs are

Amazon EC2 Configuration

Key Pair Name to your instance after it launches

- vpc_keypair

NAT Instance Type Amazon EC2 instance type for the NAT Instances. This is only used if the region does not support NAT gateways.

Bastion AMI Operating System The Linux distribution for the AMI to be used for the bastion instances

Bastion 1 Instance Type Amazon EC2 instance type for the first bastion instance

Bastion 1 Private IP Address Fixed private IP for the first bastion located in Availability Zone 1

Bastion 2 Instance Type Amazon EC2 instance type for the second bastion instance

Bastion 2 Private IP Address Fixed private IP for the second bastion located in Availability Zone 2

Linux Bastion Configuration

Enable Banner

true

To include a banner to be displayed when connecting via SSH to the bastion, set this parameter to true

Bastion Banner

https://s3.amazonaws.com/quickstart-referen

Banner text to display upon login

AWS Quick Start Configuration

**Quick Start S3 Bucket
Name**

quickstart-reference

S3 bucket name for the Quick Start assets. Quick Start bucket name can include numbers, lowercase letters, uppercase letters, and hyphens (-). It cannot start or end with a hyphen (-).

Quick Start S3 Key Prefix

linux/bastion/latest

S3 key prefix for the Quick Start assets. Quick Start key prefix can include numbers, lowercase letters, uppercase letters, hyphens (-), and forward slash (/). It cannot start or end with forward slash (/) because they are automatically appended.

Cancel



Previous

Next

Options

Tags

You can specify tags (key-value pairs) for resources in your stack. You can add up to 50 unique key-value pairs for each stack. [Learn more.](#)

	Key (127 characters maximum)	Value (255 characters maximum)	
1	Name	IoTAnalyticsVPCStack	
2	<input type="text" value="Creator"/>	<input type="text" value="YourHumbleNarrator"/>	

Permissions

You can choose an IAM role that CloudFormation uses to create, modify, or delete resources in the stack. If you don't choose a role, CloudFormation uses the permissions defined in your account. [Learn more.](#)

IAM Role

Enter role arn

▶ Advanced

You can set additional options for your stack, like notification options and a stack policy. [Learn more.](#)

[Cancel](#)

[Previous](#)

[Next](#)

Capabilities



The following resource(s) require capabilities: [AWS::CloudFormation::Stack]

This template contains Identity and Access Management (IAM) resources. Check that you want to create each of these resources and that they have the minimum required permissions. In addition, they have custom names. Check that the custom names are unique within your AWS account. [Learn more.](#)

I acknowledge that AWS CloudFormation might create IAM resources with custom names.

[Cancel](#)

[Previous](#)

[Create](#)

CloudFormation Stacks

Create Stack Actions Design template

Filter: Active By Stack Name Showing 1 stack

Stack Name	Created Time	Status	Description
<input checked="" type="checkbox"/> IoTAnalyticsVPC	2017-02-12 09:55:01 UTC-0600	CREATE_IN_PROGRESS	This template creates a VPC infrastructure for a multi-AZ, multi-tier deployment

CloudFormation Stacks

Create Stack Actions Design template

Filter: Active By Stack Name Showing 3 stacks

Stack Name	Created Time	Status	Description
<input type="checkbox"/> IoTAnalyticsVPC-BastionStack	2017-02-12 09:58:46 UTC-0600	CREATE_COMPLETE	This template is intended to be deployed into an existing VPC with two public subnets
<input type="checkbox"/> IoTAnalyticsVPC-VPCStack	2017-02-12 09:55:08 UTC-0600	CREATE_COMPLETE	This template creates a Multi-AZ, multi-subnet VPC infrastructure with multiple subnets
<input checked="" type="checkbox"/> IoTAnalyticsVPC	2017-02-12 09:55:01 UTC-0600	CREATE_COMPLETE	This template creates a VPC infrastructure for a multi-AZ, multi-tier deployment

Services Resource Groups

EC2 Dashboard

Events
Tags
Reports
Limits

INSTANCES

Instances
Spot Requests

Resources

You are using the following Amazon EC2 resources in the US West (Oregon) region:

2 Running Instances	4 Elastic IPs
0 Dedicated Hosts	0 Snapshots
2 Volumes	0 Load Balancers
1 Key Pairs	2 Security Groups
0 Placement Groups	

Launch Instance Connect Actions

Filter by tags and attributes or search by keyword

1 to 2 of 2

Name	Instance ID	Instance Type	Availability Zone	Instance State	Status Checks	Alarm S
<input type="checkbox"/> LinuxBastion2	i-019f3ea13d8d8c056	t2.micro	us-west-2b	● running	✓ 2/2 checks passed	None
<input type="checkbox"/> LinuxBastion1	i-0ab503c9bfd45c52	t2.micro	us-west-2a	● running	✓ 2/2 checks passed	None

Launch Instance **Connect** Actions

Filter by tags and attributes or search by keyword

Name	Instance ID	Instance Type	Availability Zone	Instance State	Status Checks	Alarm Status
LinuxBastion2	i-019f3ea13d8d8c056	t2.micro	us-west-2b	running	2/2 checks passed	None

Connect To Your Instance

I would like to connect with

A standalone SSH client

A Java SSH Client directly from my browser (Java required)

To access your instance:

1. Open an SSH client. (find out how to [connect using PuTTY](#))
2. Locate your private key file (vpc_keypair.pem). The wizard automatically detects the key you used to launch the instance.
3. Your key must not be publicly viewable for SSH to work. Use this command if needed:


```
chmod 400 vpc_keypair.pem
```
4. Connect to your instance using its Public DNS:


```
ec2-.us-west-2.compute.amazonaws.com
```

Example:

```
ssh -i "vpc_keypair.pem" ec2-user@ec2-.us-west-2.compute.amazonaws.com
```

Please note that in most cases the username above will be correct, however please ensure that you read your AMI usage instructions to ensure that the AMI owner has not changed the default AMI username.

If you need any assistance connecting to your instance, please see our [connection documentation](#).

Close

Create Stack Actions Design template

Filter: Active By Stack Name

	Stack Name	Created Time	Status	Description
<input checked="" type="checkbox"/>	IoTAnalyticsVPC-BastionStack-WP1GD2UP7DYF	2017-02-12 09:58:46 UTC-0600	CREATE_COMPLETE	This template is intend
<input type="checkbox"/>	IoTAnalyticsVPC-VPCStack-1STX3F5QQRNG	2017-02-12 09:55:08 UTC-0600	CREATE_COMPLETE	This template creates a
<input type="checkbox"/>	IoTAnalyticsVPC	2017-02-12 09:55:01 UTC-0600	CREATE_COMPLETE	This template creates a

Overview **Outputs** Resources Events Template Parameters Tags Stack Policy Change Sets

Stack name: IoTAnalyticsVPC-BastionStack-WP1GD2UP7DYF

Stack ID: arn:aws:cloudformation:us-west-2:680102797266:stack/IoTAnalyticsVPC-BastionStack-WP1GD2UP7DYF/2237e8c0-f13c-11e

Create Stack Actions Design template

Filter: Active By Stack Name

- Create Change Set For Current Stack
- Update Stack
- Delete Stack ←
- View/Edit template in Designer

	Stack Name	Created Time	Status	Description
<input checked="" type="checkbox"/>	IoTAnalyticsVPC-BastionStack-WP1GD2UP7DYF	2017-12-12 09:58:46 UTC-0600	CREATE_COMPLETE	This template
<input type="checkbox"/>	IoTAnalyticsVPC-VPCStack-1STX3F5QQRNG	2017-12-12 09:55:08 UTC-0600	CREATE_COMPLETE	This template

Delete Stack ✕

Are you sure you want to delete this stack?

IoTAnalyticsVPC-BastionStack-WP1GD2UP7DYF

Deleting a stack deletes all stack resources.

Cancel
Yes, Delete

Filter: Active By Stack Name

	Stack Name	Created Time	Status	Description
<input checked="" type="checkbox"/>	IoTAnalyticsVPC-BastionStack-WP1GD2UP7DYF	2017-12-12 09:58:46 UTC-0600	DELETE_IN_PROGRESS	This template is intended to
<input type="checkbox"/>	IoTAnalyticsVPC-VPCStack-1STX3F5QQRNG	2017-12-12 09:55:08 UTC-0600	CREATE_COMPLETE	This template creates a Mu

VPC Dashboard

Filter by VPC:

None

Virtual Private Cloud

Your VPCs

Subnets

Route Tables

Internet Gateways

Egress Only Internet Gateways

DHCP Options Sets

Elastic IPs

Resources ↻

Note: Your Instances will launch in the US West (Oregon) region.

You are using the following Amazon VPC resources in the US West (Oregon) region:

0 VPCs	0 Internet Gateways
0 Egress-only Internet Gateways	0 Subnets
0 Route Tables	0 Network ACLs
0 Elastic IPs	0 VPC Peering Connections
0 Endpoints	2 Nat Gateways
0 Security Groups	0 Running Instances
0 VPN Connections	0 Virtual Private Gateways
0 Customer Gateways	

VPC Dashboard

Filter by VPC:
None

Virtual Private Cloud

Your VPCs

Subnets

Create NAT Gateway

Delete NAT Gateway

Filter by attributes or search by keyword

<input type="checkbox"/>	NAT Gateway ID	Status
<input type="checkbox"/>	nat-009f9a1b372512885	Deleted
<input type="checkbox"/>	nat-03d4acb9b8024ce93	Deleted

Services

Resource Groups

EC2 Dashboard

Events

Tags

Reports

Limits

INSTANCES

Instances

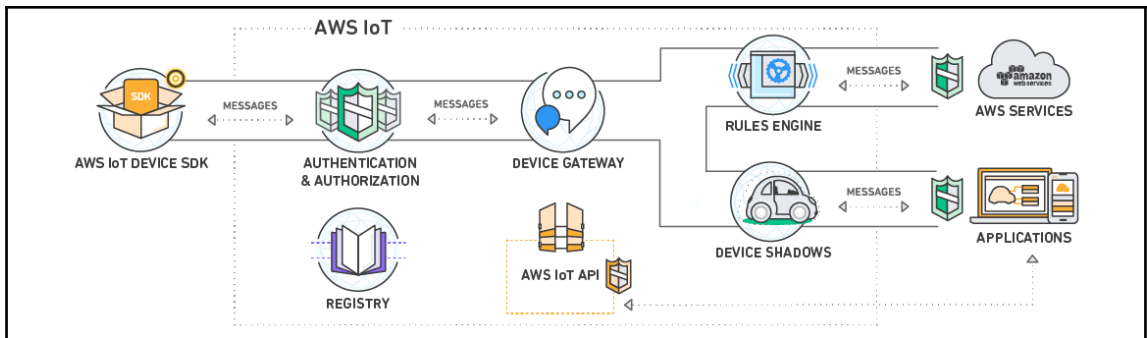
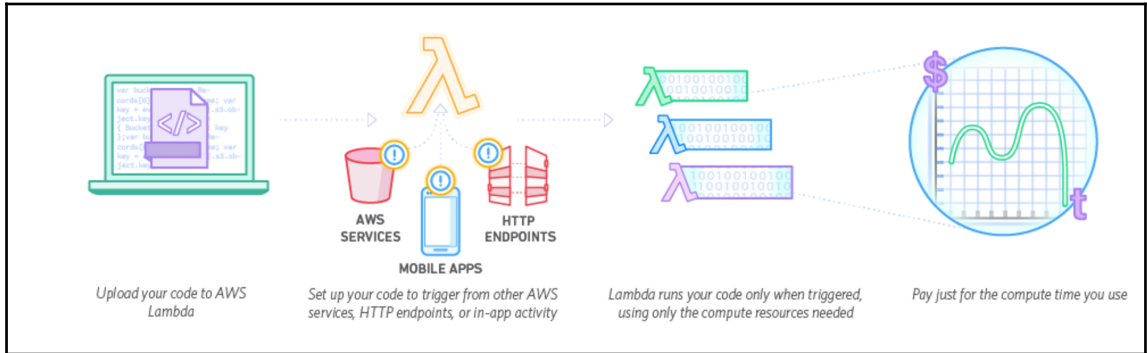
Spot Requests

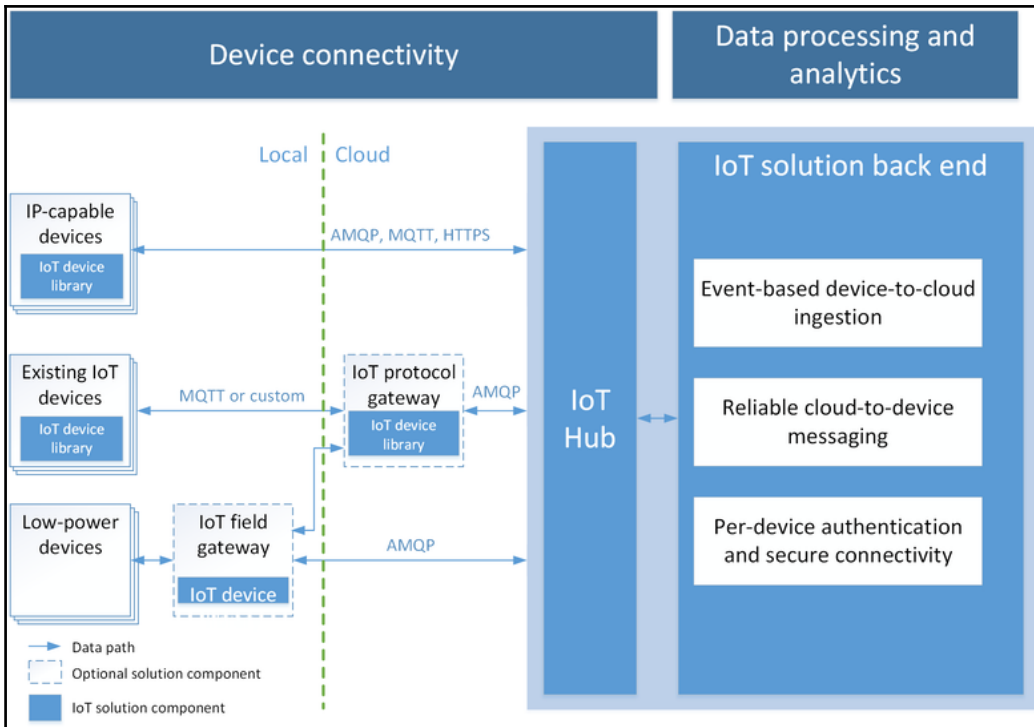
Resources

You are using the following Amazon EC2 resources in the US West (Oregon) region:

0 Running Instances	0 Elastic IPs
0 Dedicated Hosts	0 Snapshots
0 Volumes	0 Load Balancers
1 Key Pairs	0 Security Groups
0 Placement Groups	

Chapter 5: Collecting all that Data - Strategies and Techniques

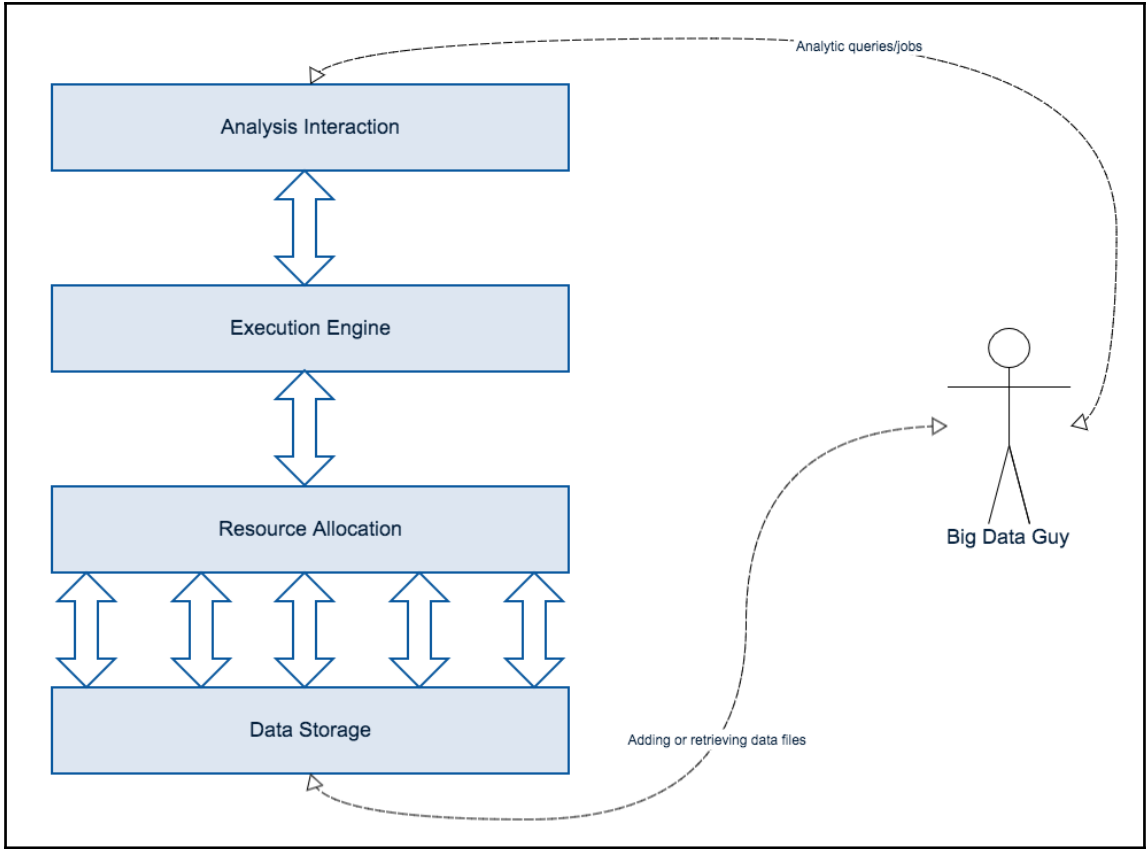


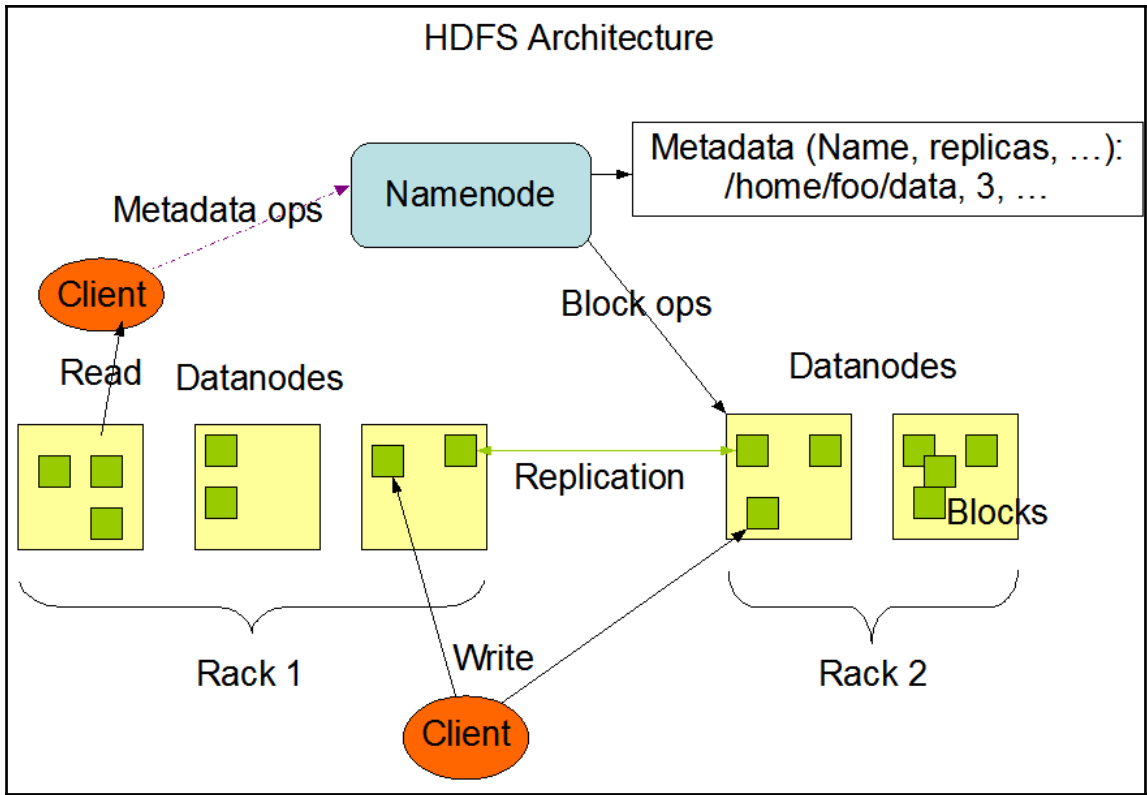


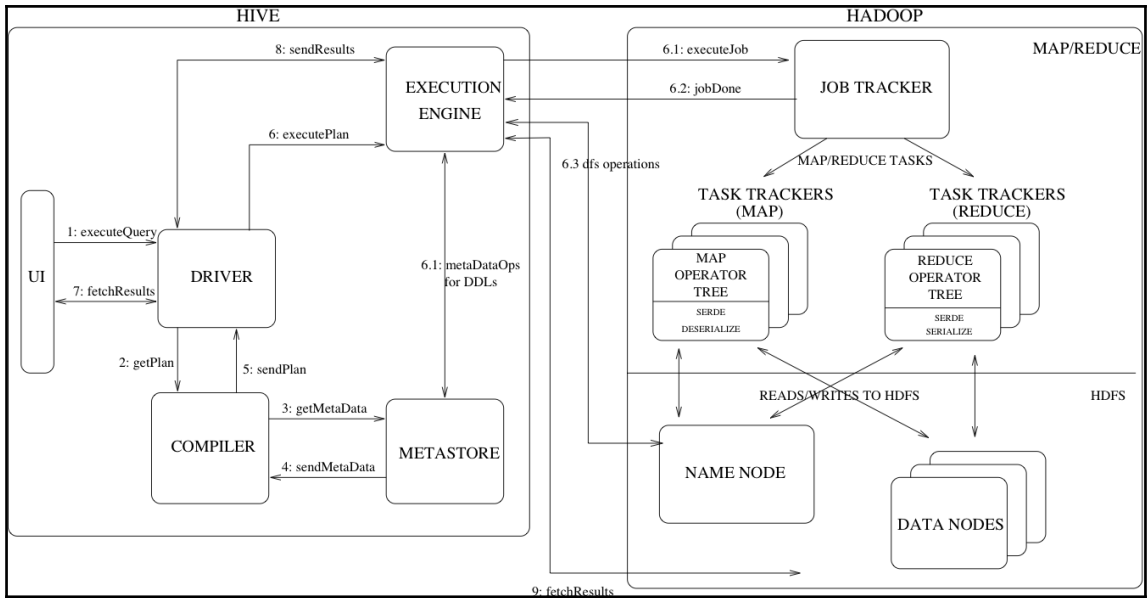
Ongoing Innovation in Apache

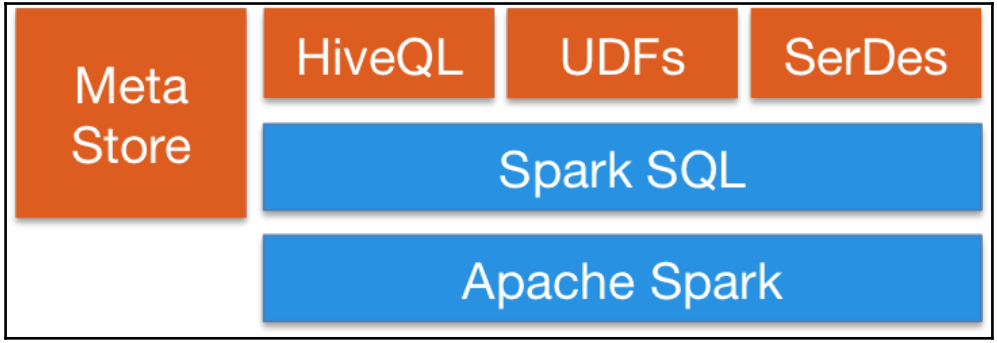
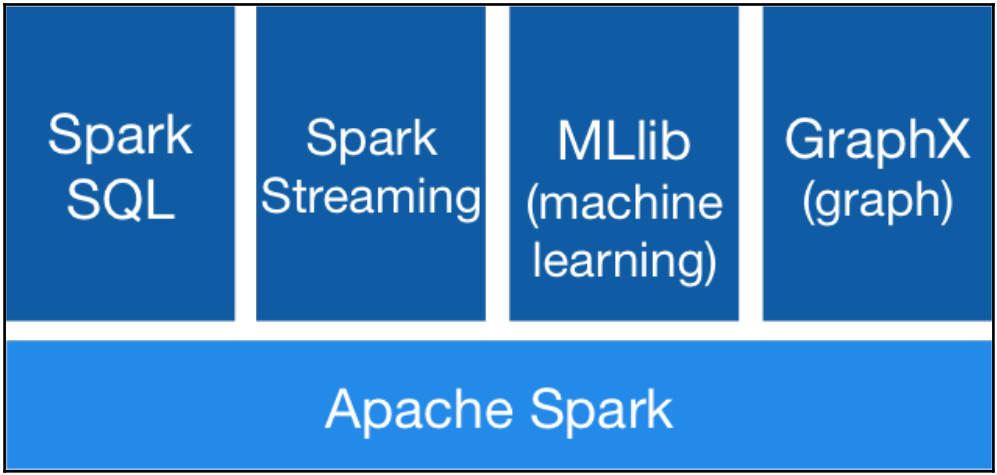
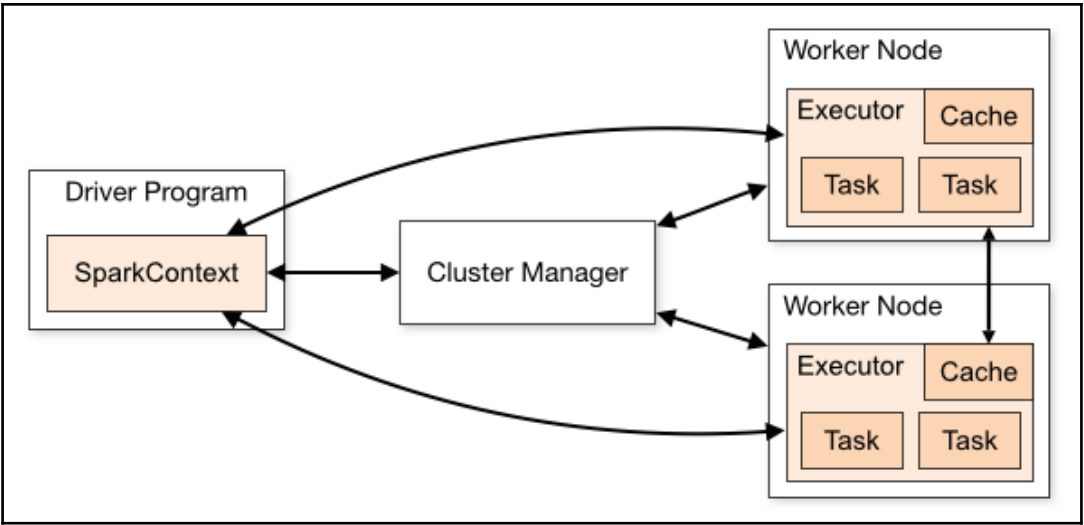
HDP 2.5 2H2016	2.7.3	0.16.0	1.2.1+ 2.1*	0.7.0	5.2.2	1.6.2+ 2.0*	0.6.0	0.91.0	1.1.2	4.7.0	1.7.0	1.0.1	0.10.0	0.7.0	1.4.6	1.5.2	0.10.0	2.4.0	1.3.0	3.4.6	4.2.0	0.9.0	0.6.0	
HDP 2.4 Mar 2016	2.7.1	0.15.0	1.2.1	0.7.0	5.2.1	1.6.0		0.80.0	1.1.2	4.4.0	1.7.0	0.10.0	0.6.1	0.5.0	1.4.6	1.5.2	0.9.0	2.2.1	1.2.0	3.4.6	4.2.0	0.6.0	0.5.0	
HDP 2.3 Oct 2015	2.7.1	0.15.0	1.2.1	0.7.0	5.2.1	1.4.1		0.80.0	1.1.2	4.4.0	1.7.0	0.10.0	0.6.1	0.5.0	1.4.6	1.5.2	0.8.2	2.1.0	1.0.0	3.4.6	4.2.0	0.6.0	0.5.0	
HDP 2.2 Dec 2014	2.6.0	0.14.0	0.14.0	0.5.2	4.10.2	1.2.1		0.60.0	0.98.4	4.2.0	1.6.1	0.9.3	0.6.0		1.4.5	1.5.2	0.8.1	2.0.0		3.4.6	4.1.0	0.5.0	0.4.0	
HDP 2.1 April 2014	2.4.0	0.12.1	0.13.0	0.4.0	4.7.2				0.98.0	4.0.0	1.5.1	0.9.1	0.5.0		1.4.4	1.4.0		1.5.1		3.4.5	4.0.0	0.4.0		
HDP 2.0 Oct 2013	2.2.0	0.12.0	0.12.0						0.96.1						1.4.4	1.3.1		1.4.4		3.4.5	3.3.2			
	Hadoop & YARN	Pig	Hive	Tez	Soil	Spark	Zeppelin	Slider	HBase	Phoenix	Accumulo	Storm	Falcon	Atlas	Sqoop	Flume	Kafka	Ambari	Cloudbreak	ZooKeeper	Oozie	Knox	Ranger	
	DATA MGMT		DATA ACCESS					GOVERNANCE & INTEGRATION					OPERATIONS			SECURITY								
HORTONWORKS DATA PLATFORM																								

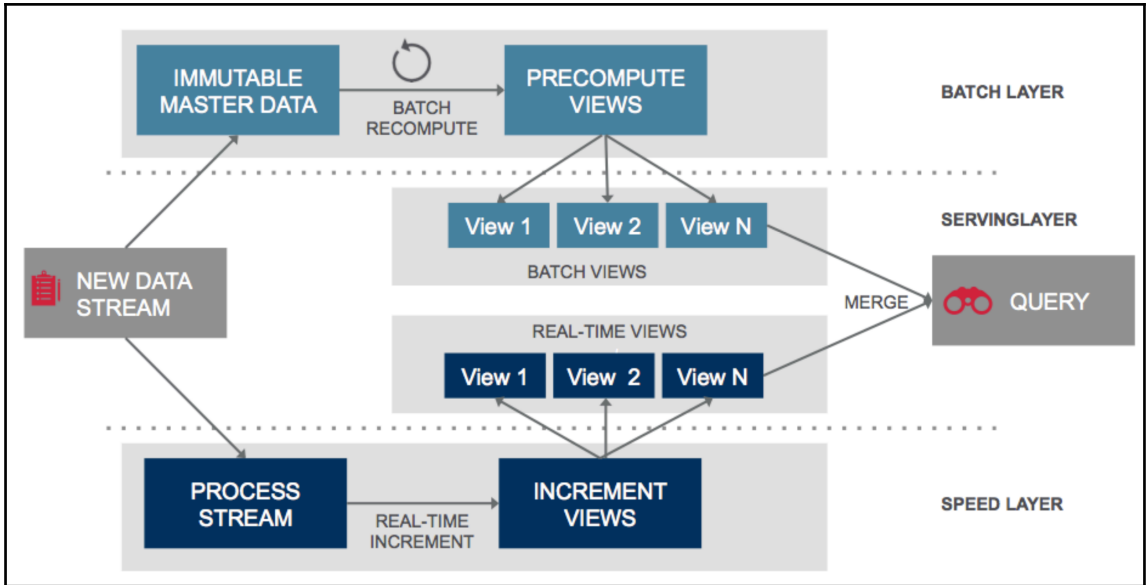
* Spark 1.6.2+ Spark 2.0 – HDP 2.5 support installation of both Spark 1.6.2 and Spark 2.0. Spark 2.0 is Technical Preview within HDP 2.5.
 Hive 1.2.1+ Hive 2.1 – Hive 2.1 is Technical Preview within HDP 2.5.



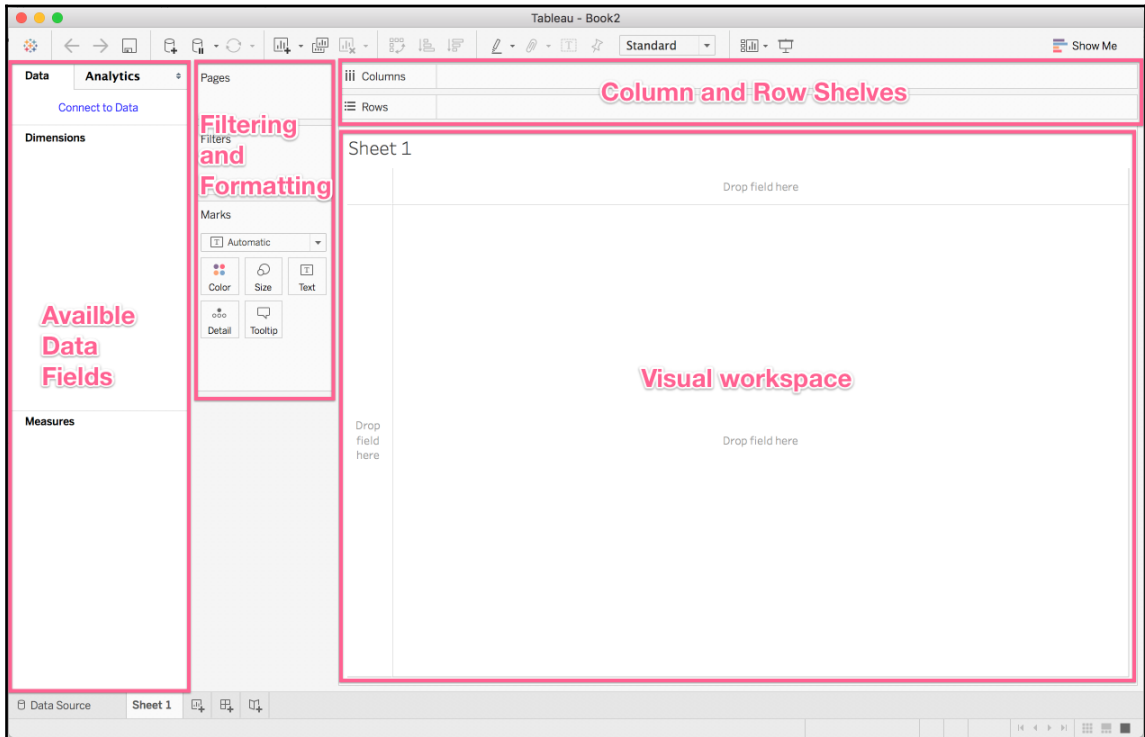




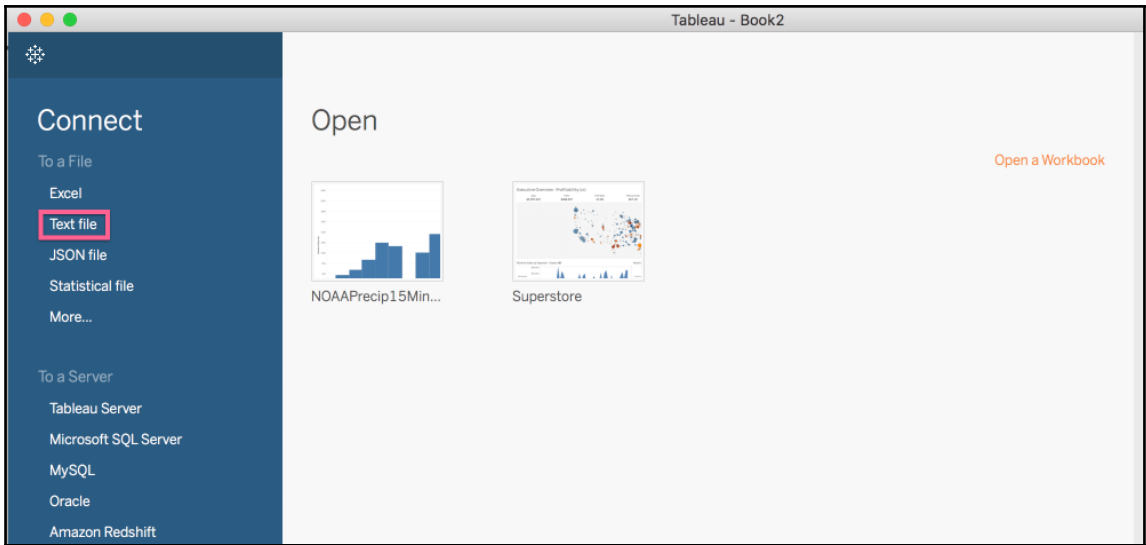




Chapter 6: Getting to Know Your Data - Exploring IoT Data



```
STATION,STATION_NAME,ELEVATION,LATITUDE,LONGITUDE,DATE,QGAG,Measurement Flag,Quality Flag,Units,QPCP,Measurement Flag,Quality Flag,Units
COOP:053579,GREENLAND 9 SE CO US,2279.9,39.1044,-104.7286,20130101,00:00,0.44,,HT,999.99,,HT
COOP:053579,GREENLAND 9 SE CO US,2279.9,39.1044,-104.7286,20130101,00:15,0.00,g,,HT,0.00,g,,HT
COOP:053579,GREENLAND 9 SE CO US,2279.9,39.1044,-104.7286,20130130,14:15,0.45,,HT,-9999,,
COOP:053579,GREENLAND 9 SE CO US,2279.9,39.1044,-104.7286,20130131,11:45,0.46,,HT,0.10,,HT
COOP:053579,GREENLAND 9 SE CO US,2279.9,39.1044,-104.7286,20130201,00:00,0.45,N,,HT,-9999,,
COOP:053579,GREENLAND 9 SE CO US,2279.9,39.1044,-104.7286,20130201,00:15,0.00,g,,HT,0.00,g,,HT
COOP:053579,GREENLAND 9 SE CO US,2279.9,39.1044,-104.7286,20130201,09:45,0.46,,HT,-9999,,
COOP:053579,GREENLAND 9 SE CO US,2279.9,39.1044,-104.7286,20130212,12:00,0.47,,HT,0.10,,HT
COOP:053579,GREENLAND 9 SE CO US,2279.9,39.1044,-104.7286,20130222,13:00,0.48,,HT,0.10,,HT
COOP:053579,GREENLAND 9 SE CO US,2279.9,39.1044,-104.7286,20130222,15:00,0.49,,HT,0.10,,HT
COOP:053579,GREENLAND 9 SE CO US,2279.9,39.1044,-104.7286,20130223,11:00,0.50,,HT,0.10,,HT
COOP:053579,GREENLAND 9 SE CO US,2279.9,39.1044,-104.7286,20130227,10:30,0.51,,HT,0.10,,HT
COOP:053579,GREENLAND 9 SE CO US,2279.9,39.1044,-104.7286,20130228,23:45,0.51,,HT,-9999,,
COOP:053579,GREENLAND 9 SE CO US,2279.9,39.1044,-104.7286,20130301,00:00,0.51,,HT,-9999,,
COOP:053579,GREENLAND 9 SE CO US,2279.9,39.1044,-104.7286,20130301,00:15,0.51,N,,HT,0.00,g,,HT
COOP:053579,GREENLAND 9 SE CO US,2279.9,39.1044,-104.7286,20130325,12:15,0.52,,HT,0.10,,HT
COOP:053579,GREENLAND 9 SE CO US,2279.9,39.1044,-104.7286,20130401,00:00,0.52,,HT,-9999,,
COOP:053579,GREENLAND 9 SE CO US,2279.9,39.1044,-104.7286,20130401,00:15,0.52,N,,HT,0.00,g,,HT
COOP:053579,GREENLAND 9 SE CO US,2279.9,39.1044,-104.7286,20130403,09:00,0.53,,HT,0.10,,HT
COOP:053579,GREENLAND 9 SE CO US,2279.9,39.1044,-104.7286,20130414,08:15,0.54,,HT,0.10,,HT
COOP:053579,GREENLAND 9 SE CO US,2279.9,39.1044,-104.7286,20130414,09:15,0.55,,HT,0.10,,HT
COOP:053579,GREENLAND 9 SE CO US,2279.9,39.1044,-104.7286,20130418,13:45,0.56,,HT,0.10,,HT
```

Station	Station Name	Elevation	Latitude	Longitude	Date	Qcag	Measurement Flag	Quality F
COOP-053579	GREENLAND 9 SE CO ...	2,279.900	39.10440	-104.72860	20130101 00:00	0.44	null	
COOP-053579	GREENLAND 9 SE CO ...	2,279.900	39.10440	-104.72860	20130101 00:15	0.00	g	
COOP-053579	GREENLAND 9 SE CO ...	2,279.900	39.10440	-104.72860	20130120 14:15	0.45	null	

Measurement Date ×

`DATEPARSE("yyyyMMdd hh:mm", [Date])`

The calculation is valid. Apply OK

All ↕

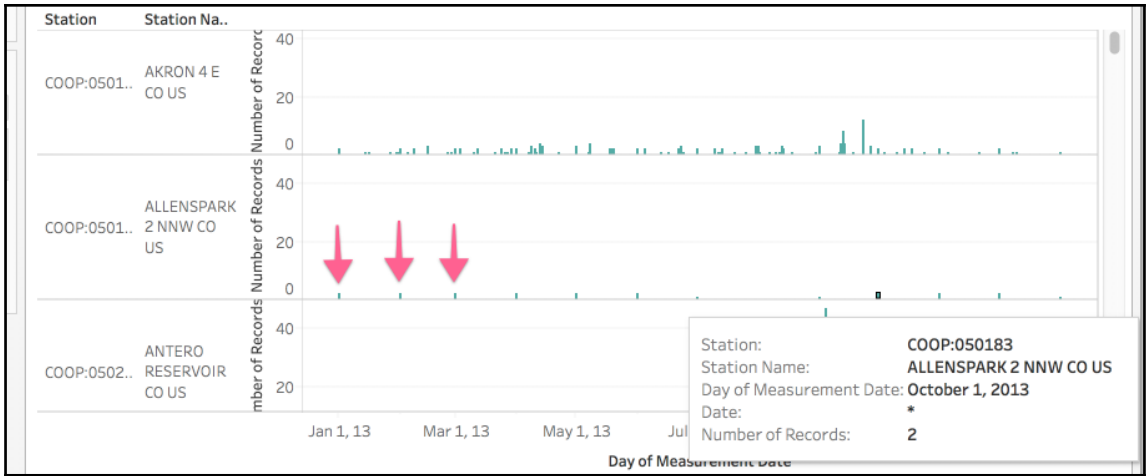
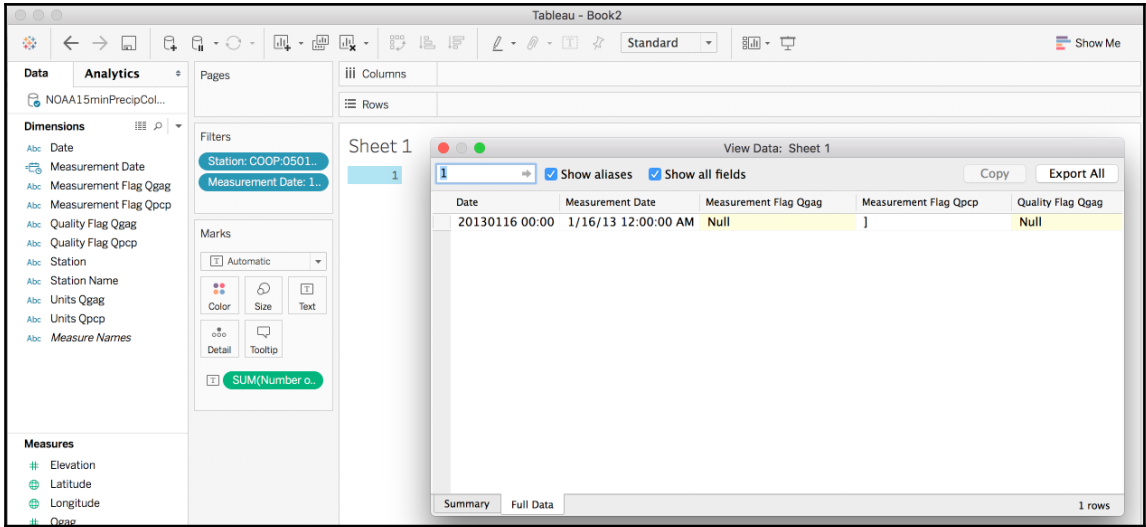
Enter search text

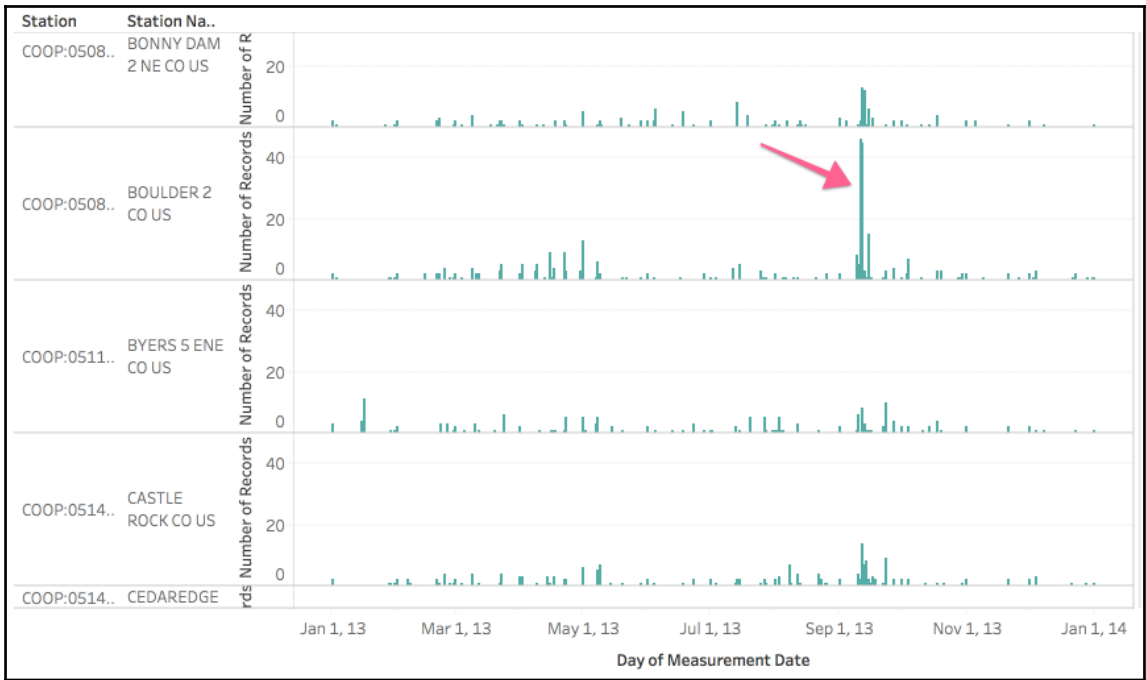
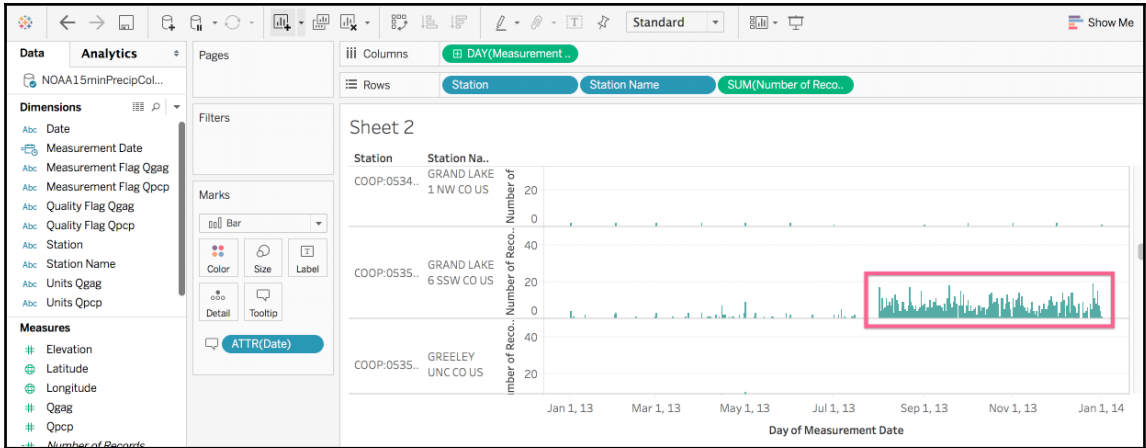
- DATEDIFF
- DATENAME
- DATEPARSE
- DATEPART
- DATETIME
- DATETRUNC
- DAY
- DEGREES

DATEPARSE(format, string)

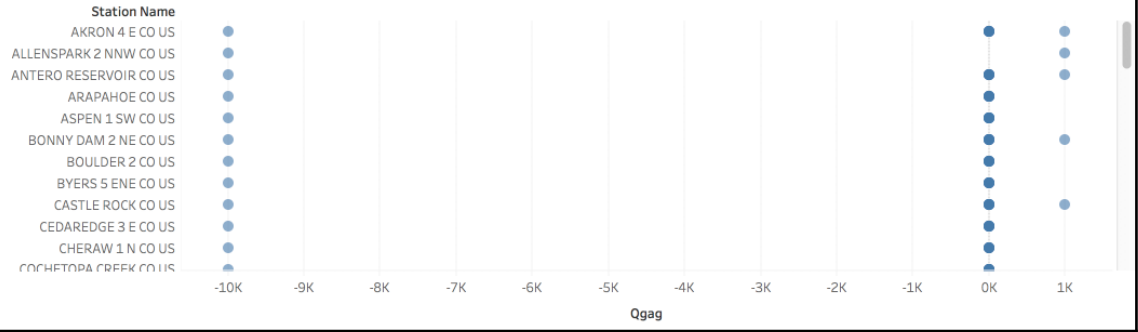
Converts a string to a date in the specified format.

Example: DATEPARSE ("dd.MMMM.yyyy", "15.April.2004") = 2004-04-15 12:00:00 AM

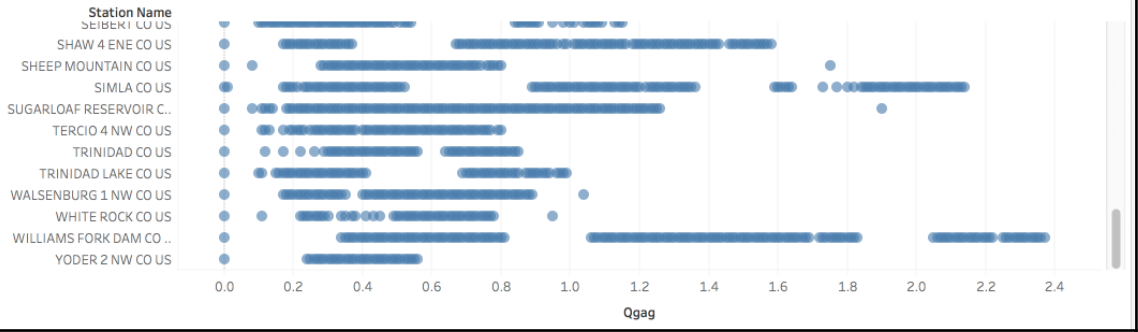




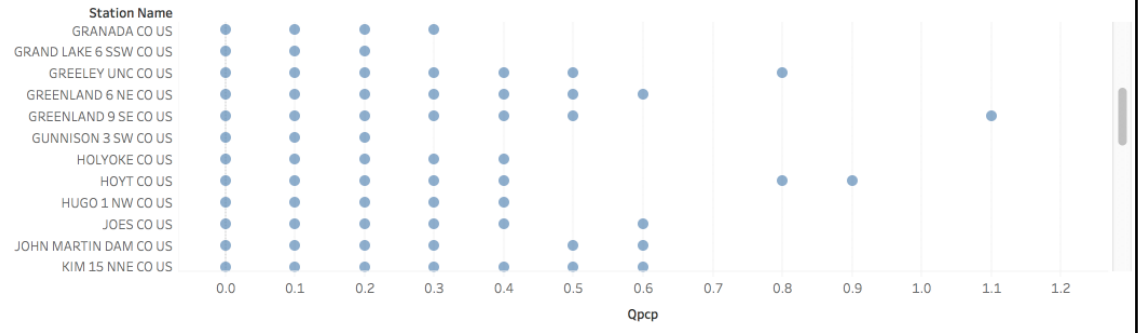
Qgag

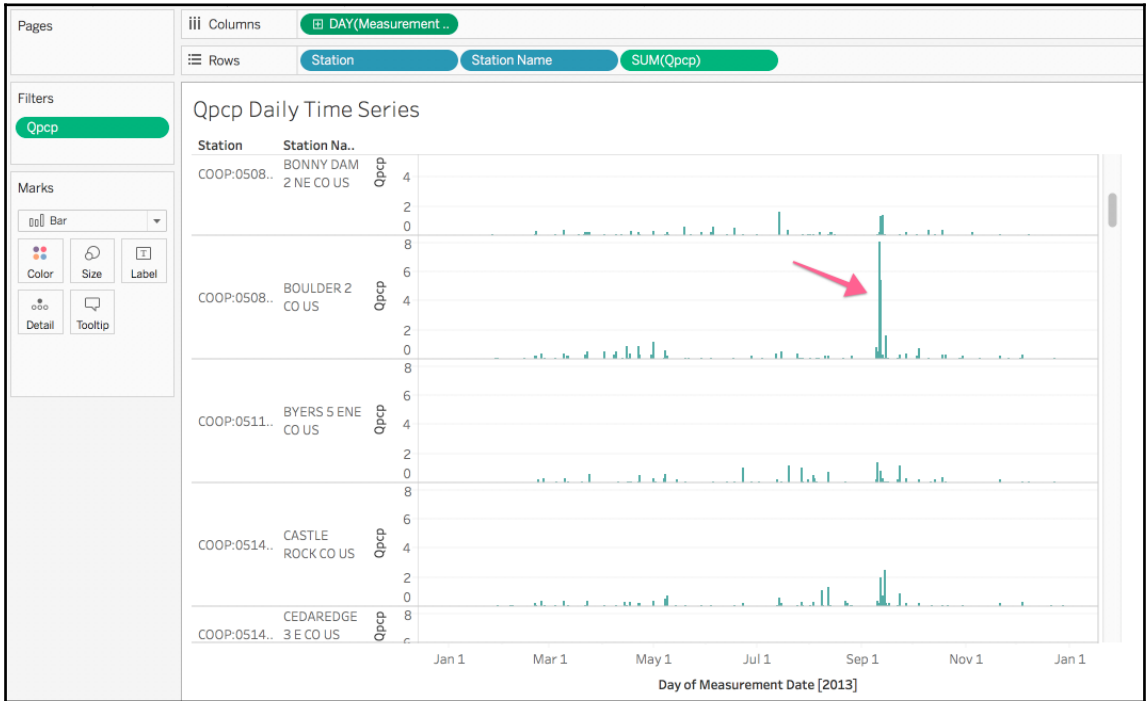
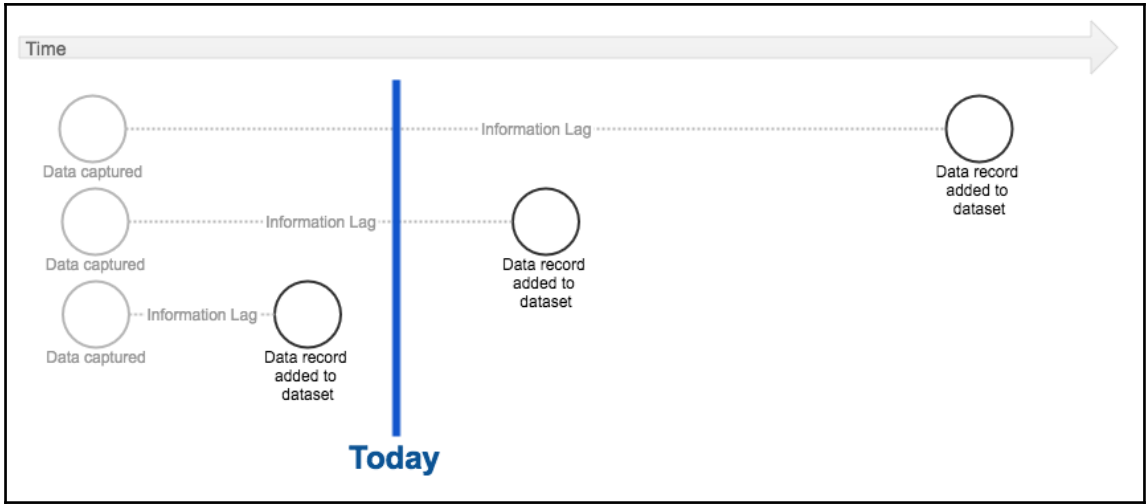


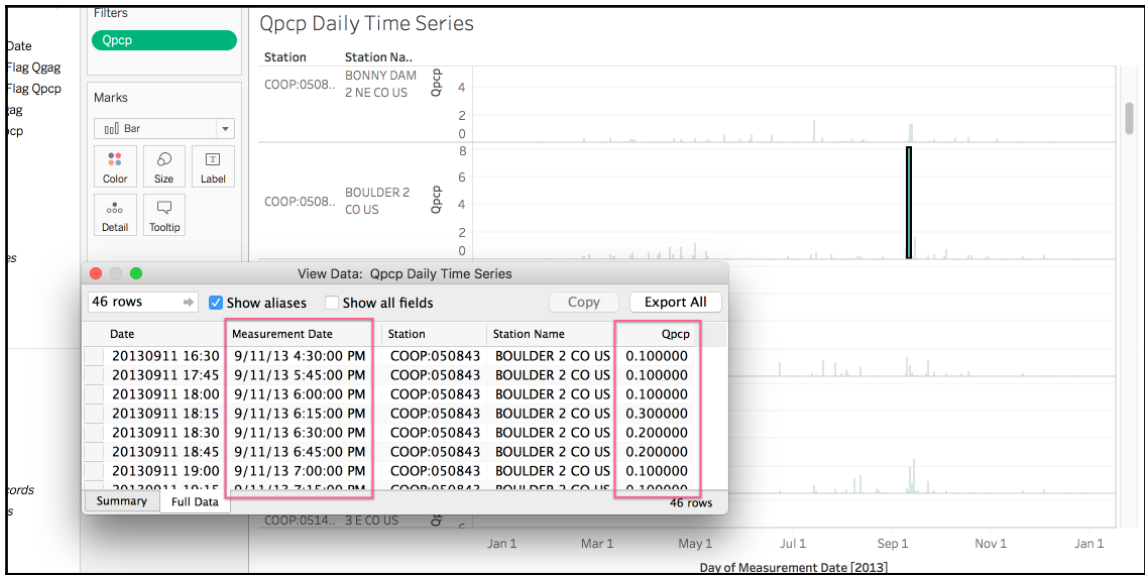
Qgag



Qpcp







Google heavy rain boulder, co 9/11/2013

All News Images Videos Shopping More Settings Tools

About 1,110 results (0.96 seconds)

Colorado Flash Flooding: How It Happened, How Unusual? | The ...
<https://weather.com/storms/.../colorado-flash-flood-how-it-happened-unusual-201309...>
 Oct 16, 2013 - First, the ground was saturated with heavy rainfall both on Sept. 9 and 10. ... Average September rainfall in Boulder is only 1.63 inches.

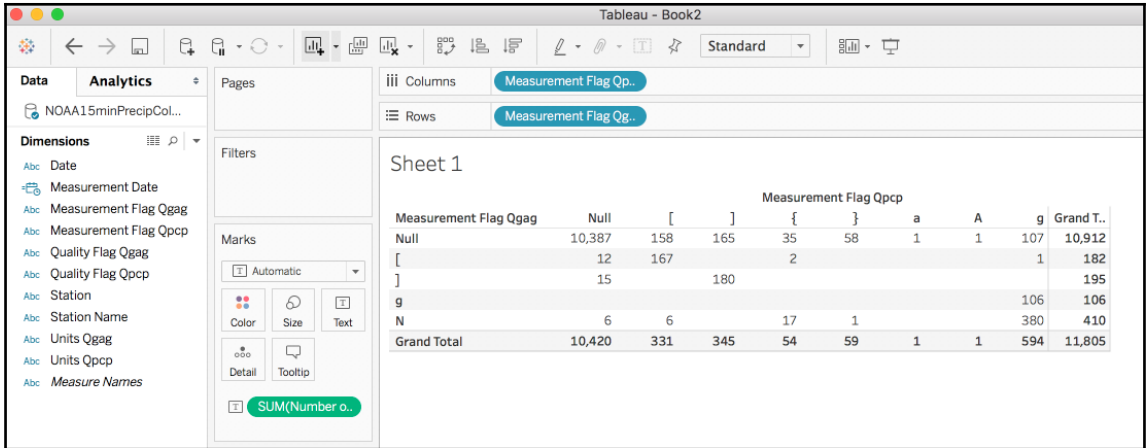
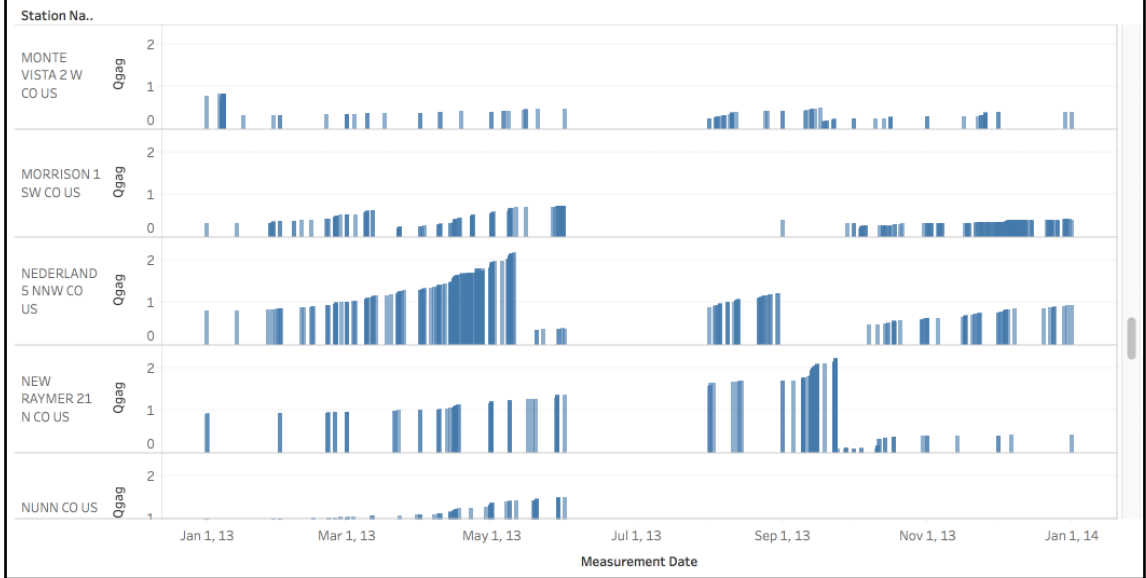
2013 Colorado floods - Wikipedia
https://en.wikipedia.org/wiki/2013_Colorado_floods
 The 2013 Colorado floods was a natural disaster occurring in the U.S. state of Colorado. Starting on September 9, 2013, a slow-moving cold front stalled over Colorado, clashing with warm humid monsoonal air from the south. This resulted in heavy rain and catastrophic flooding along Colorado's Front ... This resulted in rainfall totals exceeding 20 inches in parts of Boulder County ...

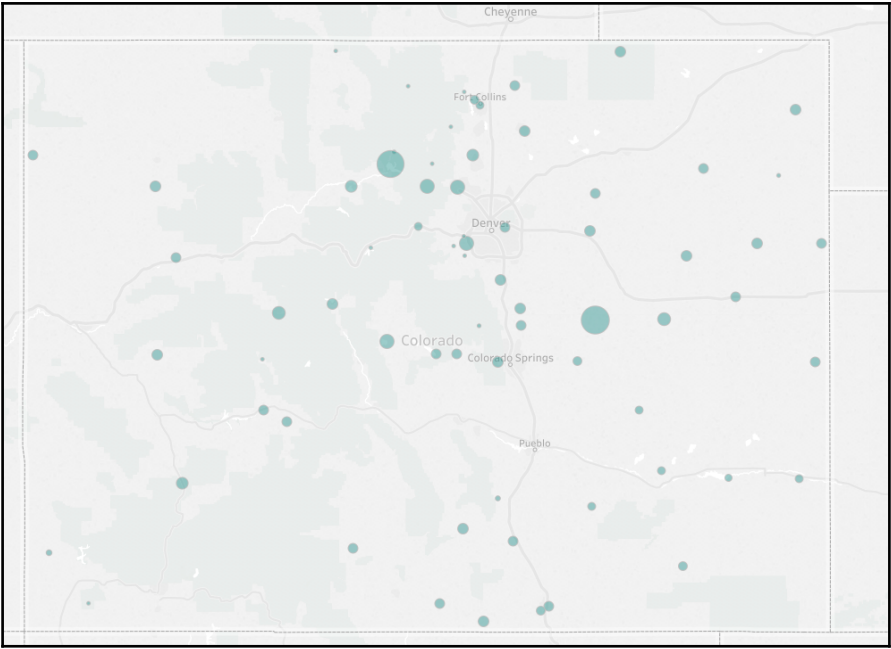
Severe Flooding on the Colorado Front Range - Western Water ...
www.colorado.edu/resources/front-range-floods/assessment.pdf
 ... Division, and the CSU Colorado Climate Center. • The very heavy rainfall was due to a combination of an unusually ... the Great Basin, at 11:15 pm MDT on September 11, 2013, during the peak rainfall intensity in Boulder. Drier air is shown.

Eight days, 1,000-year rain, 100-year flood - Boulder Daily Camera
www.dailycamera.com/.../boulder.../boulder-county-colorado-flood-2013-survival-1...
 Sep 21, 2013 - Late in the afternoon, the rain started coming down. ... 7, as the University of Colorado football team claimed its first home ... Just before midnight, a heavy mudslide in Fourmile Canyon rendered the road impassable at Colo.

The Great Colorado Flood of September 2013: Bulletin of the ...
journals.ametsoc.org/BAMS/September2015
 by D Gochis - 2015 - Cited by 41 - Related articles
 Oct 5, 2015 - University of Colorado Boulder, Boulder, Colorado Nolan Doesken ... The impacts from heavy rainfall and flooding were felt over a broad region THE EVOLUTION OF RAINFALL BETWEEN 11 AND 15 SEPTEMBER 2013.

Qgag Trend over Time





RStudio

Environment History

1 Import Dataset

File/Url: 2 Browse...

Import Text Data

Data Preview:

STATION (character)	STATION_NAME (character)	ELEVATION (double)	LATITUDE (double)	LONGITUDE (double)	DATE (double)	QGAG (double)	Measurement Flag (character)	Qu Fla (ch
COOP:053579	GREENLAND 9 SE CO US	2279.9	39.1044	-104.7286	2013-01-01 00:00:00	0.44	NA	NA
COOP:053579	GREENLAND 9 SE CO US	2279.9	39.1044	-104.7286	2013-01-01 00:15:00	0.00	g	NA
COOP:053579	GREENLAND 9 SE CO US	2279.9	39.1044	-104.7286	2013-01-30 14:15:00	0.45	NA	NA
COOP:053579	GREENLAND 9 SE CO US	2279.9	39.1044	-104.7286	2013-01-31 11:45:00	0.46	NA	NA
COOP:053579	GREENLAND 9 SE CO US	2279.9	39.1044	-104.7286	2013-02-01 00:00:00	0.45	N	NA
COOP:053579	GREENLAND 9 SE CO US	2279.9	39.1044	-104.7286	2013-02-01 00:15:00	0.00	g	NA

Previewing first 50 entries.

Import Options:

Name: First Row as Names Delimiter: Escape:

Skip: Trim Spaces Quotes: Comment:

Open Data Viewer Encoding: NA:

Code Preview:

```
library(readr)
NOAA15minPrecipColorado <- read_csv("~/Downloads/NOAA15minPrecipColorado.csv")
View(NOAA15minPrecipColorado)
```

3 Import Cancel

```

Console ~/ ↵
> summary(NOAA15minPrecipColorado)
  STATION      STATION_NAME      ELEVATION
Length:11805  Length:11805      Min.   :1062
Class :character  Class :character  1st Qu.:1579
Mode  :character  Mode  :character  Median :1885
                                           Mean  :1993
                                           3rd Qu.:2469
                                           Max.  :3051
                                           NA's  :15

  LATITUDE      LONGITUDE      DATE
Min.   :37.07  Min.   :-109.0  Min.   :2013-01-01 00:00:00
1st Qu.:38.90  1st Qu.:-105.9  1st Qu.:2013-04-18 13:00:00
Median :39.25  Median : -105.1  Median :2013-07-29 20:15:00
Mean   :39.30  Mean   :-105.1  Mean   :2013-07-09 21:05:57
3rd Qu.:40.04  3rd Qu.:-104.1  3rd Qu.:2013-09-15 16:30:00
Max.   :40.93  Max.   :-102.1  Max.   :2014-01-01 00:00:00
NA's   :15      NA's   :15

  QGAG      Measurement Flag      Quality Flag
Min.   :-9999.00  Length:11805      Length:11805
1st Qu.:  0.33  Class :character  Class :character
Median :  0.72  Mode  :character  Mode  :character
Mean   :-1609.72
3rd Qu.:  1.09
Max.   : 999.99

  Units      QPCP      Measurement Flag_1
Length:11805  Min.   :-9999.0  Length:11805
Class :character  1st Qu.: -9999.0  Class :character
Mode  :character  Median :  0.1    Mode  :character
                                           Mean  :-3211.8
                                           3rd Qu.:  0.1
                                           Max.   : 1000.0

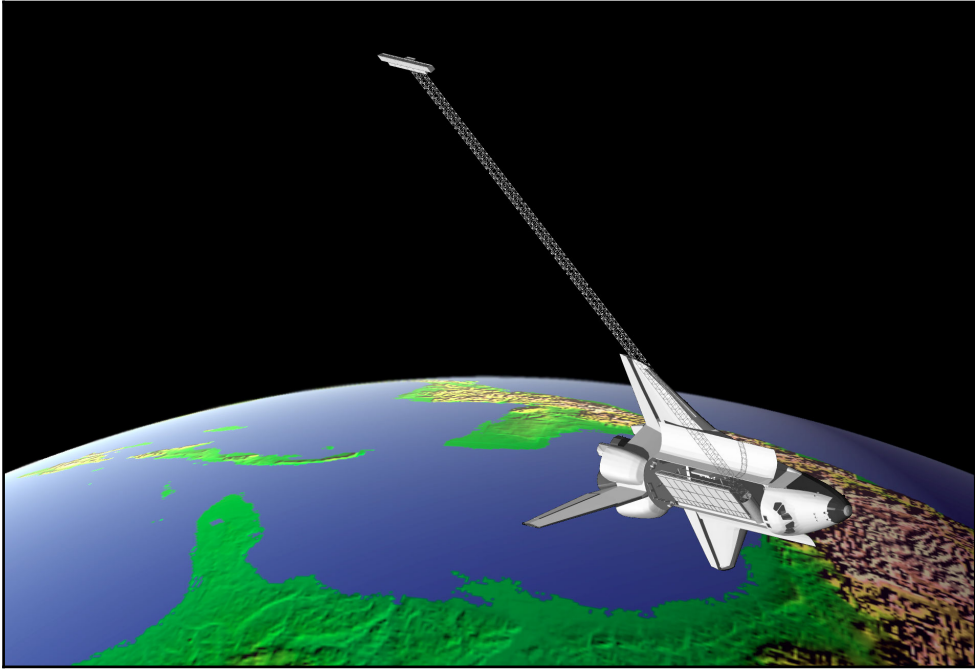
Quality Flag_1      Units_1
Length:11805      Length:11805
Class :character  Class :character
Mode  :character  Mode  :character

```

```
> summary(NOAAfiltered)
```

STATION	STATION_NAME	ELEVATION	LATITUDE	LONGITUDE
Length:5076	Length:5076	Min. :1062	Min. :37.07	Min. :-109.0
Class :character	Class :character	1st Qu.:1532	1st Qu.:38.85	1st Qu.:-106.4
Mode :character	Mode :character	Median :1885	Median :39.41	Median :-105.1
		Mean :1935	Mean :39.27	Mean :-105.2
		3rd Qu.:2352	3rd Qu.:40.04	3rd Qu.:-104.1
		Max. :3051	Max. :40.93	Max. :-102.1
DATE	QAGG	Measurement Flag	Quality Flag	
Min. :2013-01-11 05:30:00	Min. :0.0100	Length:5076	Length:5076	
1st Qu.:2013-04-18 10:56:15	1st Qu.:0.4600	Class :character	Class :character	
Median :2013-08-12 01:15:00	Median :0.7400	Mode :character	Mode :character	
Mean :2013-07-13 06:10:00	Mean :0.8376			
3rd Qu.:2013-09-18 20:15:00	3rd Qu.:1.1500			
Max. :2013-12-30 03:30:00	Max. :2.4000			
Units	QPCP	Measurement Flag_1	Quality Flag_1	Units_1
Length:5076	Min. :0.1000	Length:5076	Length:5076	Length:5076
Class :character	1st Qu.:0.1000	Class :character	Class :character	Class :character
Mode :character	Median :0.1000	Mode :character	Mode :character	Mode :character
	Mean :0.1095			
	3rd Qu.:0.1000			
	Max. :1.2000			

Chapter 7: Decorating Your Data - Adding External Datasets to Innovate



USGS TNM Download (v1.0) [How to](#) [Start Over](#) [Custom Views](#) [Share Link](#) [Contact Us](#)

Datasets

Advanced Search Options [Find Products](#)

Map

US Topo
 Historical Topographic Maps

Data

Boundaries - National Boundary Dataset

Elevation Products (GDEP)

Product Search Filter

All Subcategories

1 arc-second DEM
Show Availability

1 meter DEM
Show Availability

1/3 arc-second DEM
Show Availability

1/9 arc-second DEM
Hide Availability

2 arc-second DEM - Alaska
Show Availability

5 meter DEM (Alaska only)
Show Availability

Contours (1:24,000-scale)
Show Preview

Data Extent
 1 x 1 degree

File Format

ArcGrid
 Gridfloat
 IMG

Availability Legend

1 arc-second
 1 meter
 1/3 arc-second
 1/9 arc-second
 1/9 arc-second Coastal Zone

Use Map Box/Point Current Extent Coordinates Located Point Polygon

Map Indices 1 Degree 15 Minute 7.5 Minute All

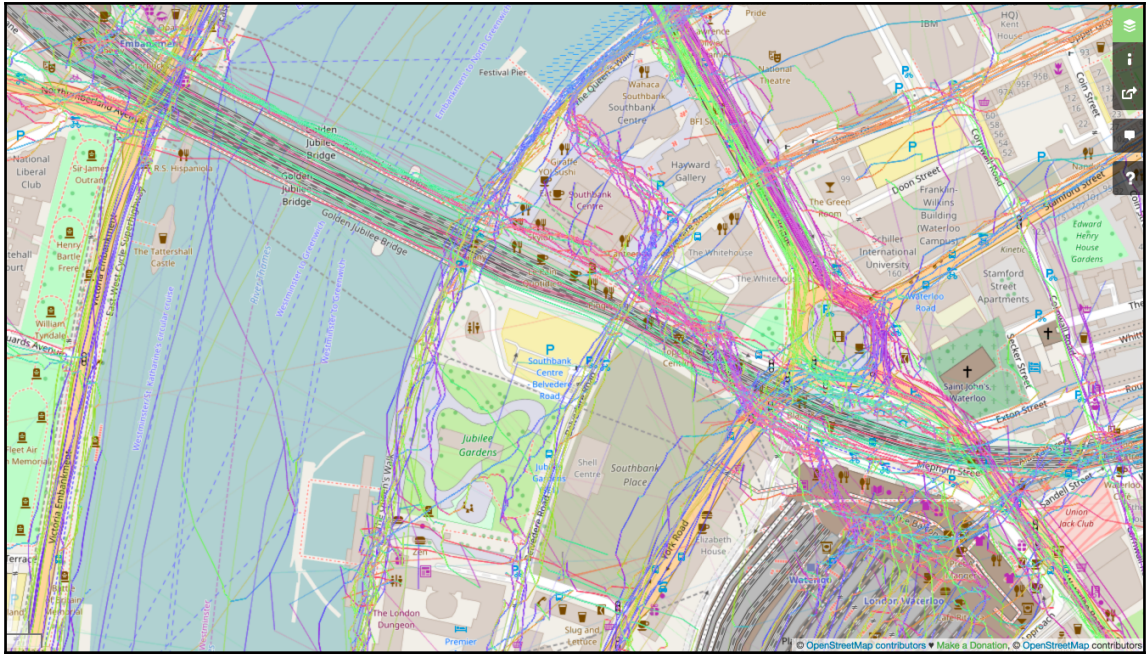
Address/Place: Search location. [Go](#) [Clear](#)

Lat/Lng = -140.5806, -123.6621









1000 km
500 mi

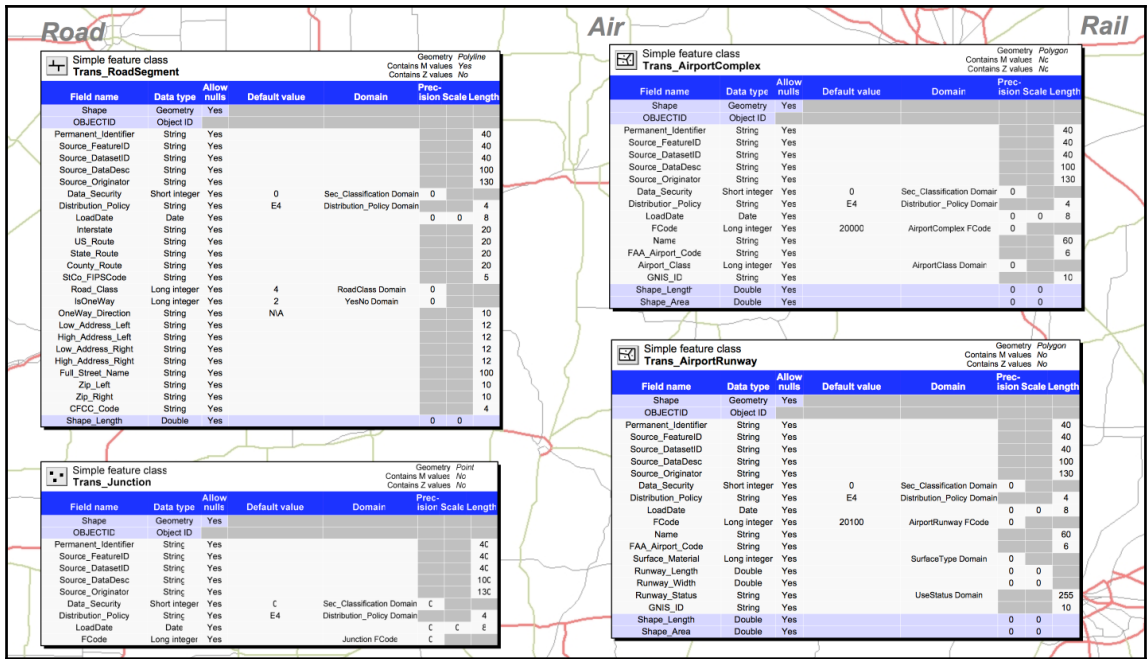
Leaflet | Powered by Esri | The National Map

AWS	WBAN	YR--MODAHRMN	DIR	SPD	GUS	CLG	SKC	L	M	H	VSB	WW	WW	W	TEMP	DEWP	SLP	ALT	STP	MAX	MIN	PCP01	PCP06	PCP24	PCPX	SD
722280	13876	200301010053	140	11	***	49	OVC	*	*	10.1	00	**	**	*	59	54	1003.8	29.65	*****	**	***	*****	*****	*****	*****	*****
722280	13876	200301010153	140	13	***	25	OVC	*	*	2.5	63	10	**	*	57	54	1003.7	29.65	*****	**	***	0.03	*****	*****	*****	*****
722280	13876	200301010253	170	14	21	14	OVC	*	*	3.0	63	10	**	*	57	55	1003.7	29.65	*****	**	***	0.19	*****	*****	0.22	**
722280	13876	200301010316	160	9	16	79	BKN	*	*	10.1	00	**	**	*	57	54	*****	29.65	*****	**	***	T	*****	*****	*****	*****
722280	13876	200301010353	150	9	***	108	BKN	*	*	10.1	00	**	**	*	57	54	1003.7	29.65	*****	**	***	T	*****	*****	*****	*****
722280	13876	200301010453	170	9	***	59	BKN	*	*	4.0	10	**	**	*	57	54	1003.4	29.64	*****	**	***	T	*****	*****	*****	*****
722280	13876	200301010553	170	6	***	60	OVC	*	*	10.0	00	**	**	*	56	53	1002.6	29.62	*****	60	56	*****	0.22	*****	*****	
722280	13876	200301010609	170	8	***	19	OVC	*	*	7.0	61	**	**	*	55	54	*****	29.62	*****	**	***	T	*****	*****	*****	
722280	13876	200301010617	160	8	***	20	OVC	*	*	7.0	00	**	**	*	55	52	*****	29.61	*****	**	***	T	*****	*****	*****	
722280	13876	200301010653	160	5	***	36	OVC	*	*	7.0	61	**	**	*	55	52	1002.2	29.61	*****	**	***	T	*****	*****	*****	
722280	13876	200301010700	160	5	***	37	OVC	*	*	7.0	61	**	**	*	55	52	1002.2	29.61	*****	**	***	0.00	*****	*****	*****	
722280	13876	200301010753	170	6	***	17	OVC	*	*	6.0	51	45	10	*	54	52	1002.0	29.60	*****	**	***	0.00	*****	*****	*****	
722280	13876	200301010823	150	5	***	13	OVC	*	*	4.0	61	10	**	*	54	52	*****	29.60	*****	**	***	0.01	*****	*****	*****	
722280	13876	200301010853	190	6	***	13	OVC	*	*	3.0	61	45	10	*	54	52	1002.2	29.61	*****	**	***	0.00	*****	*****	0.03	**



Web Service APIs

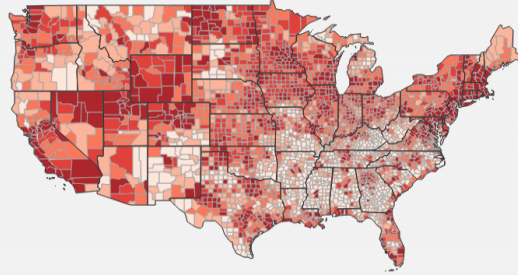
 <p>Google Maps Geocoding API Convert between addresses and geographic coordinates.</p>	 <p>Google Maps Distance Matrix API Travel time and distance for multiple destinations.</p>	 <p>Google Maps Roads API Snap-to-road functionality to accurately trace GPS breadcrumbs.</p>
 <p>Google Places API Web Service Up-to-date information about millions of locations.</p>	 <p>Google Maps Time Zone API Time zone data for anywhere in the world.</p>	 <p>Google Maps Geolocation API Location data from cell towers and WiFi nodes.</p>
 <p>Google Maps Directions API Directions between multiple locations.</p>	 <p>Google Maps Elevation API Elevation data for any point in the world.</p>	



Product	Best For...	File Format	Type of Data	Level of Detail	Descriptive Attributes	Vintages Available
TIGER/Line Shapefiles	Most mapping projects—this is our <i>most comprehensive dataset</i> . Designed for use with GIS (geographic information systems).	Shapefiles (.shp) and database files (.dbf)	Boundaries, roads, address information, water features, and more	Full detail (not generalized)	Extensive	2006 - 2016, CD 113
TIGER Geodatabases	Useful for users needing national datasets or all major boundaries by state. Designed for use in ArcGIS. Files are extremely large.	Geodatabase (.gdb)	Boundaries, roads, address information, water features, and more	Full detail (not generalized)	Limited	2013-2016
TIGER/Line with Selected Demographic and Economic Data	Data from selected attributes from the 2010 Census, 2006-2010 through 2010-2014 ACS 5-year estimates and County Business Patterns (CBP) for selected geographies. Designed for use with GIS.	Shapefiles (.shp) and Geodatabases	Boundaries, Population Counts, Housing Unit Counts, 2010 Census Demographic Profile 1 attributes, 2006-2010 through 2010-2014 ACS 5-year estimates data profiles, CBP data.	Full detail (not generalized)	Limited	2013 CBP 2010, 2006-2010 to 2011-2015 ACS 5-Year Estimates
Cartographic Boundary Shapefiles	Small scale (limited detail) mapping projects clipped to shoreline. Designed for thematic mapping using GIS.	Shapefiles (.shp)	Selected boundaries	Less detail (generalized)	Limited	2013-2015, 2010, 2000, 1990
KML - Cartographic Boundary Files	Viewing data or creating maps using Google Earth, Google Maps, or other platforms that use KML.	KML (.kml)	Selected boundaries	Less detail (generalized)	Limited	2013-2015
TIGERweb	Viewing spatial data online or streaming to your mapping application.	Interactive viewer, HTML data files, plus REST and WMS map services	Boundaries, roads, address information, water features, and more	Detailed	Extensive	Current, 2015 ACS, 2014 ACS, 2010 Census

Monthly Economic Indicators
Composite Leading Indicators
Composite Leading Indicators (MEI)
<input type="checkbox"/> Composite Leading Indicators (MEI) i
<input type="checkbox"/> CLI : Frequently Asked Questions
<input type="checkbox"/> Confidence Indicators - OECD Standardised i
Business Tendency and Consumer Opinion Indicators
Business Tendency and Consumer Opinion Surveys (MEI)
<input type="checkbox"/> Consumer opinion surveys i
<input type="checkbox"/> Business Tendency and Consumer Opinion Surveys (MEI) i
<input type="checkbox"/> Business tendency surveys i
Main Economic Indicators
Main Economic Indicators Publication
<input type="checkbox"/> Main Economic Indicators i
<input type="checkbox"/> Business Tendency and Consumer Opinion Surveys i
<input type="checkbox"/> Financial Indicators i
<input type="checkbox"/> Price Indices i
<input type="checkbox"/> International Trade Indicators i
<input type="checkbox"/> Labour Indicators i
<input type="checkbox"/> National Accounts i
<input type="checkbox"/> Production and Sales i

2014 90% Confidence Interval Lower Bound of Estimate of Median Household Income by County(dollars)



Legend

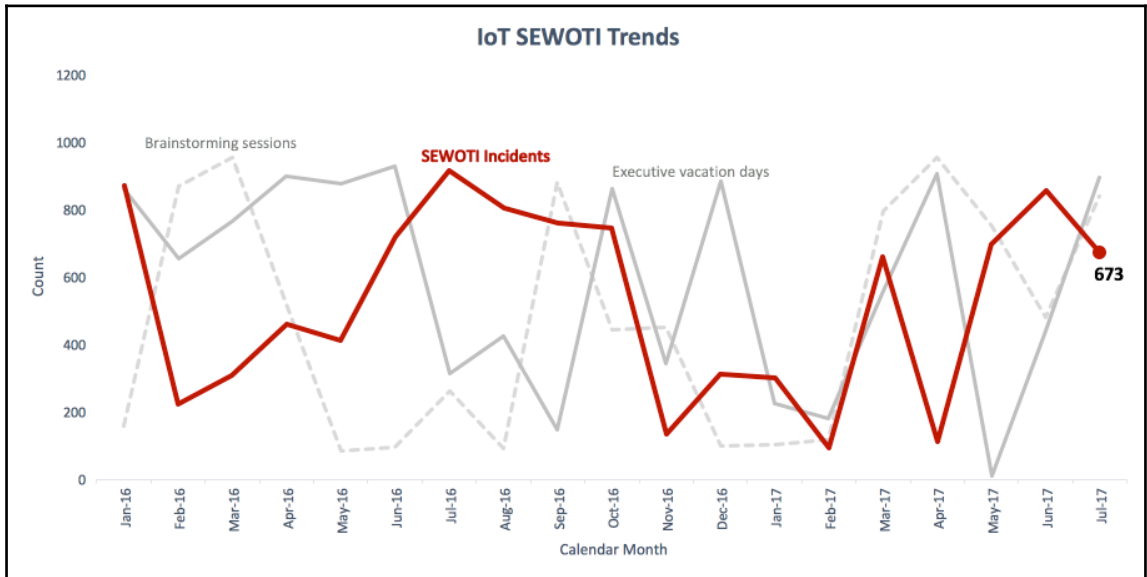
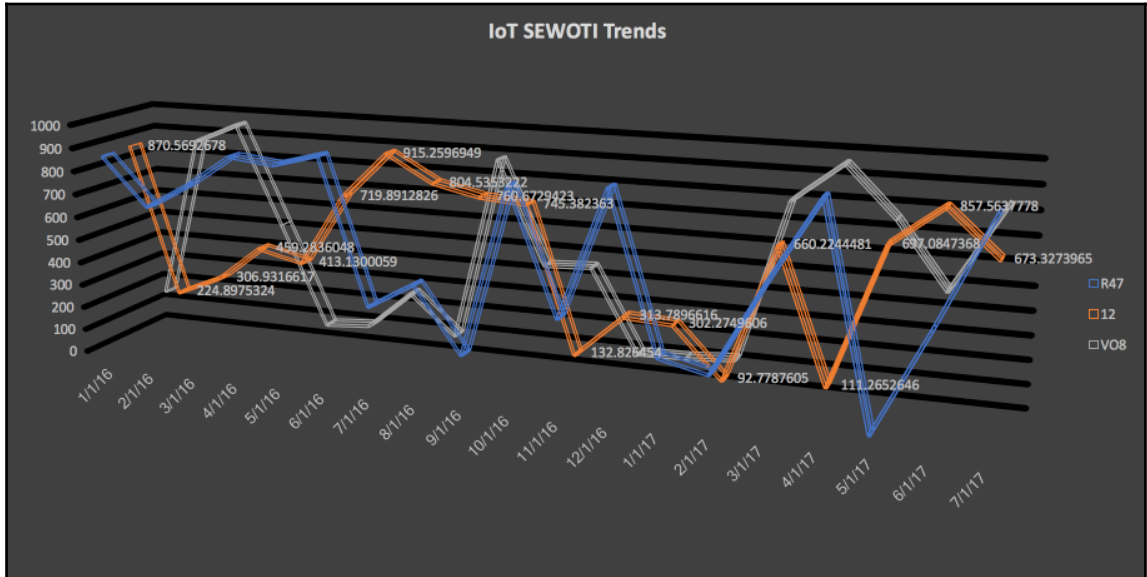
GEO FRED

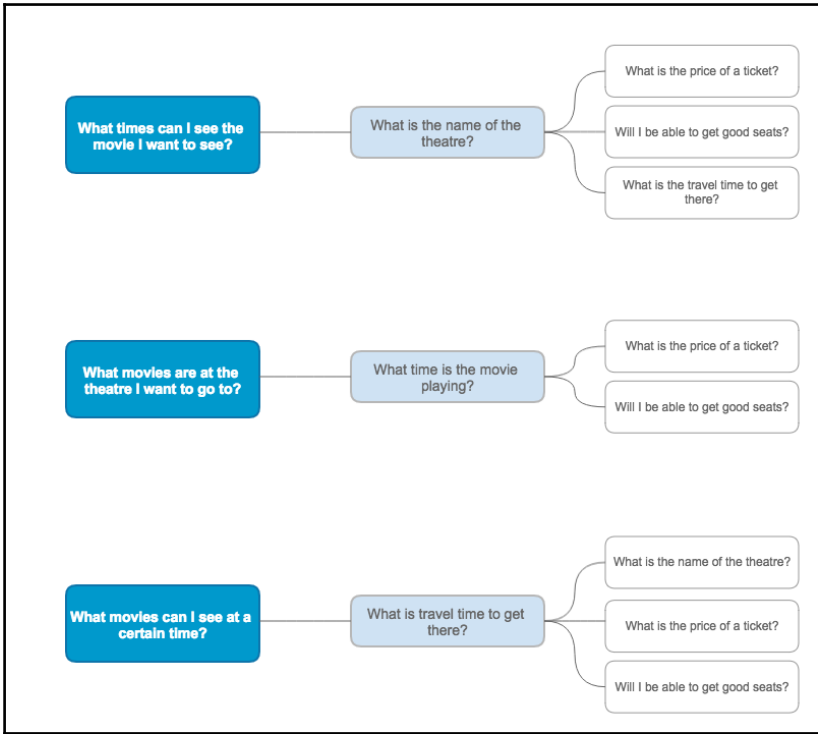
DATE: 2014

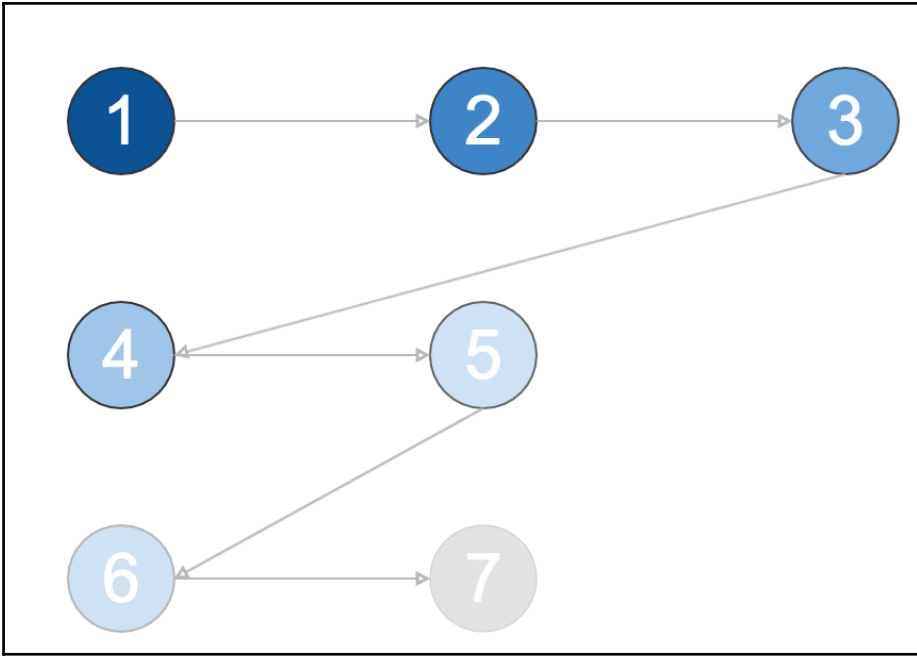
UNITS: (Dollars)

- ≤ 34.07 K
- ≤ 39.35 K
- ≤ 44.32 K
- ≤ 50.66 K
- ≤ 119.39 K
- No Data Available

Chapter 8: Communicating with Others - Visualization and Dashboarding

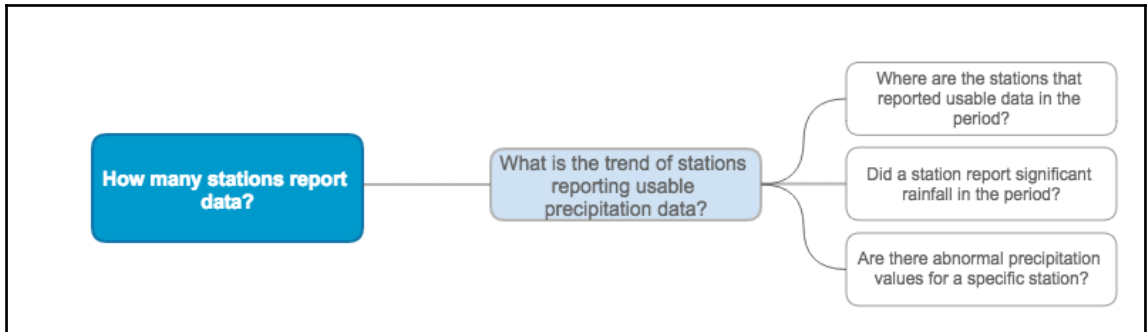






83291381337794749
91422691539122696
17946686489967647
35594183184243557
62144473513428797
96375323638591958

83291381337794749
91422691539122696
17946686489967647
35594183184243557
62144473513428797
96375323638591958



Data | Analytics | Pages

NOAA15minPrecipColor...

Dimensions

- Abc Date
- Measurement Date
- Abc Measurement Flag
- Abc Measurement Flag 1
- Abc Quality Flag
- Abc Quality Flag 1
- Abc Station
- Abc Station Name
- Abc Units
- Abc Units 1
- Abc Measure Names

Filters

Marks

Automatic

Color Size Text

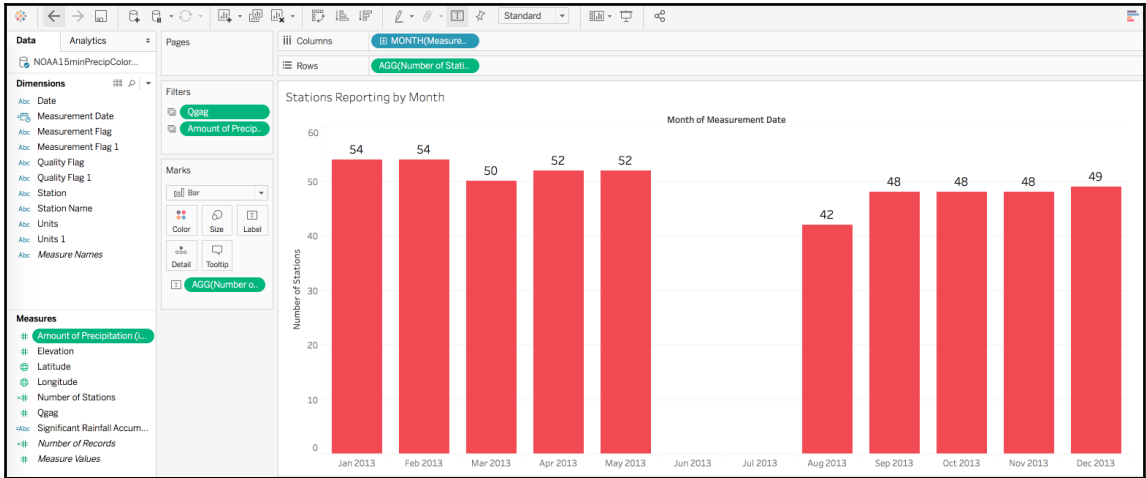
Detail Tooltip

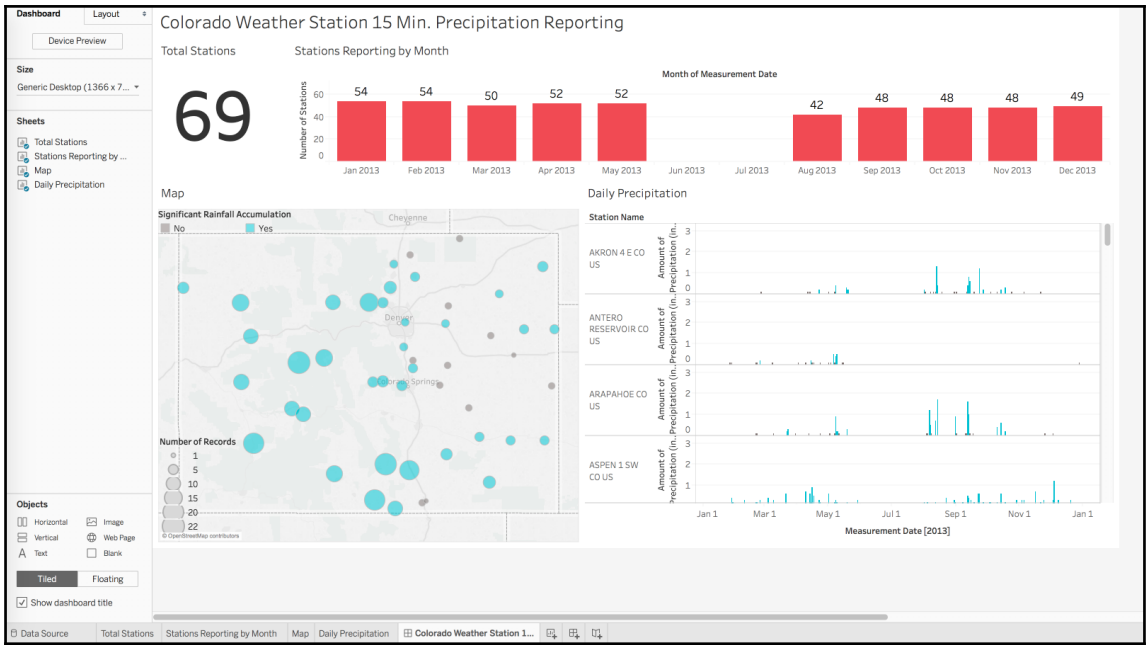
AGG(Number of...

Columns | Rows

Total Stations

69





Colorado Weather Station 15 Min. Precipitation Reporting

Actions

Name	Run On	Source	Fields
DailyPrecipitationFilter	Select	Colorado Weather ...	Station
MapFilter	Select	Colorado Weather ...	MONTH(Measurement Date)

Edit Filter Action

Name: MapFilter

Source Sheets:

- Daily Precipitation
- Map
- Stations Reporting by Month
- Total Stations

Run action on:

-
-
-

Run on single select only

Target Sheets:

- Map

Clearing the selection will:

- Leave the filter
- Show all values
- Exclude all values

Target Filters:

- Selected Fields
- All Fields

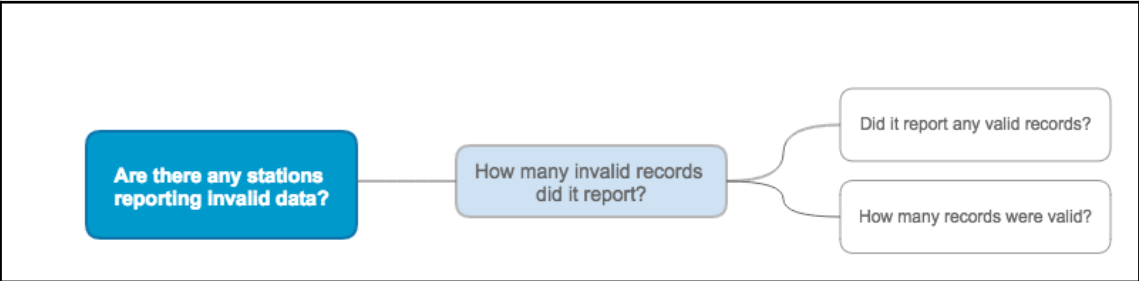
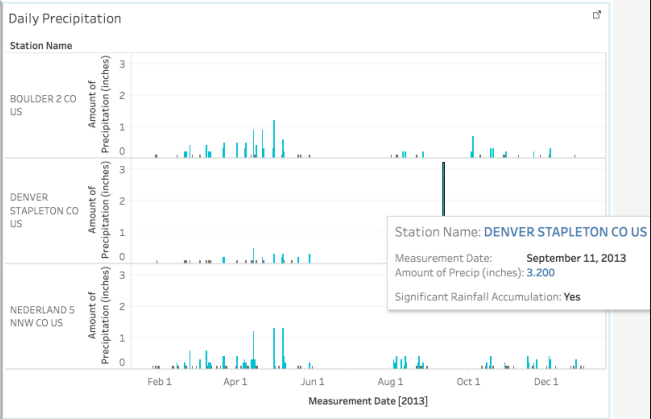
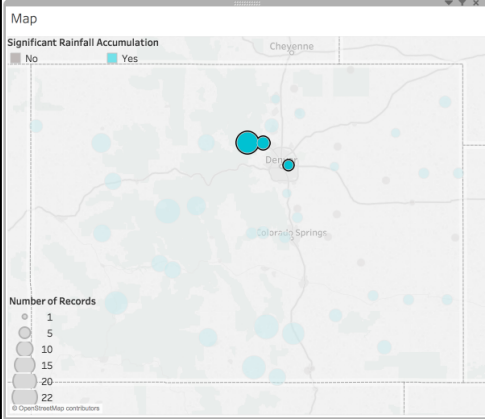
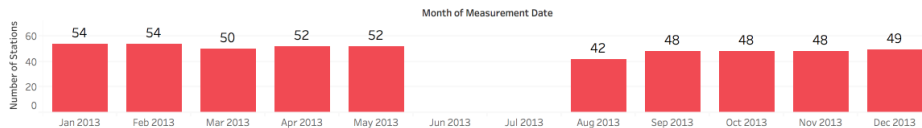
Source Field	Target Field	Target Data Source
MONTH(Measurement Date)	MONTH(Measurement Date)	NOAA15minPrecipColor...

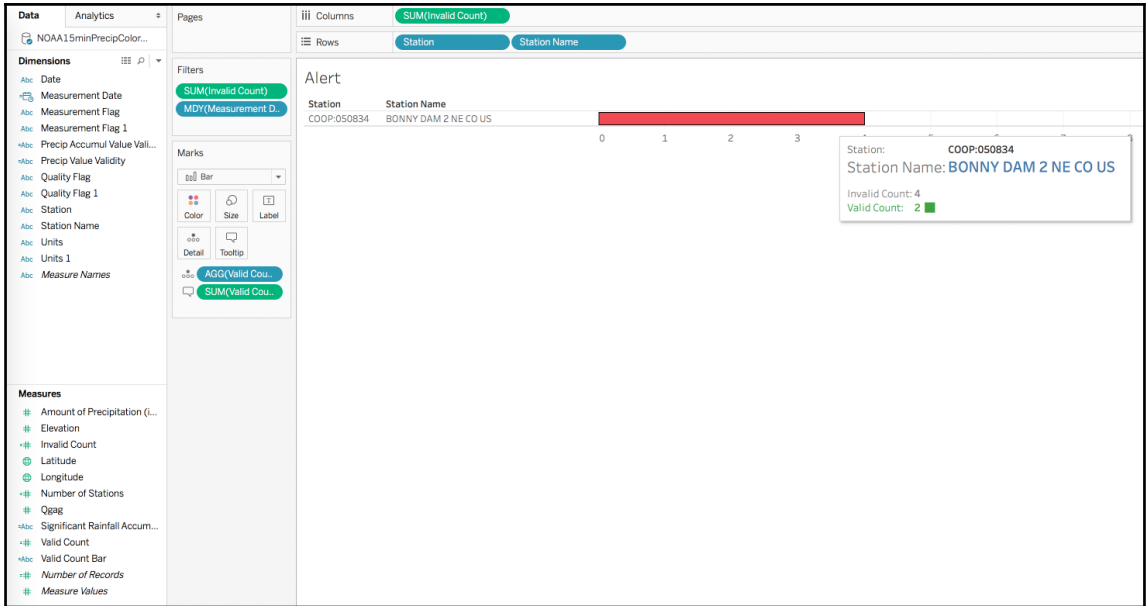
Colorado Weather Station 15 Min. Precipitation Reporting

Total Stations

69

Stations Reporting by Month





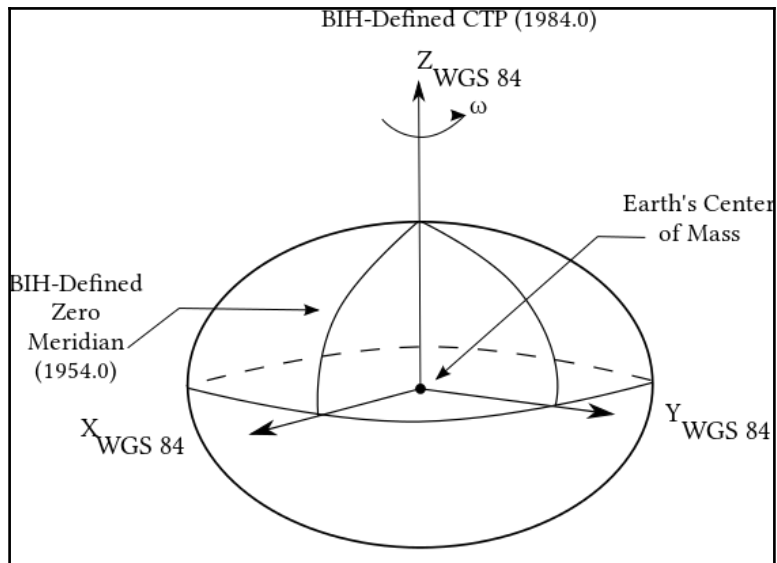
Chapter 9: Applying Geospatial Analytics to IoT Data

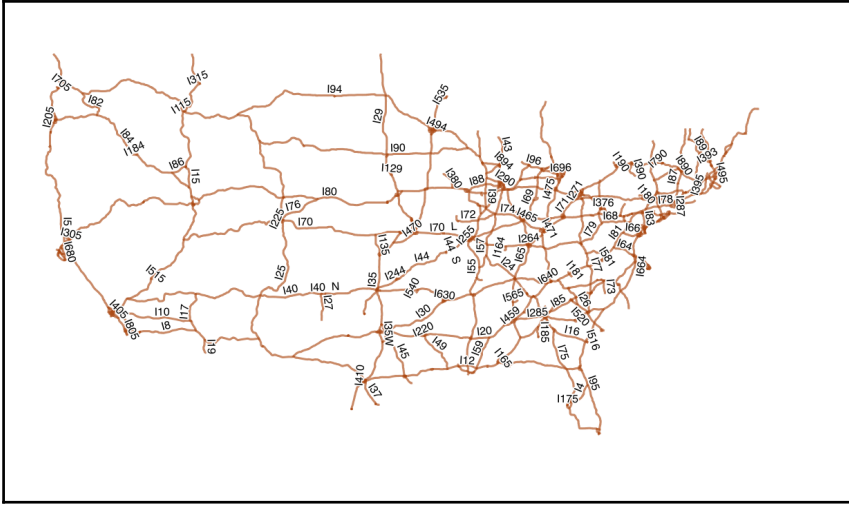


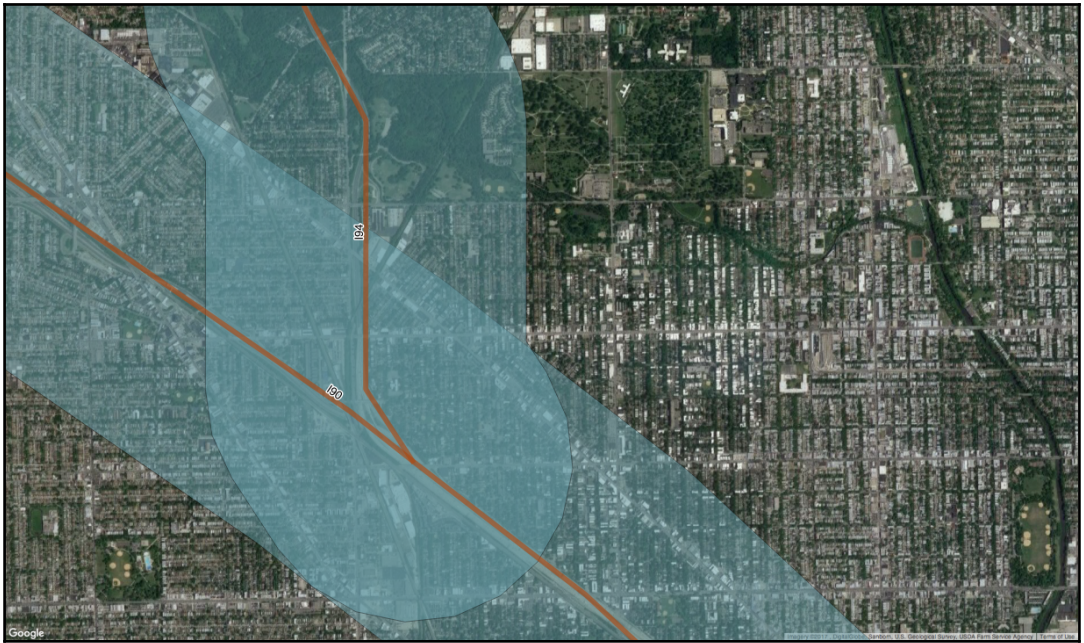
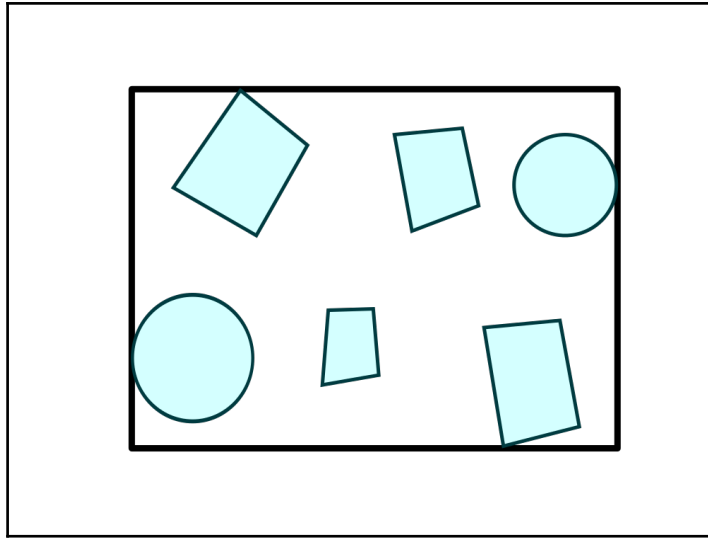
The screenshot shows the website for 'The Republic of Null Island'. The header features a blue background with palm trees and the text 'The Republic of Null Island' and 'LIKE NO PLACE ON EARTH'. Below the header is a navigation menu with links for history, geography, people, economy, travel, and shop. The main content area includes a welcome message, a brief history of the island, and information about its location and flag. A globe on the left shows the island's location on the Prime Meridian. The date 'October 12, 2016' is displayed at the top of the main content area.

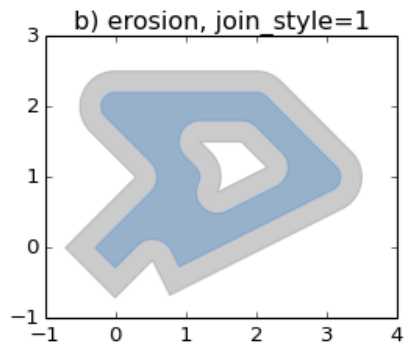
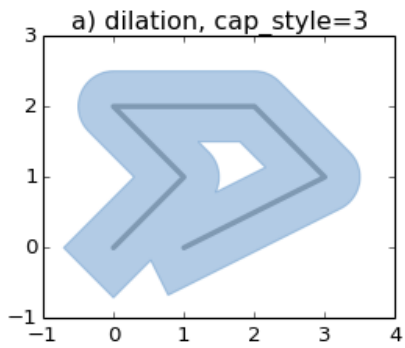
$$\text{hav}(\theta) = \sin^2\left(\frac{\theta}{2}\right) = \frac{1 - \cos(\theta)}{2}$$

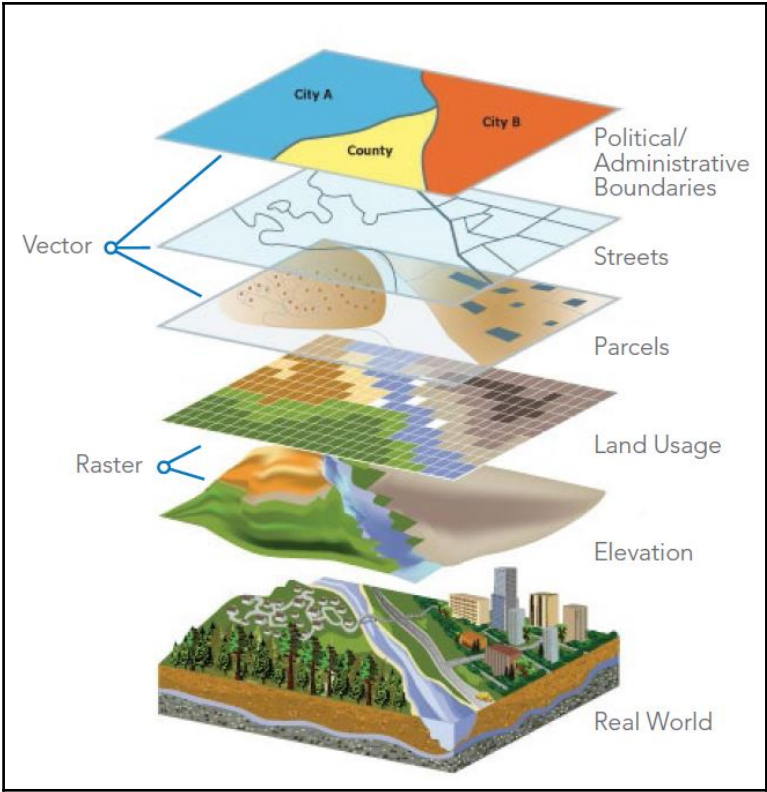
Parameter	Notation	Value
Flattening Factor of the Earth	$1/f$	298.257223563
Geocentric Gravitational Constant	GM	$3986004.418 \cdot 10^8 \text{ m}^3/\text{s}^2$
Nominal Mean Angular Velocity	ω	$7292115 \cdot 10^{-11} \text{ rad/s}$
Semi-major Axis	a	6378137.0 m
















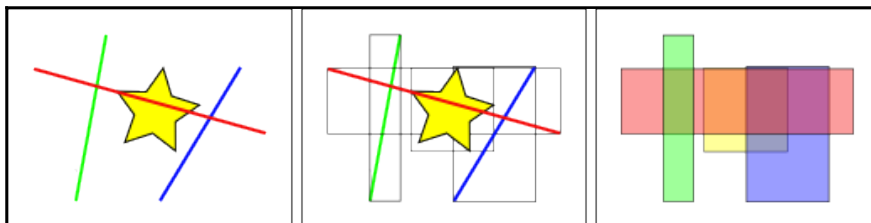


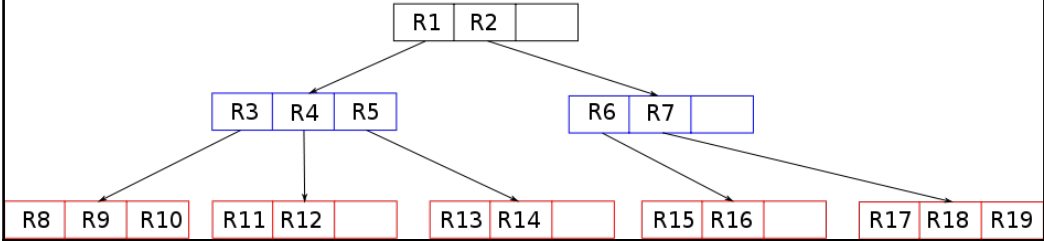
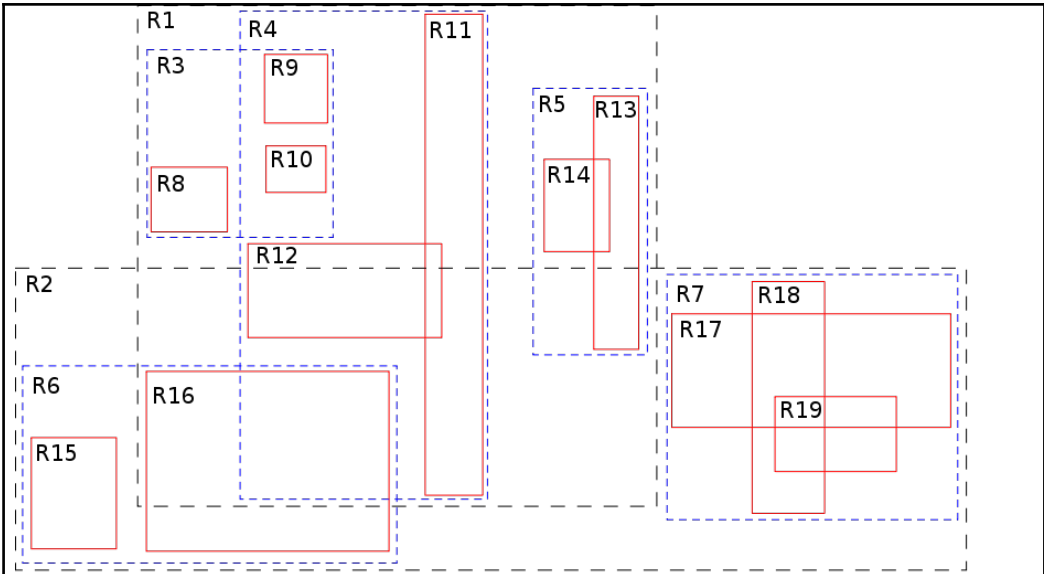
Geometry primitives (2D)

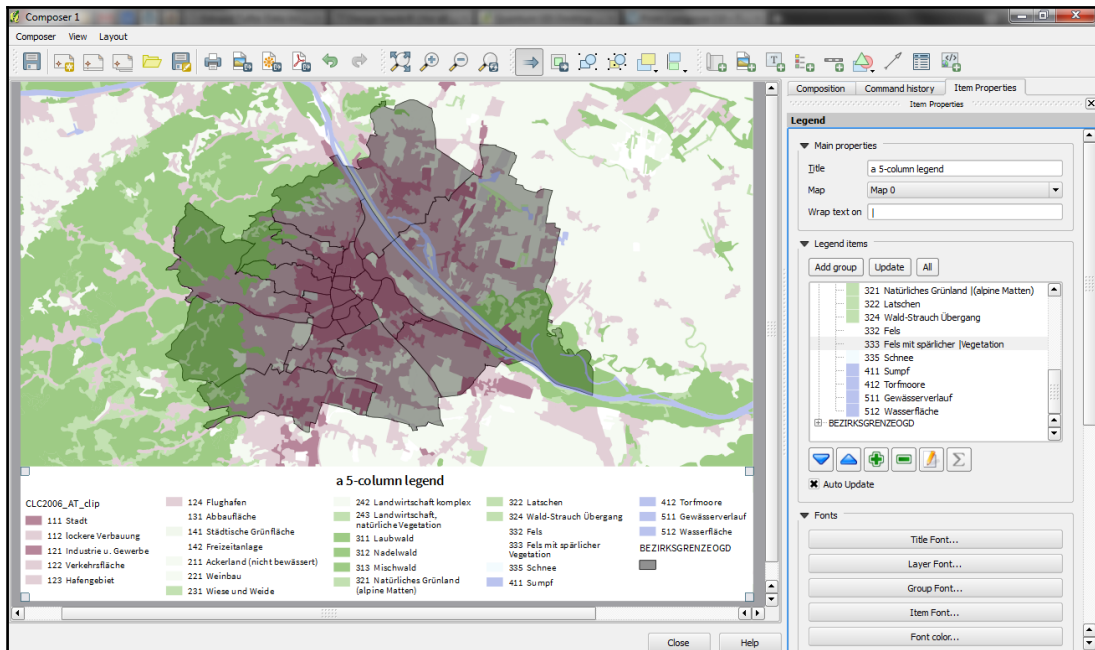
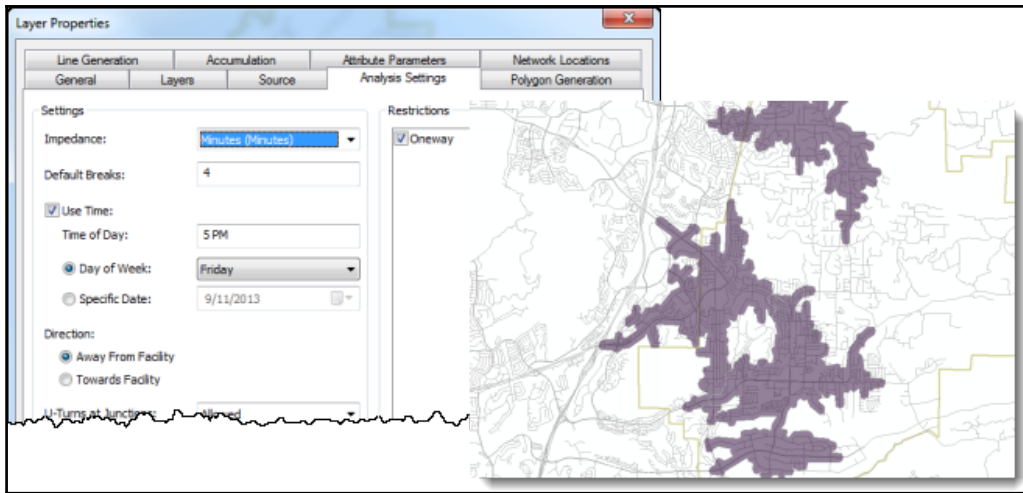
Type	Examples	
Point		<code>POINT (30 10)</code>
LineString		<code>LINESTRING (30 10, 10 30, 40 40)</code>
Polygon		<code>POLYGON ((30 10, 40 40, 20 40, 10 20, 30 10))</code>
		<code>POLYGON ((35 10, 45 45, 15 40, 10 20, 35 10), (20 30, 35 35, 30 20, 20 30))</code>

Multipart geometries (2D)

Type	Examples	
MultiPoint		<code>MULTIPOINT ((10 40), (40 30), (20 20), (30 10))</code>
		<code>MULTIPOINT (10 40, 40 30, 20 20, 30 10)</code>
MultiLineString		<code>MULTILINESTRING ((10 10, 20 20, 10 40), (40 40, 30 30, 40 20, 30 10))</code>
MultiPolygon		<code>MULTIPOLYGON (((30 20, 45 40, 10 40, 30 20)), ((15 5, 40 10, 10 20, 5 10, 15 5)))</code>
		<code>MULTIPOLYGON (((40 40, 20 45, 45 30, 40 40)), ((20 35, 10 30, 10 10, 30 5, 45 20, 20 35), (30 20, 20 15, 20 25, 30 20)))</code>



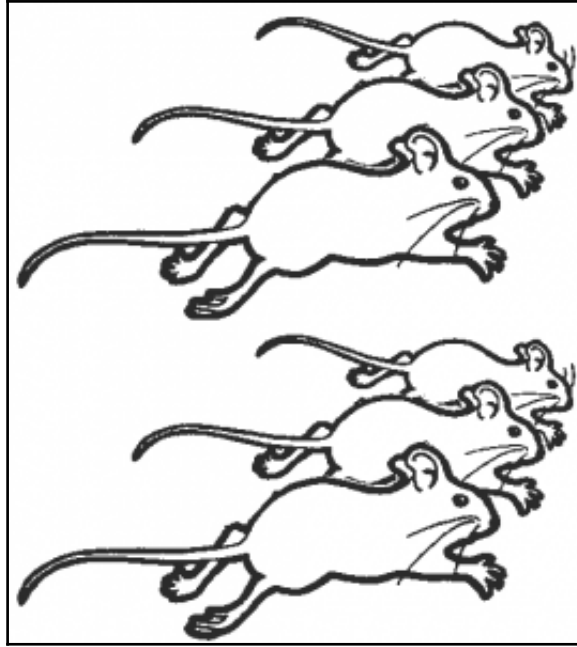




Chapter 10: Data Science for IoT Analytics

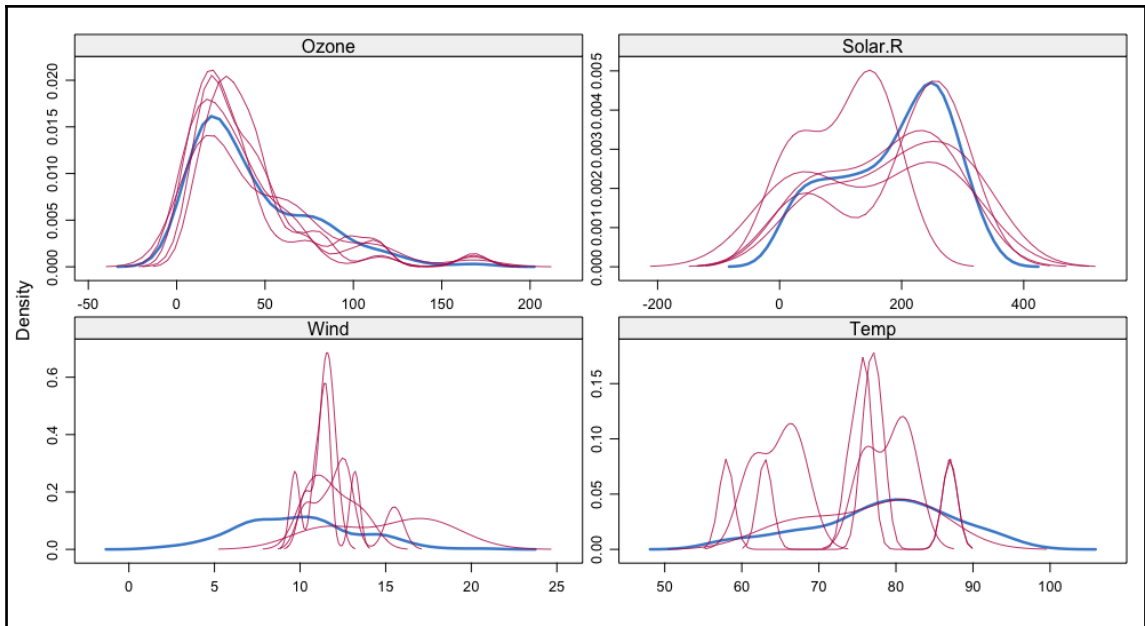


Representation	Evaluation	Optimization
Instances	Accuracy/Error rate	Combinatorial optimization
<i>K</i> -nearest neighbor	Precision and recall	Greedy search
Support vector machines	Squared error	Beam search
Hyperplanes	Likelihood	Branch-and-bound
Naive Bayes	Posterior probability	Continuous optimization
Logistic regression	Information gain	Unconstrained
Decision trees	K-L divergence	Gradient descent
Sets of rules	Cost/Utility	Conjugate gradient
Propositional rules	Margin	Quasi-Newton methods
Logic programs		Constrained
Neural networks		Linear programming
Graphical models		Quadratic programming
Bayesian networks		
Conditional random fields		



Ozone	Solar.R	Wind	Temp	Month	Day
Min. : 1.00	Min. : 7.0	Min. : 1.700	Min. :56.00	Min. :5.000	Min. : 1.0
1st Qu.: 18.00	1st Qu.:115.8	1st Qu.: 7.400	1st Qu.:72.00	1st Qu.:6.000	1st Qu.: 8.0
Median : 31.50	Median :205.0	Median : 9.700	Median :79.00	Median :7.000	Median :16.0
Mean : 42.13	Mean :185.9	Mean : 9.958	Mean :77.88	Mean :6.993	Mean :15.8
3rd Qu.: 63.25	3rd Qu.:258.8	3rd Qu.:11.500	3rd Qu.:85.00	3rd Qu.:8.000	3rd Qu.:23.0
Max. :168.00	Max. :334.0	Max. :20.700	Max. :97.00	Max. :9.000	Max. :31.0
NA's :37	NA's :7				

Ozone	Solar.R	Wind	Temp	Month	Day
Min. : 1.00	Min. : 7.0	Min. : 1.700	Min. :57.00	Min. :5.000	Min. : 1.0
1st Qu.: 18.00	1st Qu.:115.8	1st Qu.: 7.400	1st Qu.:73.00	1st Qu.:6.000	1st Qu.: 8.0
Median : 31.50	Median :205.0	Median : 9.700	Median :79.00	Median :7.000	Median :16.0
Mean : 42.13	Mean :185.9	Mean : 9.848	Mean :78.28	Mean :6.993	Mean :15.8
3rd Qu.: 63.25	3rd Qu.:258.8	3rd Qu.:11.500	3rd Qu.:85.00	3rd Qu.:8.000	3rd Qu.:23.0
Max. :168.00	Max. :334.0	Max. :20.700	Max. :97.00	Max. :9.000	Max. :31.0
NA's :37	NA's :7	NA's :5	NA's :5		

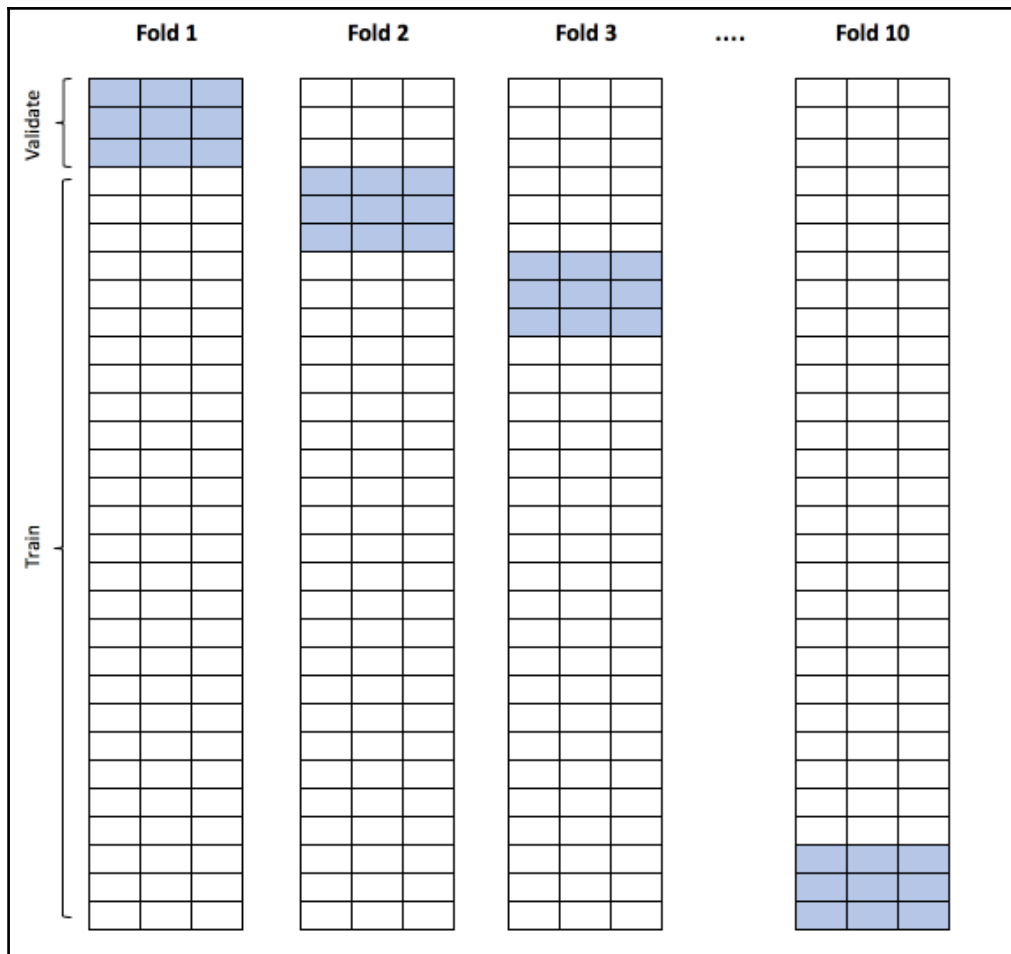


Ozone	Solar.R	Wind	Temp
Min. : 1.0	Min. : 7.0	Min. : 1.70	Min. : 57.00
1st Qu.: 18.0	1st Qu.: 115.0	1st Qu.: 7.40	1st Qu.: 72.00
Median : 31.0	Median : 212.0	Median : 9.70	Median : 79.00
Mean : 42.6	Mean : 186.2	Mean : 10.01	Mean : 77.83
3rd Qu.: 63.0	3rd Qu.: 259.0	3rd Qu.: 11.50	3rd Qu.: 85.00
Max. : 168.0	Max. : 334.0	Max. : 20.70	Max. : 97.00

```

[1] mice.impute.2l.norm      mice.impute.2l.pan      mice.impute.2lonly.mean  mice.impute.2lonly.norm
[5] mice.impute.2lonly.pmm  mice.impute.cart       mice.impute.fastpmm     mice.impute.lda
[9] mice.impute.logreg      mice.impute.logreg.boot mice.impute.mean        mice.impute.midastouch
[13] mice.impute.norm        mice.impute.norm.boot  mice.impute.norm.nob    mice.impute.norm.predict
[17] mice.impute.passive     mice.impute.pmm        mice.impute.polr        mice.impute.polyreg
[21] mice.impute.quadratic   mice.impute.rf         mice.impute.ri          mice.impute.sample
[25] mice.mids               mice.theme
see '?methods' for accessing help and source code

```

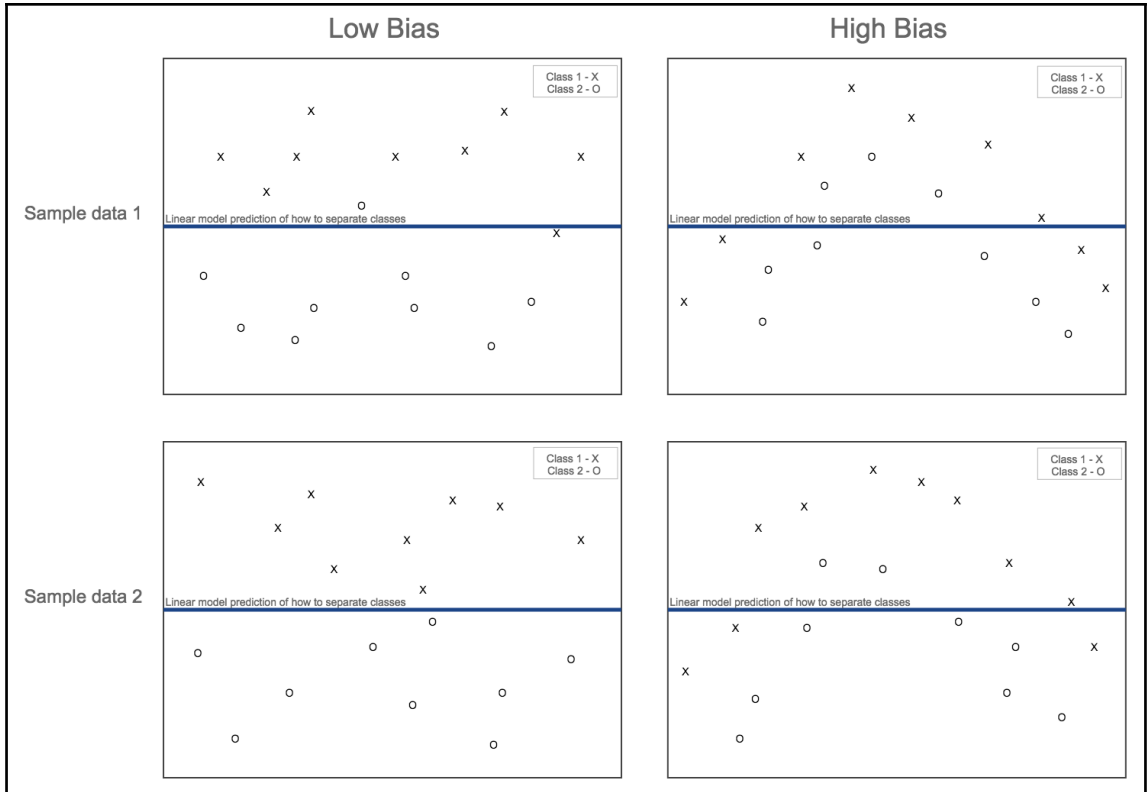


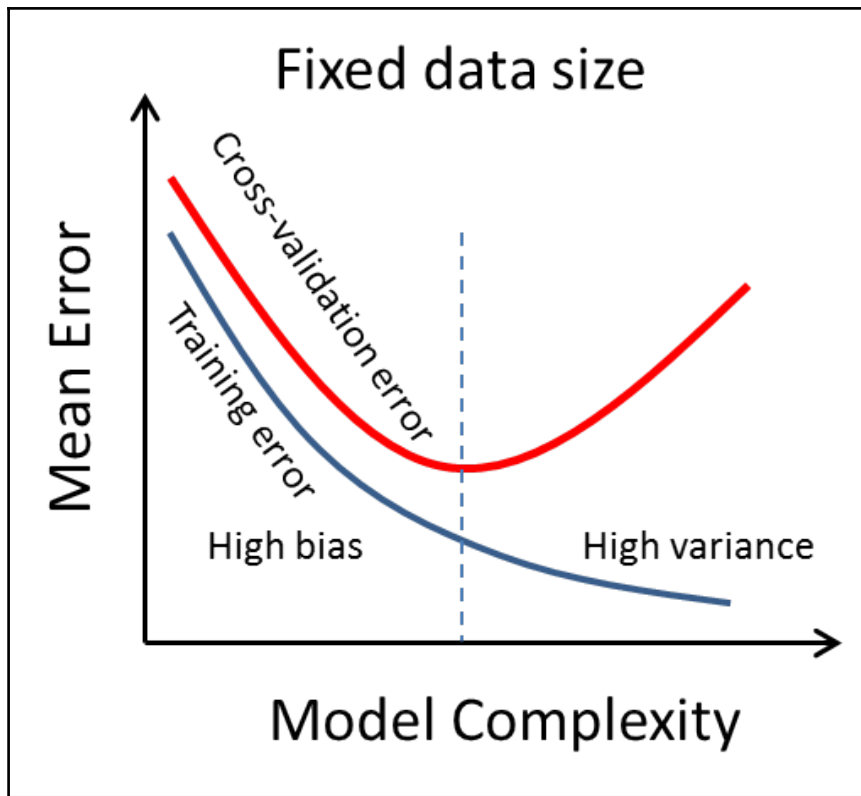
Confusion Matrix Example

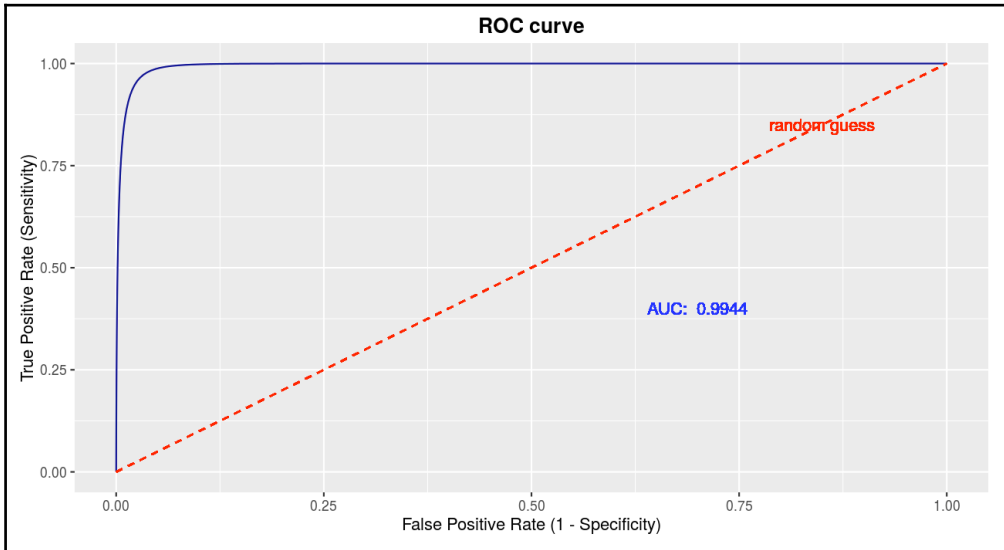
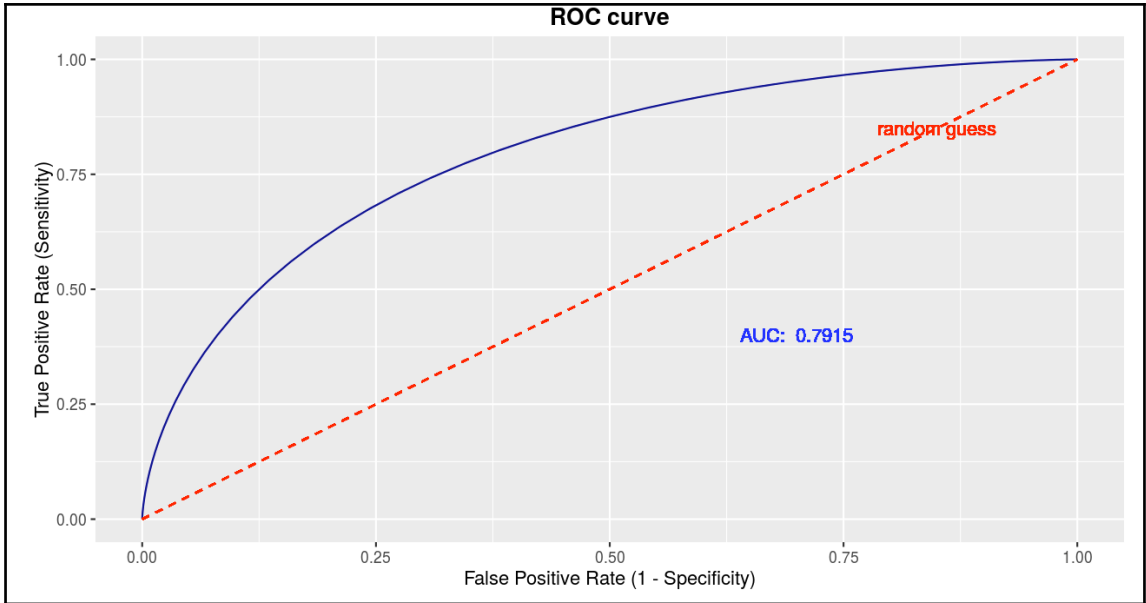
		Actual (Reference)	
		Class1	Class2
Prediction	Class1	True Positive (TP)	False Positive (FP)
	Class2	False Negative (FN)	True Negative (TN)

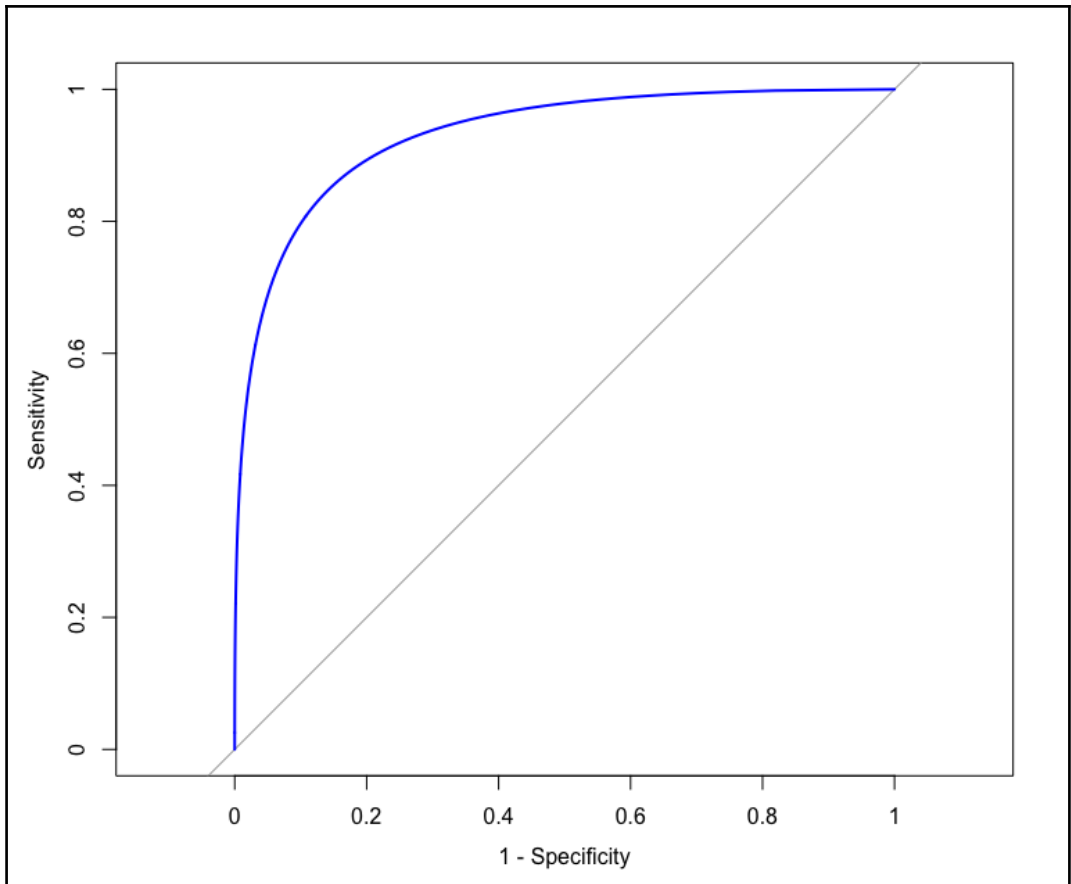
Class1 is considered the target class for prediction in this example

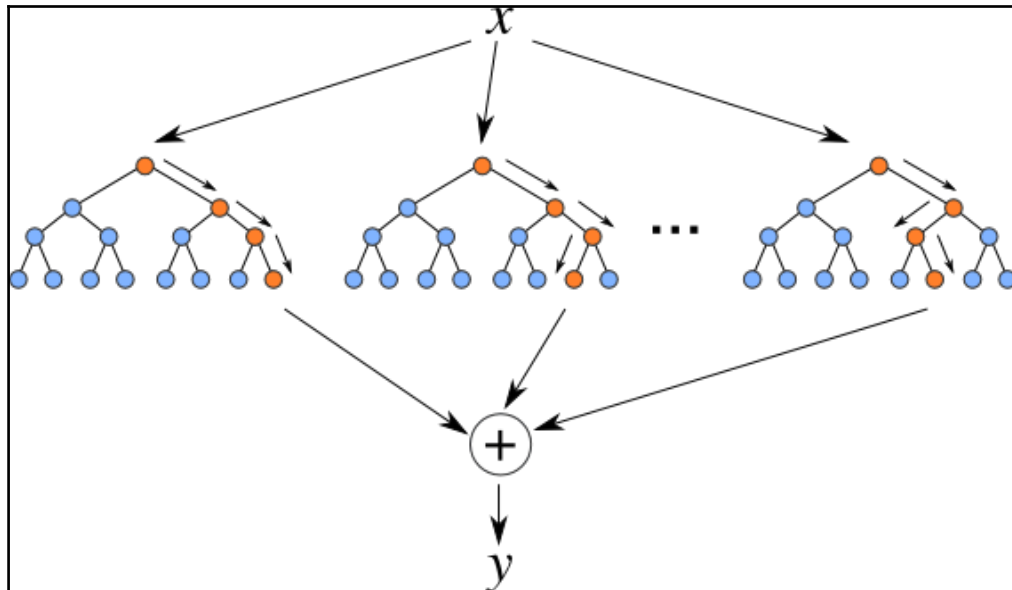
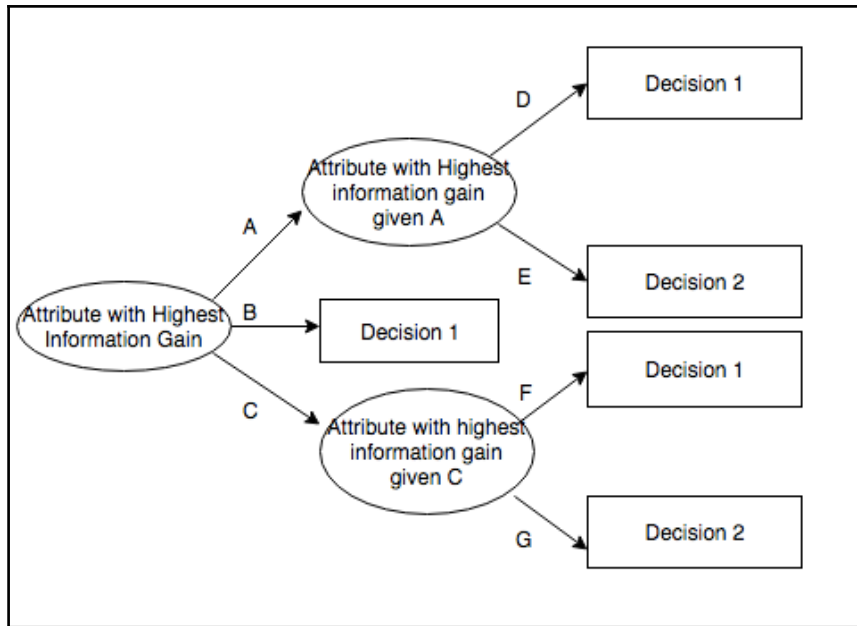
Reference		
Prediction	Class1	Class2
Class1	380	57
Class2	79	484











Confusion Matrix and Statistics

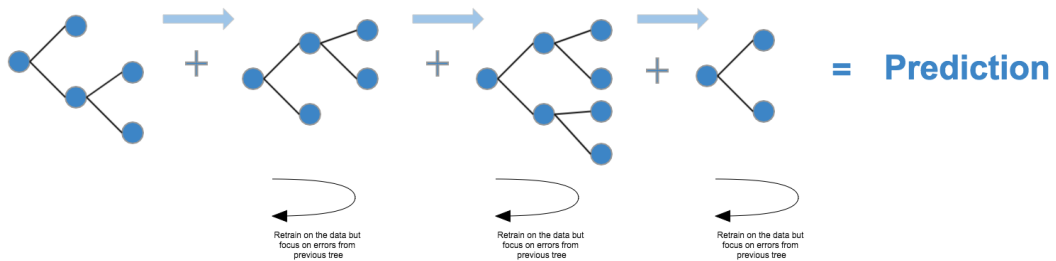
Reference
Prediction cold hot
cold 14 5
hot 6 20

Accuracy : 0.7556
95% CI : (0.6046, 0.8712)
No Information Rate : 0.5556
P-Value [Acc > NIR] : 0.004499

Kappa : 0.5025
McNemar's Test P-Value : 1.000000

Sensitivity : 0.8000
Specificity : 0.7000
Pos Pred Value : 0.7692
Neg Pred Value : 0.7368
Prevalence : 0.5556
Detection Rate : 0.4444
Detection Prevalence : 0.5778
Balanced Accuracy : 0.7500

'Positive' Class : hot



Stay Shallow, My Friends!
Your weakness, is my strength...

Confusion Matrix and Statistics

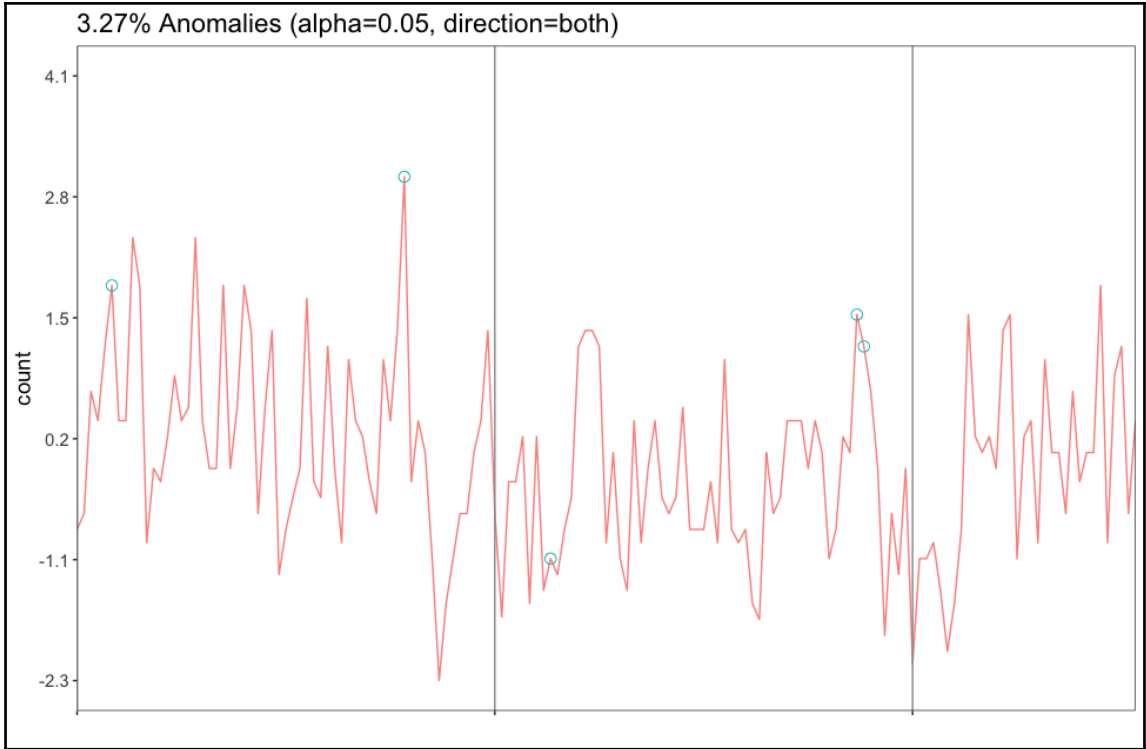
Reference
Prediction cold hot
cold 16 5
hot 4 20

Accuracy : 0.8
95% CI : (0.654, 0.9042)
No Information Rate : 0.5556
P-Value [Acc > NIR] : 0.0005445

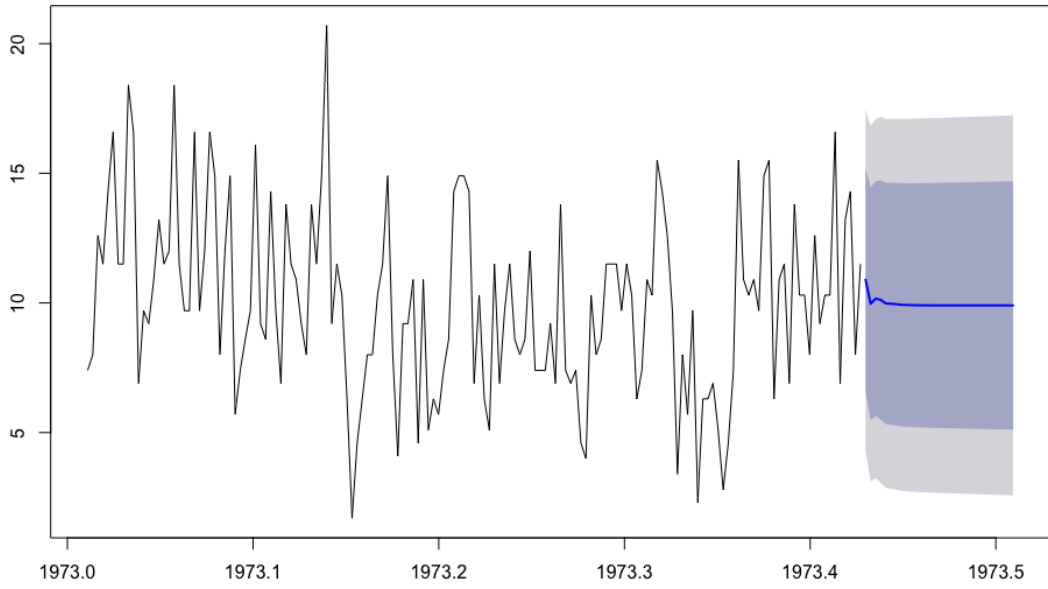
Kappa : 0.597
McNemar's Test P-Value : 1.0000000

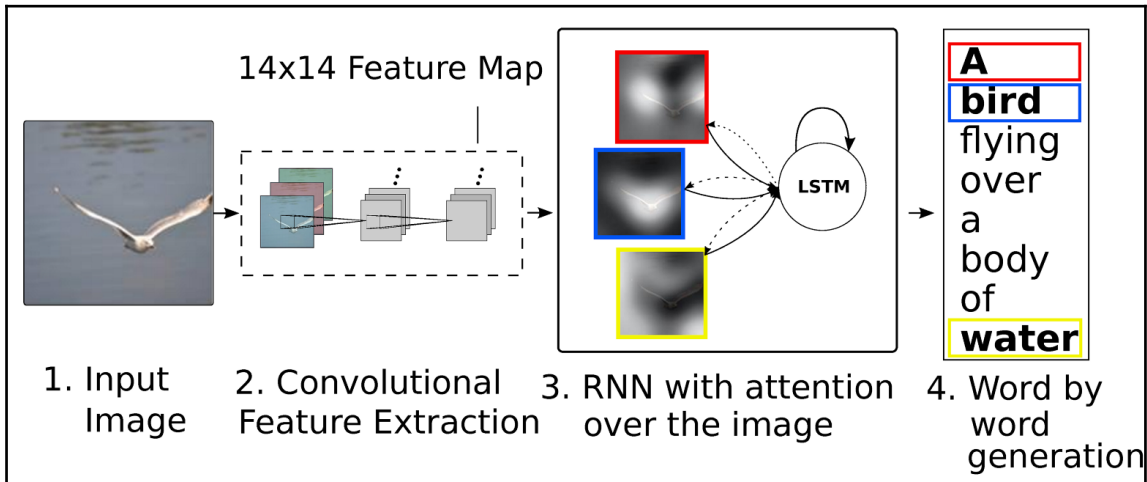
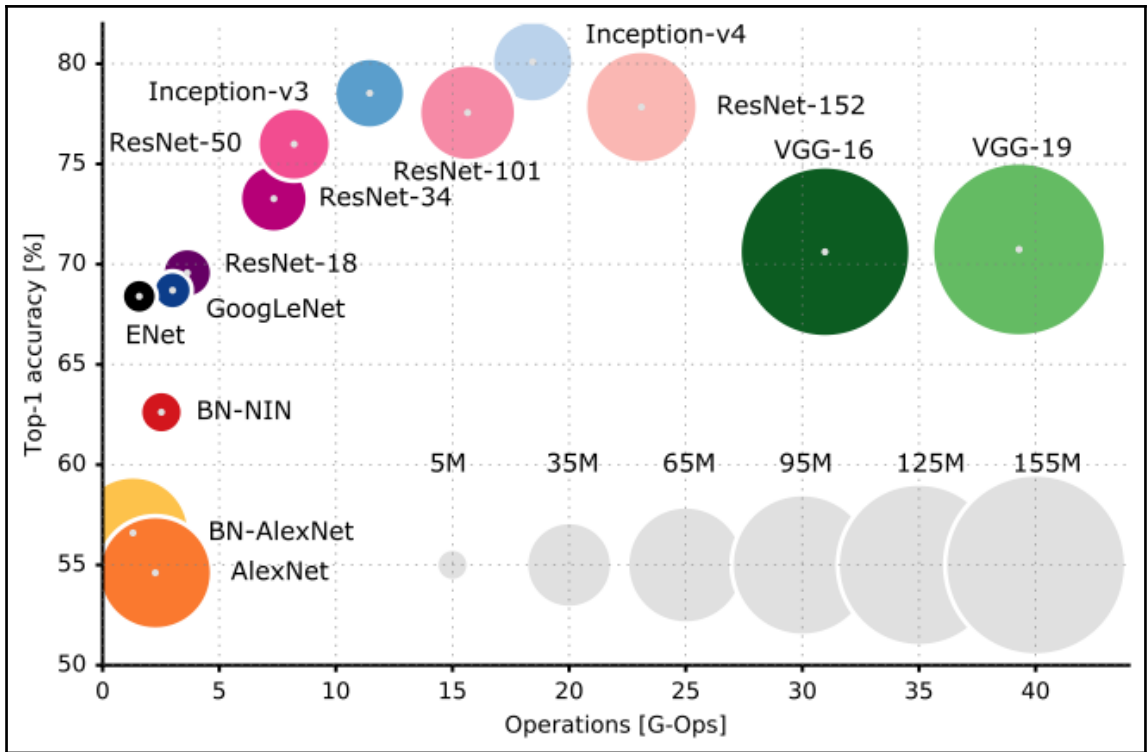
Sensitivity : 0.8000
Specificity : 0.8000
Pos Pred Value : 0.8333
Neg Pred Value : 0.7619
Prevalence : 0.5556
Detection Rate : 0.4444
Detection Prevalence : 0.5333
Balanced Accuracy : 0.8000

'Positive' Class : hot



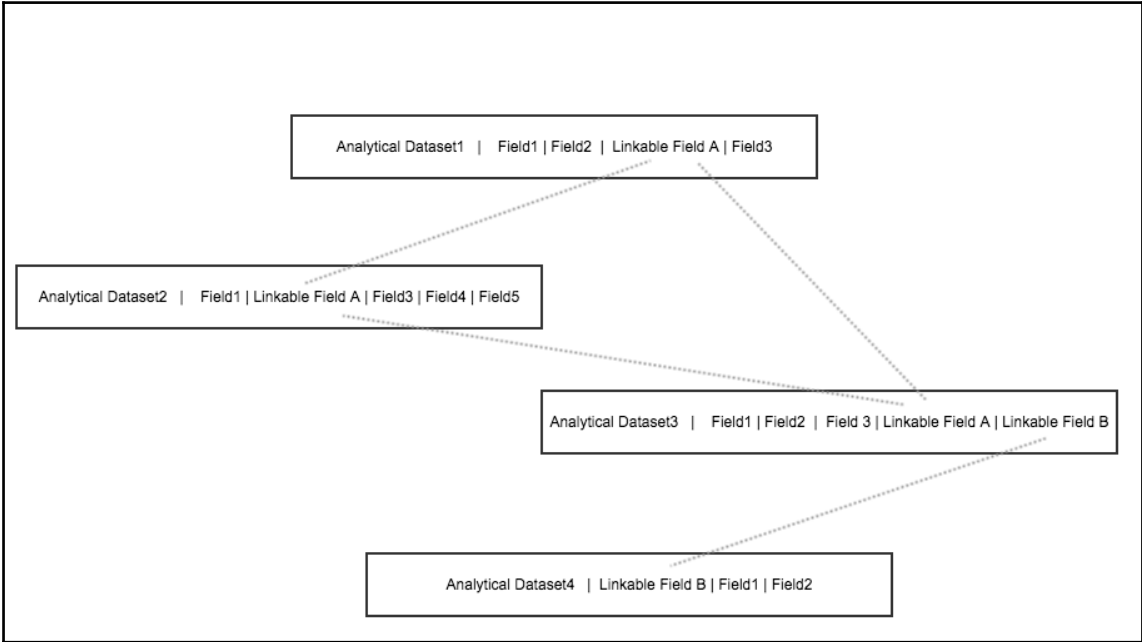
Forecasts from ARIMA(3,1,1)

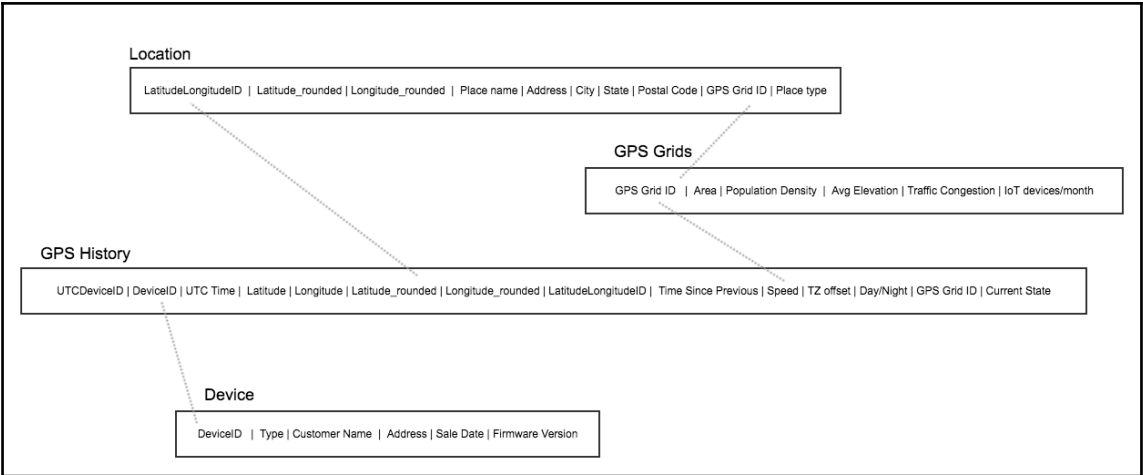


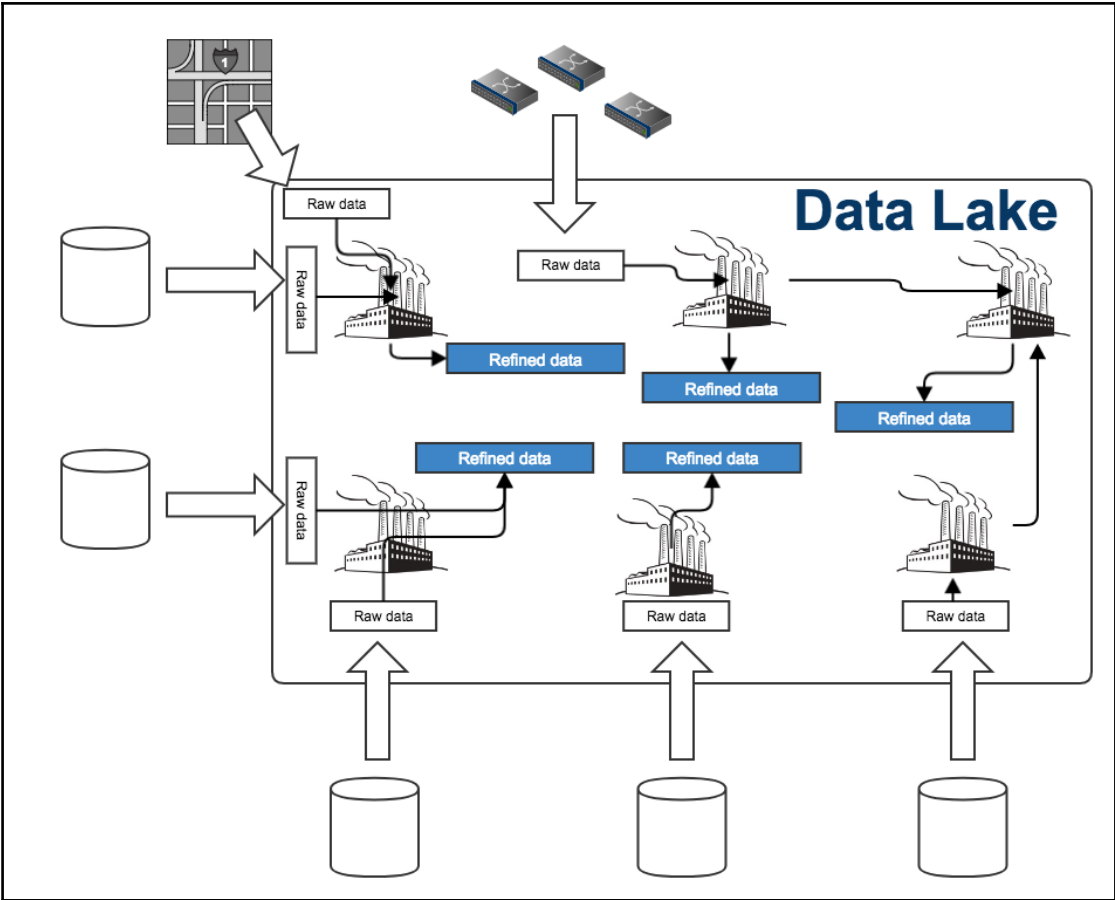


Chapter 11: Strategies to Organize Data for Analytics

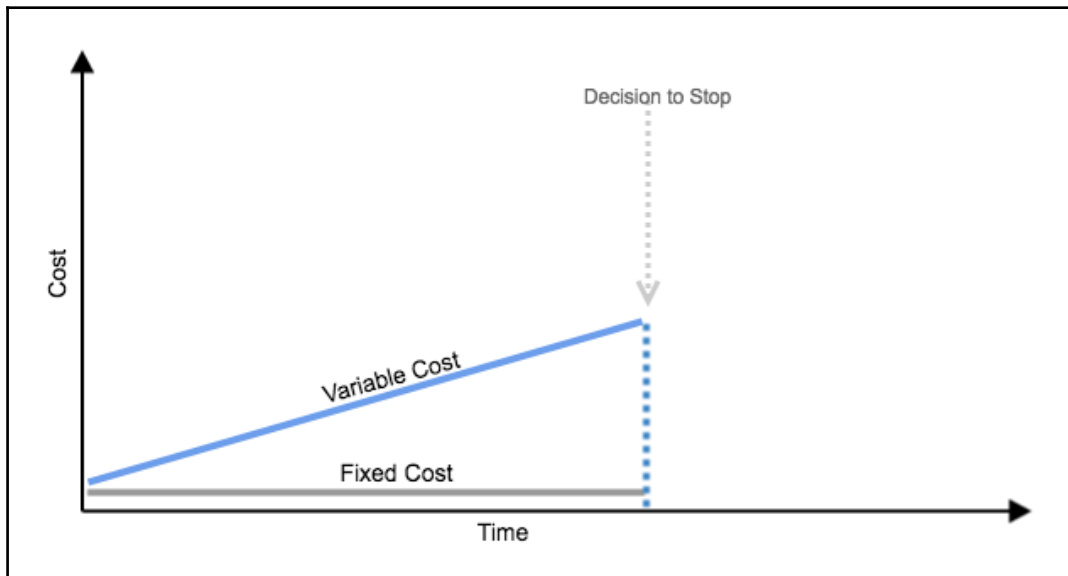
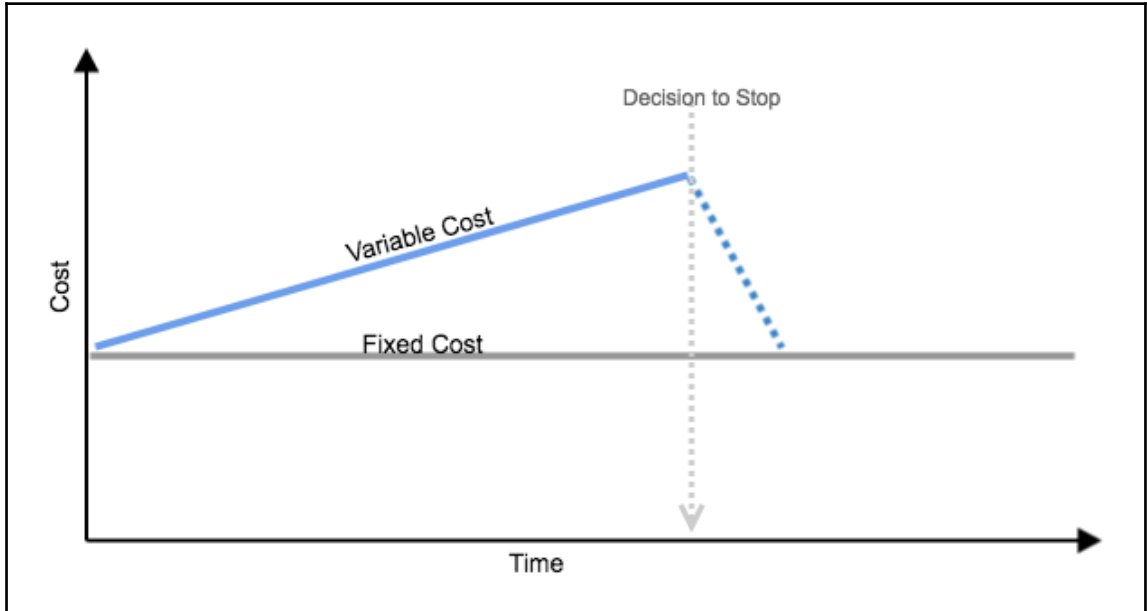
UTC Time	Latitude	Longitude	Time since previous (sec)	Speed (km)	Current time zone offset	Day/Night	GPS grid identifier	Current State
6/19/2017 3:15:04	41.881832	-87.623177	15	0	-5	N	U2345	Parked
6/19/2017 3:15:24	41.881834	-87.623181	20	5	-5	N	U2345	Driving
6/19/2017 3:15:44	41.881828	-87.623182	20	20	-5	N	U2345	Driving
6/19/2017 3:16:04	41.881841	-87.623187	20	25	-5	N	U2344	Driving

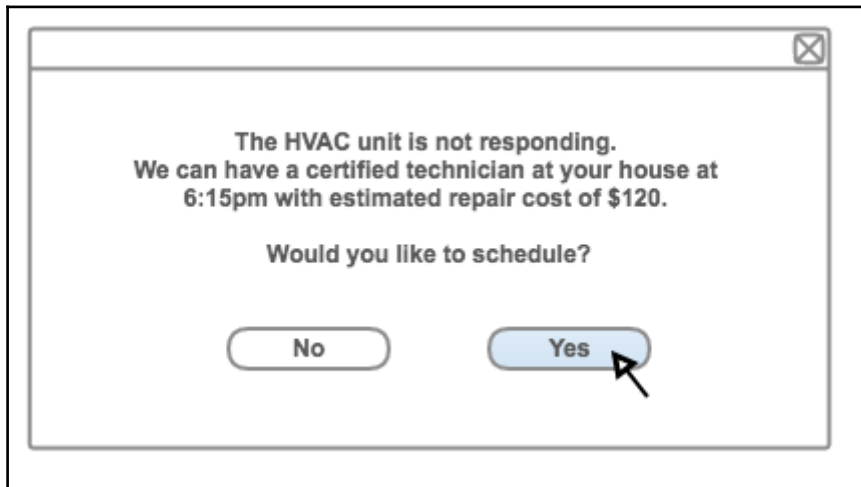
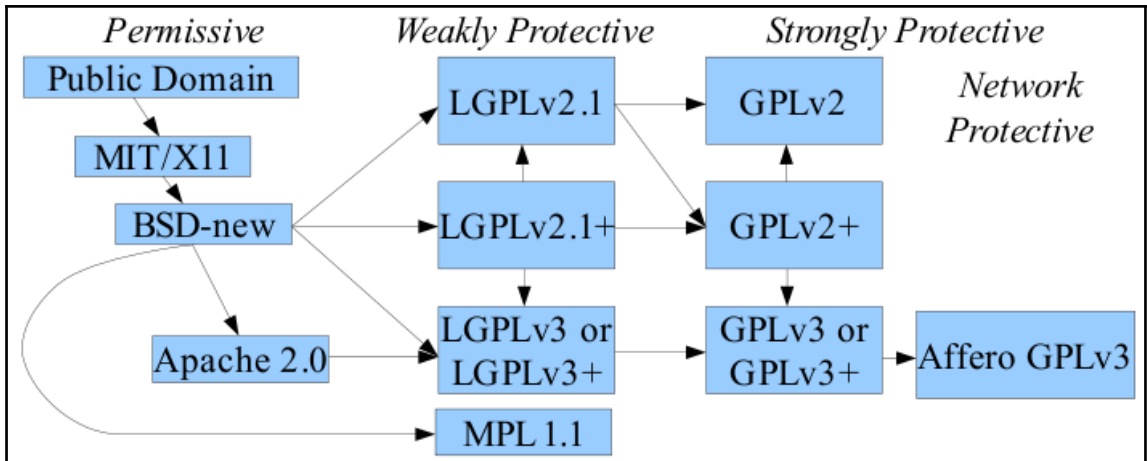




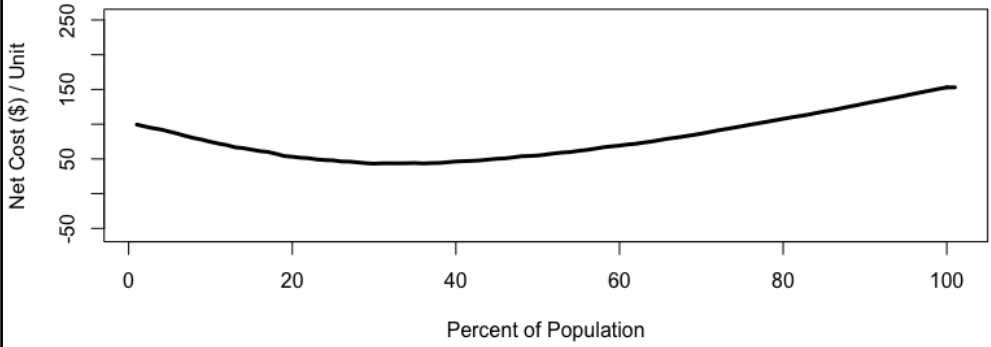


Chapter 12: The Economics of IoT Analytics

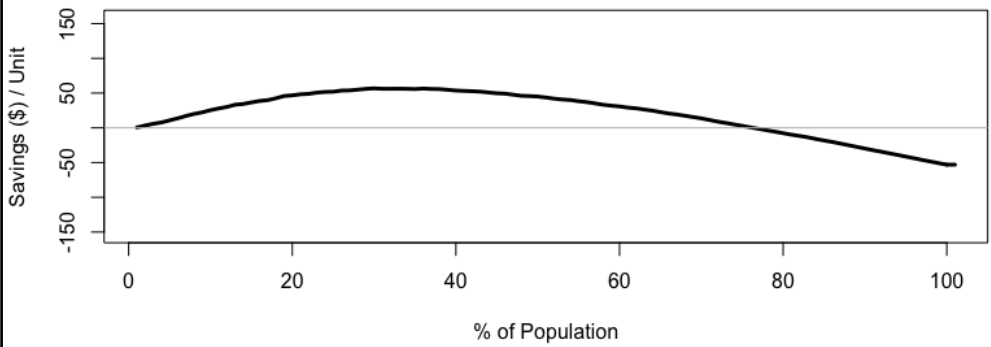




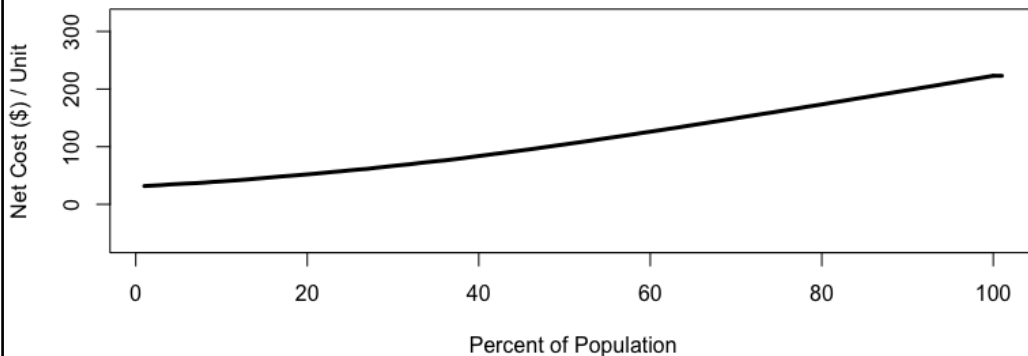
Net Costs: Proactive Repair Cost of \$253, Failure cost \$1000



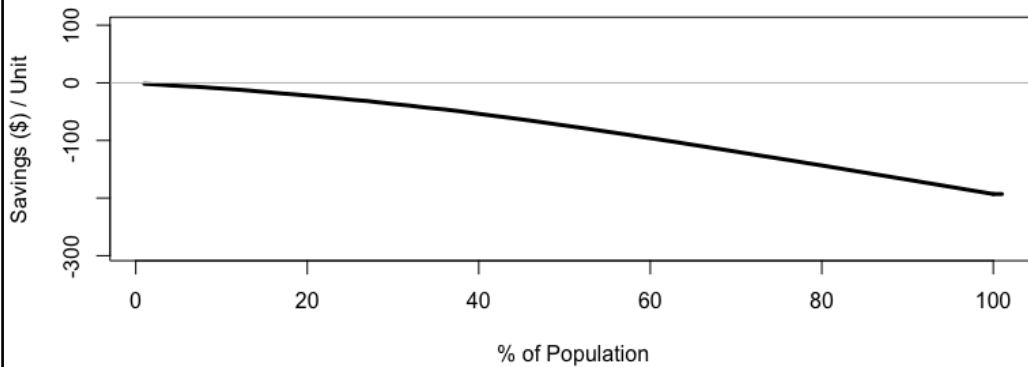
Savings: Proactive Repair Cost of \$253, Failure cost \$1000



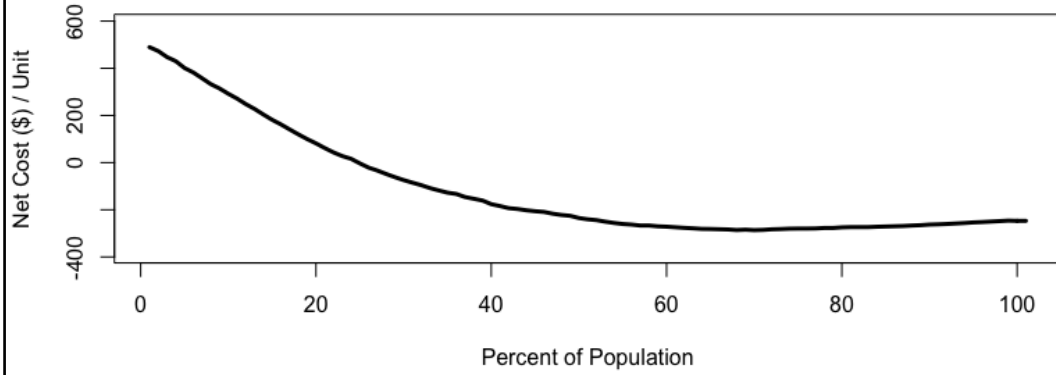
Net Costs: Proactive Repair Cost of \$253, Failure cost \$300



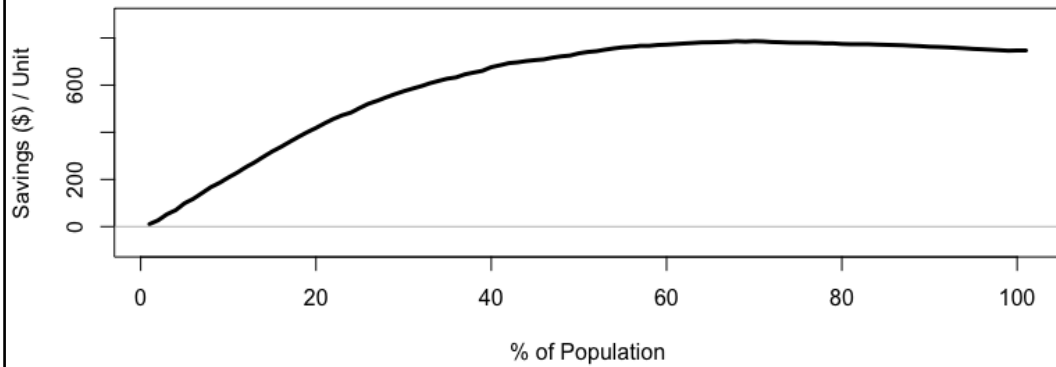
Savings: Proactive Repair Cost of \$253, Failure cost \$300



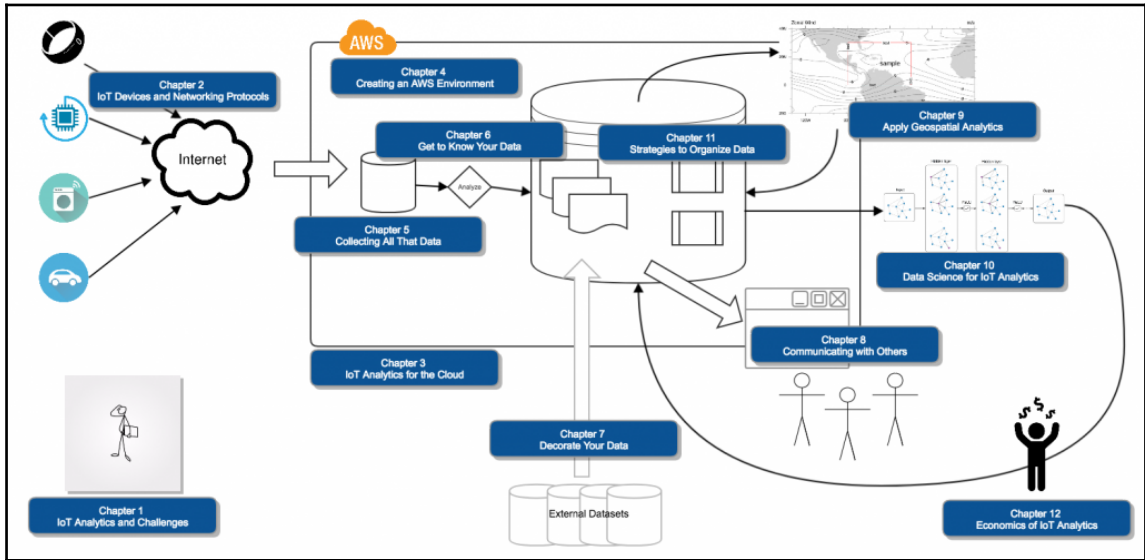
Net Costs: Proactive Repair Cost of \$253, Failure cost \$5000



Savings: Proactive Repair Cost of \$253, Failure cost \$5000



Chapter 13: Bringing It All Together



THE THEORY OF HOW THE FINANCIAL SYSTEM CREATED AAA-RATED ASSETS OUT OF SUBPRIME MORTGAGES

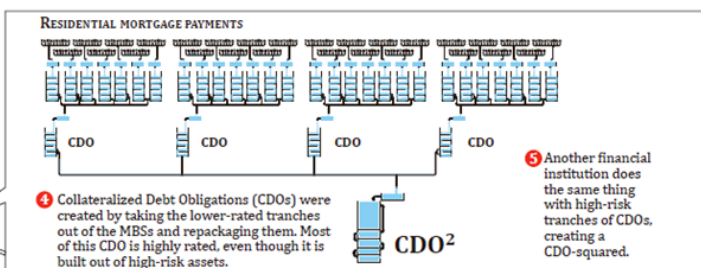
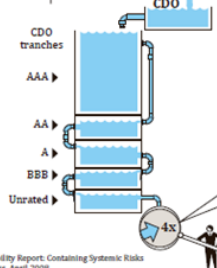
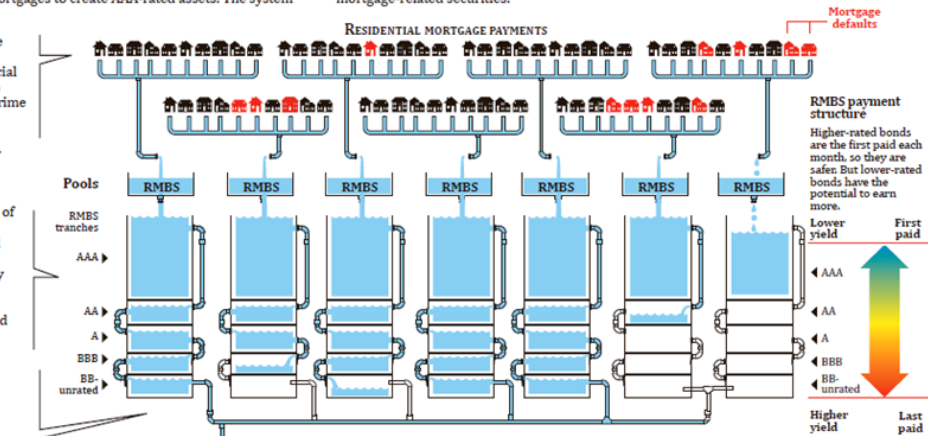
In the financial system, AAA-rated assets are the most valuable because they are the safest for investors and the easiest to sell. Financial institutions packaged and re-packaged securities built on high-risk subprime mortgages to create AAA-rated assets. The system

worked as long as mortgages all over the country and of all different characteristics didn't default all at once. When homeowners all over the country defaulted, there was not enough money to pay off all the mortgage-related securities.

1 People all over the country take out mortgages. Financial institutions group hundreds of subprime mortgages into Mortgage Backed Securities (MBSs).

2 The securities are grouped into tranches by levels of risk and earnings potential for bond holders. When everybody can pay their mortgage in full each month, each group of bond holders gets paid.

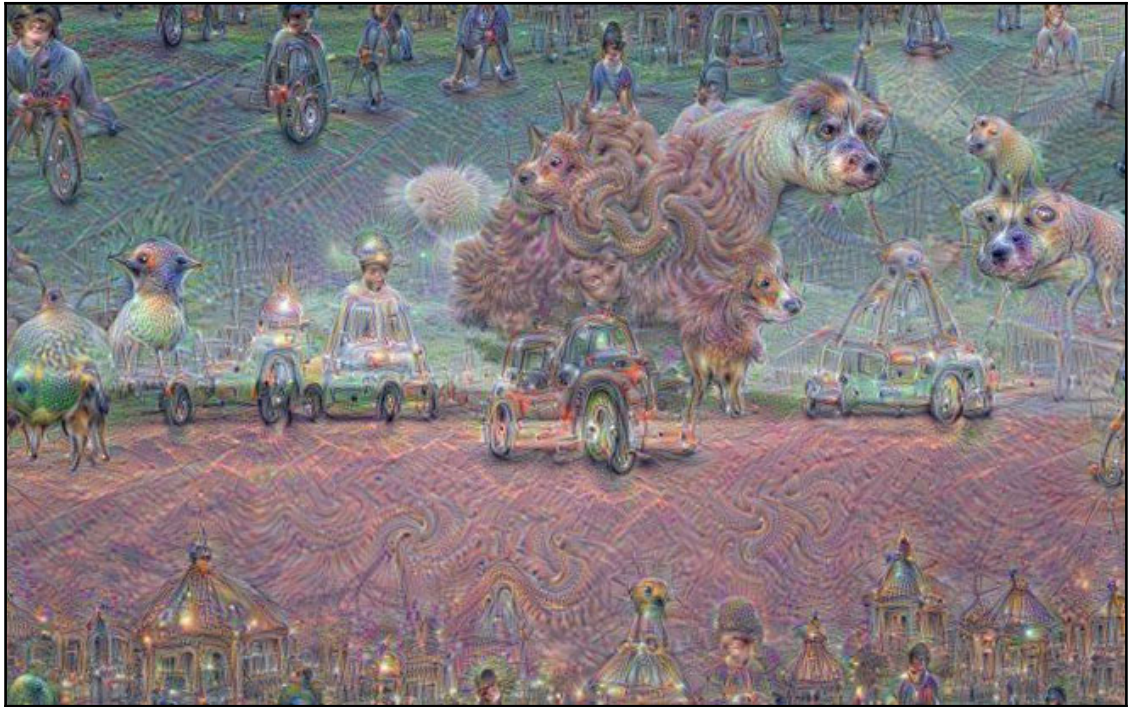
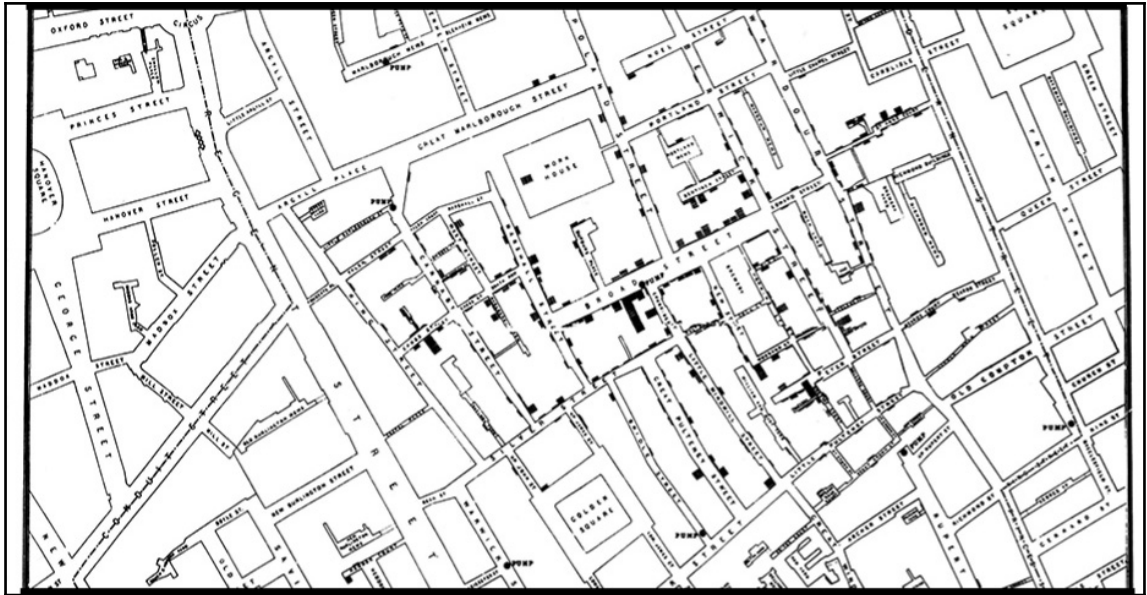
3 The mortgage payments are collected by a financial institution and payments distributed to bond holders. Higher rated tranches are paid first. When monthly mortgage payments are not made, payments may not reach holders of lower-rated tranches.



4 Collateralized Debt Obligations (CDOs) were created by taking the lower-rated tranches out of the MBSs and repackaging them. Most of this CDO is highly rated, even though it is built out of high-risk assets.

5 Another financial institution does the same thing with high-risk tranches of CDOs, creating a CDO-squared.

Source: IMF, Global Financial Stability Report, Containing Systemic Risks and Restoring Financial Soundness, April 2008.



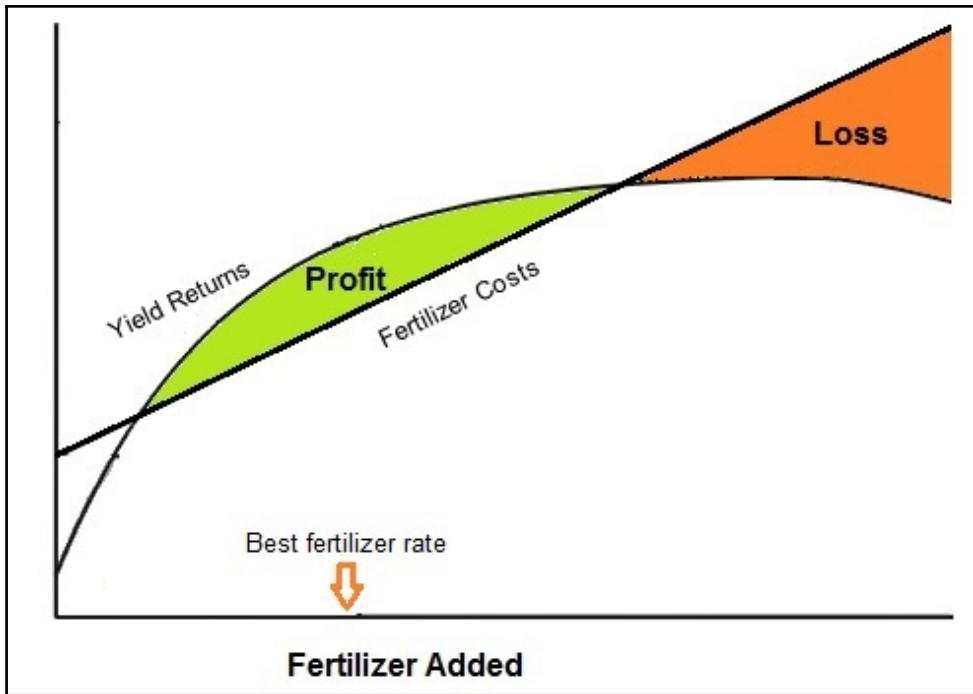


Table of Contents

Index

2

Index