Use Case of Business Prediction

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Agenda

01 **2020 Prediction for AI in Business**

02 **Prediction in Business**

03 **Big Data & Data Analytic**

04 **Timeline of Using Big Data**

05 **Use Cases**

01.2020 Prediction for AI in Business

Greater personalization

Personalization allows businesses to give customers exactly what they want when they want without soliciting them all the time. The AI solutions monitor their usage, habits and other performance data to discern what kinds of experiences, products, recommendations, and even marketing content matches their lifestyle.

AI-powered risk assessment opportunities

AI solutions can take over for human eyes, not just providing 24/7 active monitoring, but also a system that learns and improves over time. Machine learning and deep neural network solutions offer some of the best and most versatile support.

Predictive modeling will grow even more sophisticated

people can use machine learning algorithms to accurately predict or even pinpoint future changes coming down the pipeline. This approach allows businesses to adequately prepare for market and demand changes, supply shortages, growing competition and much more..

AI in Business

The rise of AI-as-a-Service

IBM's Watson, Azure AI, and Google Cloud AI are just a few examples of how the technology applies in service-like settings. A third party handles everything, businesses gain access to a low-cost AI solution with almost no risk and no buy-in.

Algorithmic employee experience improvements

as 85 percent of employees are either uninterested or actively disengaged at work. Machine learning and other types of AI can help change that. Tools like Vibe or Keen allow managers to see how their employees are feeling, good or bad.

AI will power robust marketing campaigns

Big data and analytics solutions provide the necessary information to build such campaigns, while the AI solutions drive them forward. AI can also power sales forecasting, customer insights, digital advertising, and even customer service.
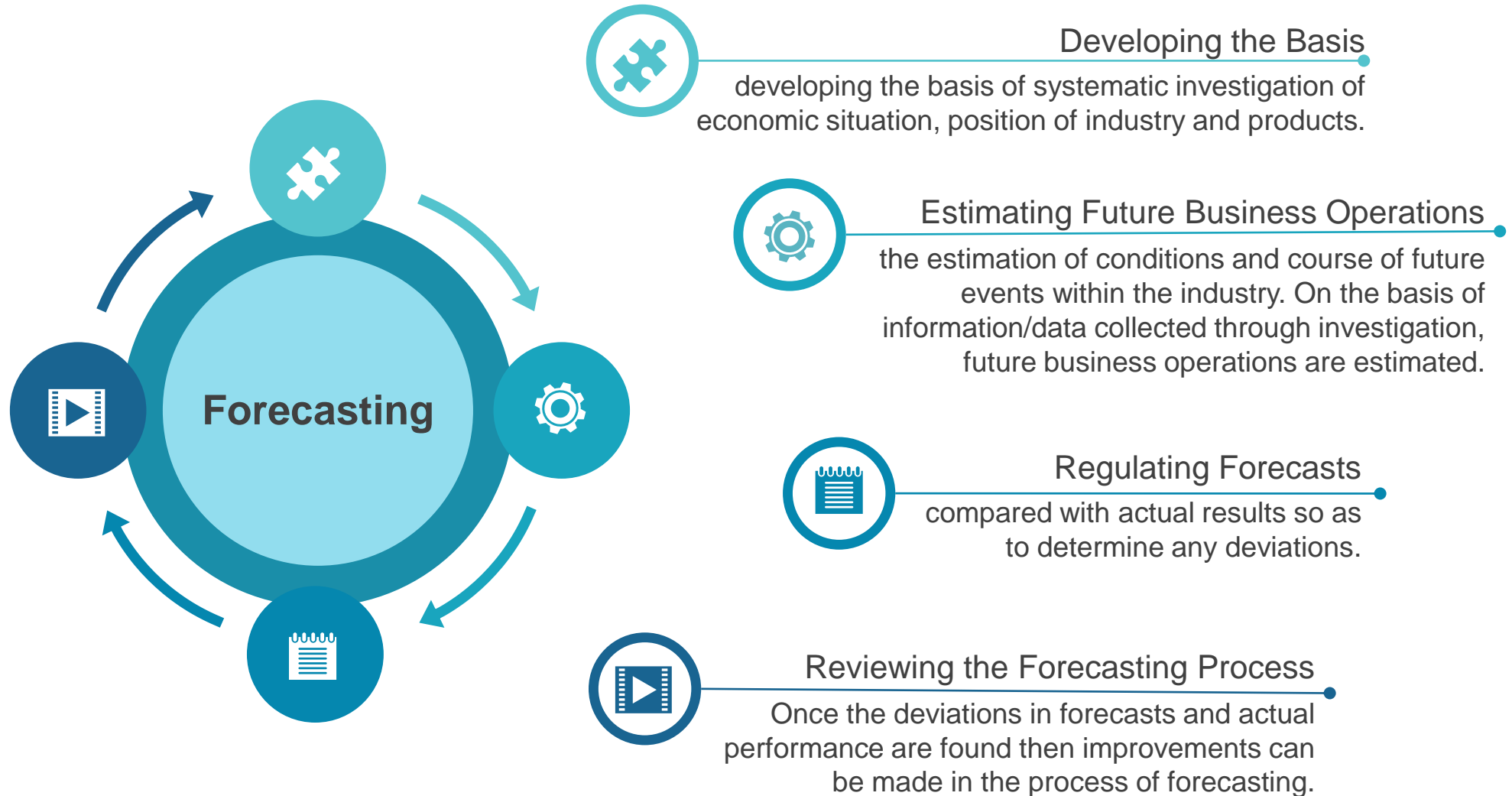
Business Prediction
or
Business Forecasting

> " Business forecasting is a method to predict the future, where the future is narrowly defined by economic conditions. It combines information gathered from past circumstances with an accurate picture of the present economy to predict future conditions for a business.[1] "

> " Business Forecasting is the calculation of reasonable probabilities about the future, based on the analysis of all the latest relevant information by tested and logically sound statistical econometric techniques, as interpreted, modified and applied in terms of an executive's personal judgment and social knowledge of his own business and his own industry or trade.[2] "

[1] https://www.projectmanager.com/blog/business-forecasting

[2] https://www.businessmanagementideas.com/business-forecasting/business-forecasting-meaning-steps-and-sources/3934

02.Steps of Forecasting

Developing the Basis
developing the basis of systematic investigation of economic situation, position of industry and products.

Estimating Future Business Operations
the estimation of conditions and course of future events within the industry. On the basis of information/data collected through investigation, future business operations are estimated.

Regulating Forecasts
compared with actual results so as to determine any deviations.

Reviewing the Forecasting Process
Once the deviations in forecasts and actual performance are found then improvements can be made in the process of forecasting.

Forecasting

02. Sources of Data Used In Business Forecasting

Primary Sources

It is collected by personal interviews, questionnaires or observations.
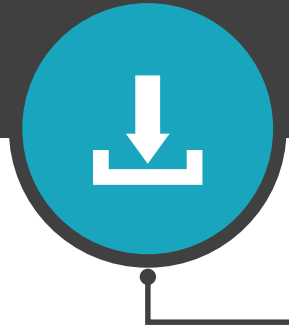
Collected Data

Collection of data is a first step in any statistical investigation. It is the basis for any analysis and interpretations. Before collection of data, many questions shall occupy the mind of the manager. The manager must be able to answer these questions before task of collection is started

Secondary Sources

Already published data or data collected by other agencies. This includes official reports from governments, publications, financial statements from banks or other financial institutions, annual reports of companies, journals, newspapers, magazines and other periodicals.

02. Business Forecasting Methods

There are several different methods by which a business forecast can be made. All the methods fall into one of two overarching approaches: qualitative and quantitative.

Qualitative Models

- Market Research
- Delphi Method

Quantitative Models

- The Indicator Approach
- Econometric Modeling
- Time Series Methods

03.Big Data & Data Analytic

Big Data

Big data is a term that describes the large volume of data – both structured and unstructured – that inundates a business on a day-to-day basis. But it's not the amount of data that's important. It's what organizations do with the data that matters. Big data can be analyzed for insights that lead to better decisions and strategic business moves.

Big Data

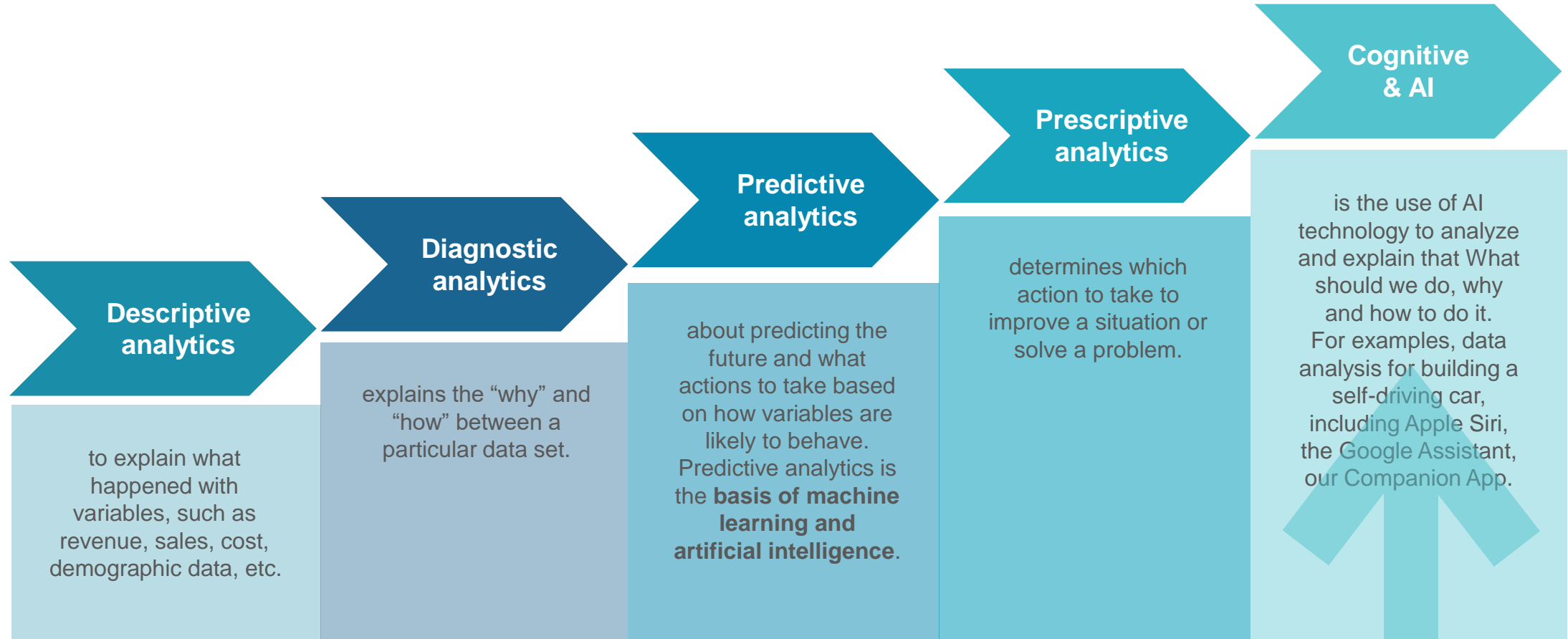**Data Analytic**

Data Analytic

Data Analytics refers to the techniques to analyze data to enhance productivity and business gain. Data is extracted from various sources and is cleaned and categorized to analyze different behavioral patterns. The techniques and the tools used vary according to the organization or individual..

Source :
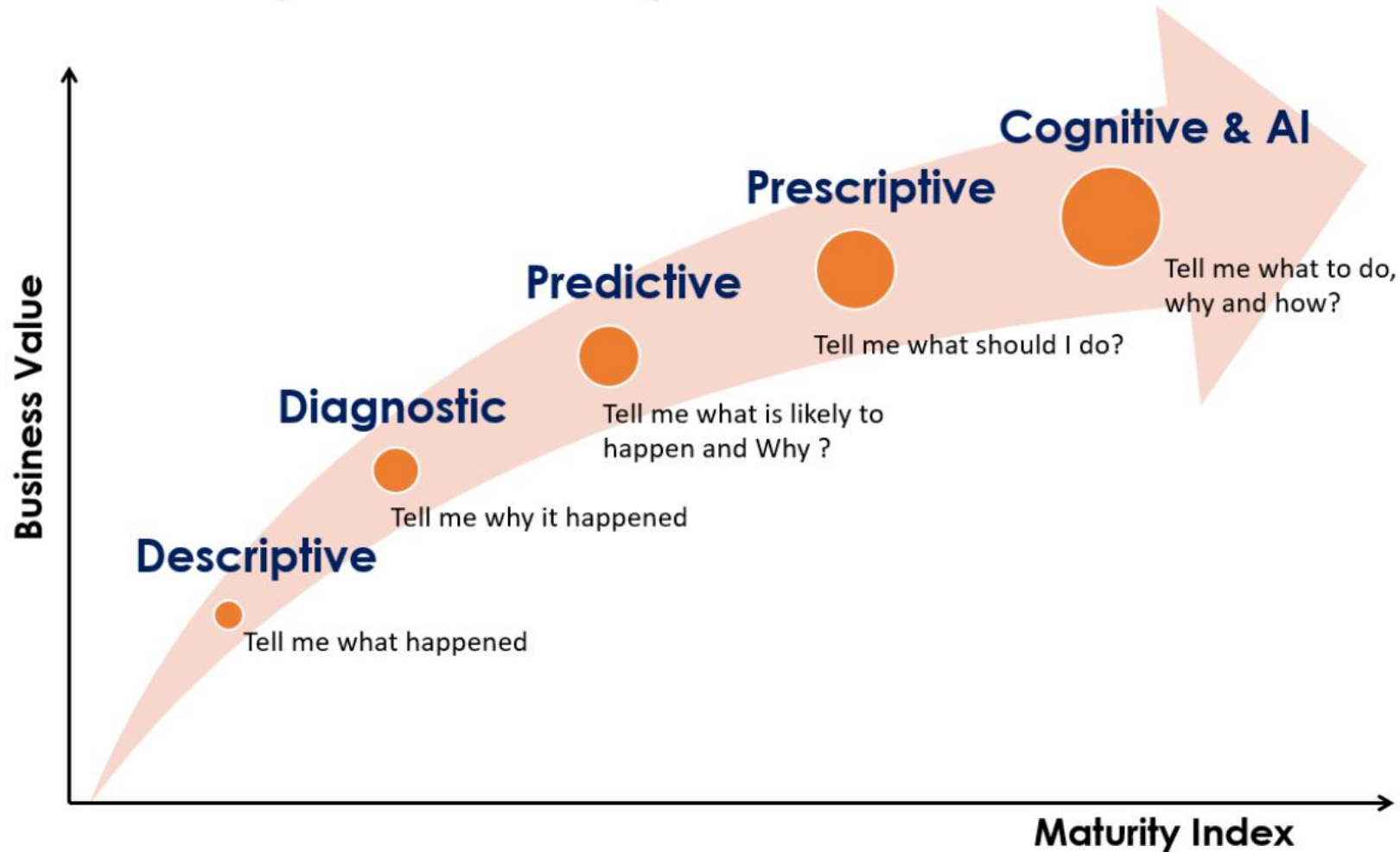*https://www.sas.com/en_us/insights/big-data/what-is-big-data.html*
https://www.edureka.co/blog/what-is-data-analytics/#What%20is%20Data%20Analytics?
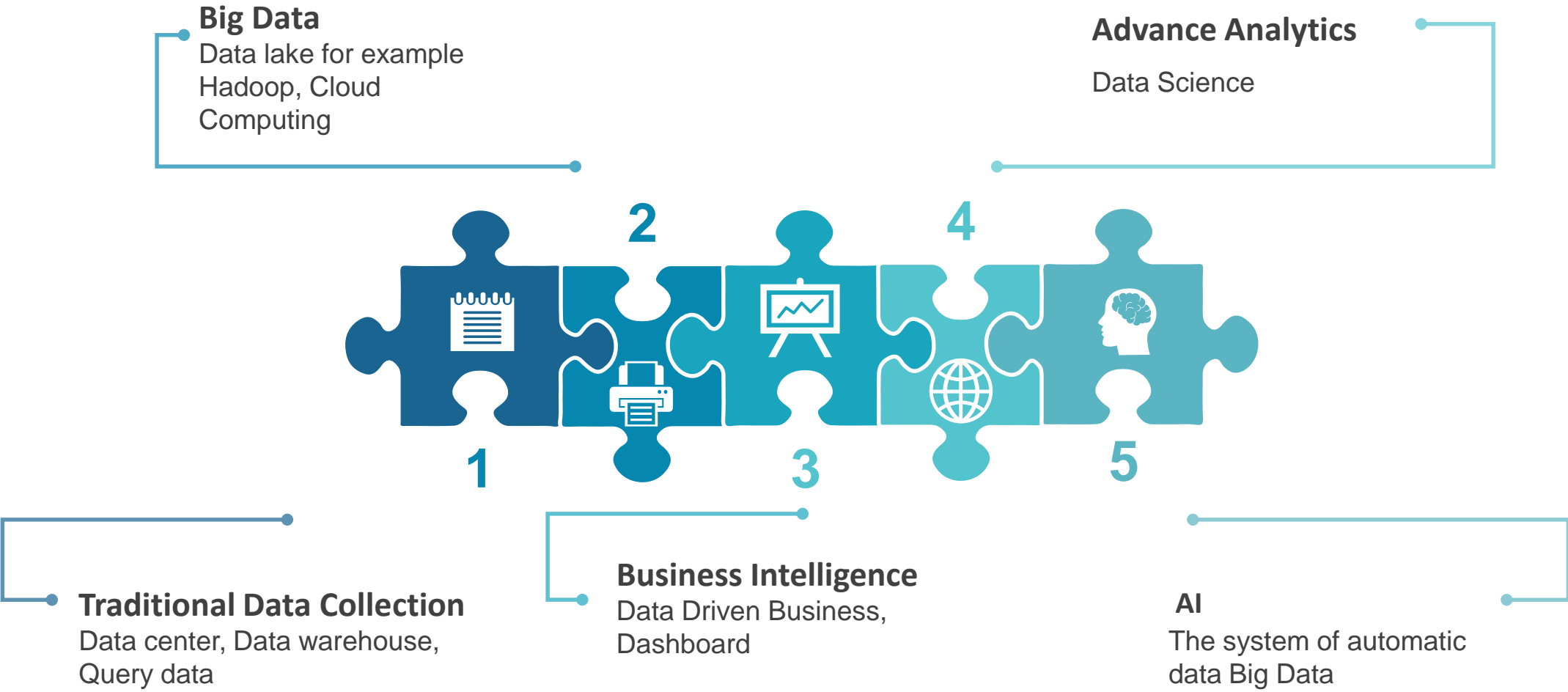
03. Types of Data Analysis

Cognitive & AI

is the use of AI technology to analyze and explain that What should we do, why and how to do it. For examples, data analysis for building a self-driving car, including Apple Siri, the Google Assistant, our Companion App.

Prescriptive analytics

determines which action to take to improve a situation or solve a problem.

Predictive analytics

about predicting the future and what actions to take based on how variables are likely to behave. Predictive analytics is the **basis of machine learning and artificial intelligence**.

Diagnostic analytics

explains the "why" and "how" between a particular data set.

Descriptive analytics

to explain what happened with variables, such as revenue, sales, cost, demographic data, etc.

03.Types of Data Analysis

Analytics Maturity

Business Value / Maturity Index

Descriptive — Tell me what happened

Diagnostic — Tell me why it happened

Predictive — Tell me what is likely to happen and Why ?

Prescriptive — Tell me what should I do?

Cognitive & AI — Tell me what to do, why and how?

04. Timeline of the development of using data

Big Data
Data lake for example Hadoop, Cloud Computing

Advance Analytics

Data Science

2

4

1

3

5

Traditional Data Collection
Data center, Data warehouse, Query data

Business Intelligence
Data Driven Business, Dashboard

AI
The system of automatic data Big Data

Source : https://www.coraline.co.th/single-post/5-Steps-to-Big-Data-Project

05. Use Cases

5 Business Intelligence & Analytics Case Studies Across Industry
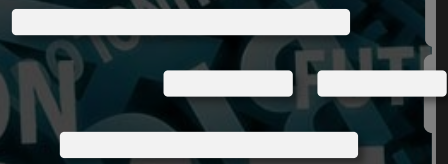
Global Tech LED:Google Analytics Instant Activation of Remarketing

Company description:

Headquartered in Bonita Springs, Florida, Global Tech LED is a LED lighting design and supplier to U.S. and international markets, specializing in LED retrofit kits and fixtures for commercial spaces.
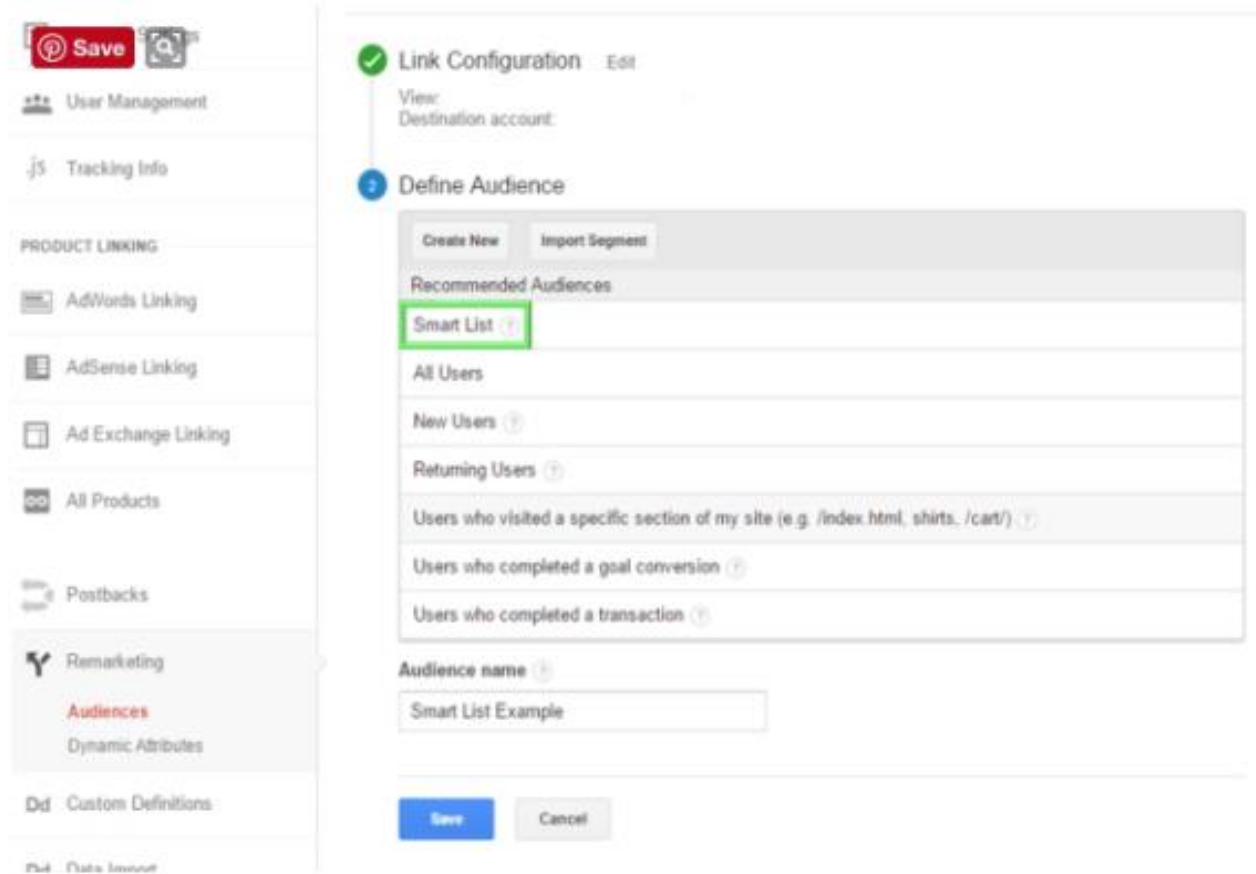

Image credit: SearchStar

Global Tech LED:Google Analytics Instant Activation of Remarketing

How Google Analytics is being used:

- Google Analytics' Smart Lists were used to automatically identify Global Tech LED prospects who were "most likely to engage", and to then remarket to those users with more targeted product pages.

- Google's Conversion Optimizer was used to automatically adjust potential customer bids for increased conversions.

Value proposition:

- Remarketing campaigns triggered by Smart Lists drove 5 times more clicks than all other display campaigns.

- The click-through rate of Global Tech LED's remarketing campaigns was more than two times the remarketing average of other campaigns.

- Traffic to the company's website grew by more than 100%, and was able to re-engage users in markets in which it was trying to make a dent, including South Asia, Latin America, and Western Europe.

- Use of the Conversion Optimizer allowed Global Tech LED to better allocate marketing costs based on bid potential.

Under Armour: IBM Watson Cognitive Computing

Company description:

Under Armour, Inc. is an American manufacturer of sports footwear and apparel, with global headquarters in Baltimore, Maryland..

Image credit: UA Record

Under Armour: IBM Watson Cognitive Computing

How IBM Watson is being used:

- Under Armour's UA Record™ app was built using the IBM Watson Cognitive Computing platform. The "Cognitive Coaching System" was designed to serve as a personal health assistant by providing users with real-time, data-based coaching based on sensor and manually input data for sleep, fitness, activity and nutrition. The app also draws on other data sources, such as geospatial data, to determine how weather and environment may affect training. Users are also able to view shared health insights based on other registered people in the UA Record database who share similar age, fitness, health, and other attributes.

Value proposition:

- The UA Record app has a rating of 4.5 stars by users; based on sensor functionality, users are encouraged (via the company's website and the mobile app) to purchase UA HealthBox devices (like the UA Band and Headphones) that synchronize with the app.

- According to Under Armour's 2016 year-end results, revenue for Connected Fitness accessories grew 51 percent to $80 million.

Plexure (VMob): IoT and Azure Stream Analytics

Company description:

Formerly known as VMob, Plexure is a New Zealand-based media company that uses real-time data analytics to help companies tailor marketing messages to individual customers and optimize the transaction process.

How Azure Stream Analytics is being used:

- Plexure used Azure Stream to help McDonald's increase customer engagement in the Netherlands, Sweden and Japan, regions that make up 60 percent of the food service retailer's locations worldwide.

- Azure Stream Analytics was used to analyze the company's stored big data (40 million+ endpoints) in the cloud, honing in on customer behavior patterns and responses to offers to ensure that targeted ads were reaching the right groups and individuals.

- Plexure combined Azure Analytics technology with McDonald's mobile app, analyzing with contextual information and social engagement further customize the user experience. App users receive individualized content based on weather, location, time of day, as well as purchasing a and ad response habits. For example, a customer located near a McDonald's location on a hot afternoon might receive a pushed ad for a free ice cream sundae.

Plexure (VMob): IoT and Azure Stream Analytics

Value proposition:

- McDonald's in the Netherlands yielded a 700% increase in customer redemptions of targeted offers.

- Customers using the app returned to stores twice as often and on average spent 47% more than non-app users.

Coca-Cola Amatil: Trax Retail Execution

Company description:

Coca-Cola Amatil is the largest bottler and distributor of non-alcoholic, bottled beverages in the Asia Pacific, and one of the largest bottlers of Coca-Cola products in the region.

Image credit: Trax Retail

Coca-Cola Amatil: Trax Retail Execution

How Trax Image Recognition for Retail is being used:

- Prior to using Trax's imaging technology, Coca-Cola Amatil was relying on limited and manual measurements of products in store, as well as delayed data sourced from phone conversations.

- Coca-Cola Amatil sales reps used Trax Retail Execution image-based technology to take pictures of stores shelves with their mobile devices; these images were sent to the Trax Cloud and analyzed, returning actionable reports within minutes to sales reps and providing more detailed online assessments to management.

Value proposition:

- Real-time images of stock allowed sales reps to quickly identify performance gaps and apply corrective actions in store. Reports on shelf share and competitive insights also allowed reps to strategize on opportunities in store and over the phone with store managers.

- Coca-Cola Amatil gained 1.3% market share in the Asia Pacific region within five months.

Peter Glenn: AgilOne Advanced Analytics

Company description:

Peter Glenn has provided outdoor apparel and gear to individual and wholesale customers for over 50 years, with brick-and-mortar locations along the east coast, Alaska, and South Beach.

AGILONE
Predictive Marketing Cloud

The State of the Consumer Journey

Pre-Purchase | Post Purchase

1 Discover   2 Research/Browse   3 Trial   4 Purchase / Pick-up Return   5 Experience   6 Re-Purchase   Loyal   At-Risk   Lapsed

2/3 of customer's abandon online shopping cart

Goal: Conversion

73% of customers are "one-night stands"

Goal: Lifetime Value

A 5% increase in customer retention can increase business profits by 20-125% (Gartner)

Image credit: AgilOne

Peter Glenn: AgilOne Advanced Analytics

How AgilOne Analytics is being used:

- AgilOne Analytics' Dashboard provides a consolidated view across online and offline channels, which allowed Peter Glenn to view trends between buyer groups and make better segmentation decisions.

- Advanced segmentation abilities included data on customer household, their value segment, and proximity to any brick-and-mortar locations.

- Peter Glenn used this information to launch integrated promotional, triggered, and lifecycle campaigns across channels, with the goal of increasing sales during non-peak months and increasing in-store traffic.

Value proposition:

- Once AgilOne's data quality engine had combed through Peter Glenn's customer database, the company learned that more than 80% of its customer base had lapsed; they were able to use that information to re-target and re-engage stagnant customers.

- Peter Glenn saw a 30% increase in Average Order Value (AOV) as a result of its automated marketing campaigns.

- Access to data points, such as customer proximity to a store, allowed Peter Glenn to target customers for store events using advanced segmentation and more aligned channel marketing strategies.

Artificial Intelligence
& Machine Learning
Case Studies

Starbucks: Using Big Data, Analytics And Artificial Intelligence To Boost Performance

- Starbucks Rewards and Mobile App

- Personalizing the Starbucks experience

- Targeted and personalized marketing

- Virtual barista

- Determine new store locations

- Expansion of products into grocery stores

- Menu updates

How McDonald's Is Getting Ready For The 4th Industrial Revolution Using AI, Big Data And Robotics

- Personalised and improved customer experience

- Digital menus that use data

- Trends analytics

- Kiosks and interactive terminals

The 4th Industrial Revolution

The Amazing Ways Samsung Is Using Big Data, Artificial Intelligence And Robots To Drive Performance

- Bringing innovators together

- Bixby: Samsung's AI Assistant

- Samsung to add AI to all devices by 2020

- AI technology based on machine learning to upscale images

- Samsung's AI robot

NEC provides Smart City solutions in Cordoba, Spain

Intelligent Energy
Management System

Intelligent and
Data Analytics

Waste
Management

Citizen
Participation
Platform

Smart City

Open Data
Platform

Asset
Management
System

Incident
Management
System

Intelligent Water
Management System

System Diagram

Components Initiative Intelligent and Sustainable Cordoban Municipalities

| Intelligent Energy Management System | Intelligent Waste and Environmental Management System | Intelligent Water Management System | Service Analytics and Optimization System | Incident Management System and Action Plans | Asset Management System | Open Data Platform | Platform for Citizen Participation |

↕

Intelligent Provincial Services Platform

↕

Existing Systems in the Diputacion de Cordoba
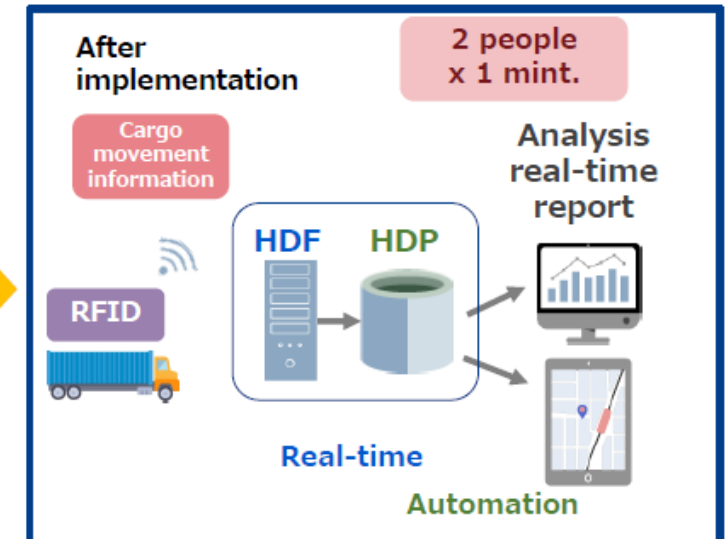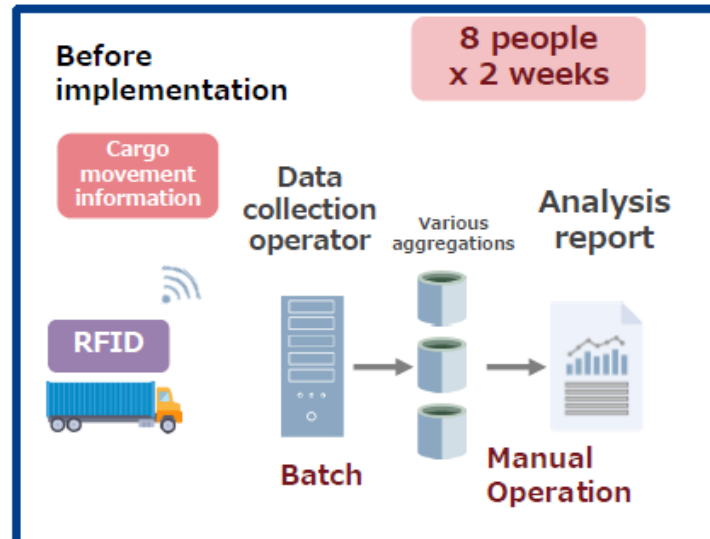
GIS Diputacion LDAP

Self-service & Real-time Reporting - Overcome Business Managers Challenges

Provide real-time information to the management using structured and unstructured data

- Provide real-time container information
- Automated Analytics and Reporting by combining RFID data with existing data
- Common analytics platform for business users and data scientists

Integration of traditional data and real-time location information from RFID devices to reduce TAT and the resource used to create container status and analytics reports

- Longer response time to business as the customer's business intelligence team was taking 2 weeks to create business critical report such as container information etc. due to manual process and batch processing.
- Data Platform for Hadoop (DPH) captures real-time location information of the container through RFID resulting in faster identification of status and insights
- Container information like quantity, transit points, transportation mode which was managed through the conventional system was integrated on DPH and a dashboard to show the result quickly was for business critical information
- Used notebook type ad hoc query tool Apache Zeppelin to enable data scientist and users actively interact with the dashboard and customize/create new reports easily.

Before implementation — 8 people x 2 weeks
Cargo movement information — RFID — Data collection operator — Various aggregations — Analysis report — Batch — Manual Operation

After implementation — 2 people x 1 mint.
Cargo movement information — RFID — HDF — HDP — Real-time — Analysis real-time report — Automation

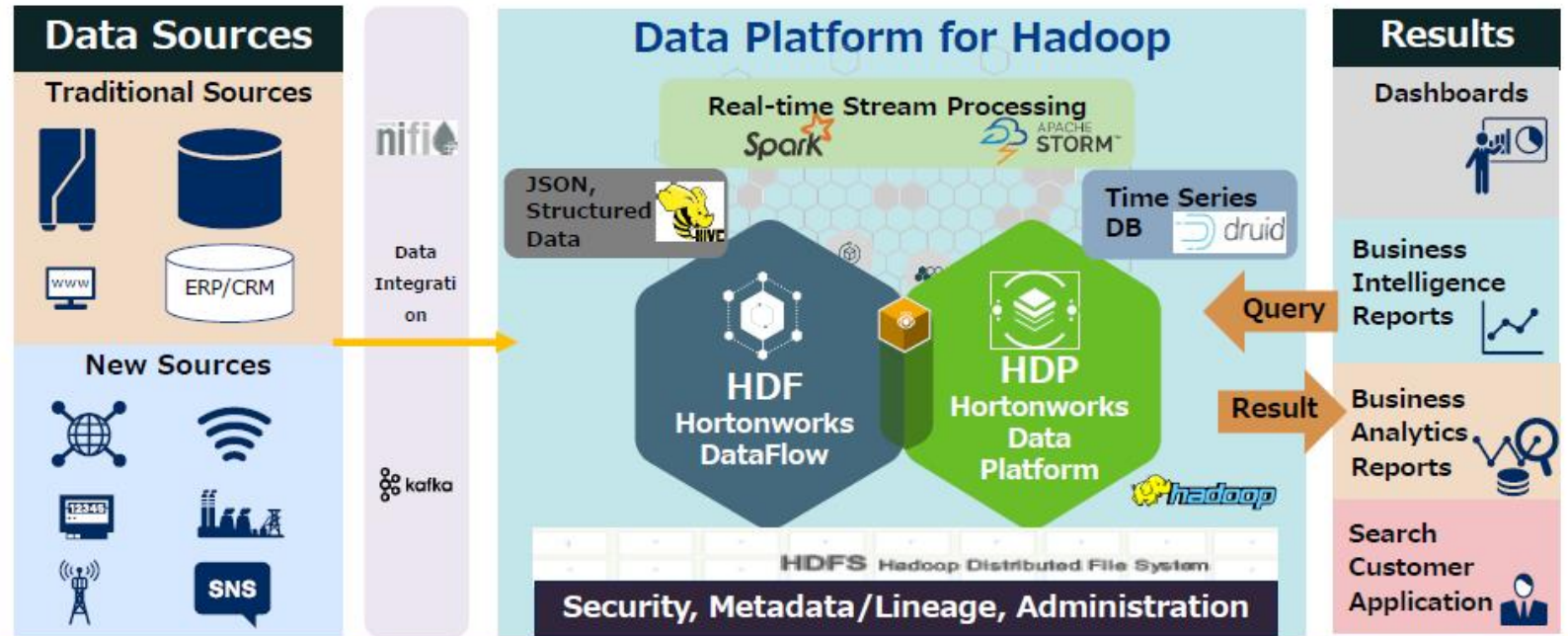\Orchestrating a brighter world   **NEC**

Common Data Lake Platform to Harness the Value of All Data for better Insight

Integrate all the data together for better business outcome

- Ingest data from multiple system and sources including other division system
- Integrate structured and unstructured data together including time-series data
- Faster Ad-hoc reporting
- Predictive Analytics for better business insights

Integrate all the data across organization from silos to one common platform for unified data access, analyse it and discover new business insight which was not possible earlier

- Customer has data spread across different location and in silos and existing platforms are not capable to store all these data coming from different equipment, sensors, RDBMS, images, logs, e-mails including time-series data and analyse it

- NEC helps customers to ingest different types and size of data from various sources and group companies to one common data lake platform for unified access and in-memory distributed processing which offers better analytics. Customer can combine time-series data with other real-time data and get the insights in real-time within seconds

Data Sources

Traditional Sources

www   ERP/CRM

Data Integration

New Sources

kafka

nifi

Data Platform for Hadoop

Real-time Stream Processing
Spark   APACHE STORM

JSON, Structured Data   HIVE

Time Series DB   druid

HDF Hortonworks DataFlow

HDP Hortonworks Data Platform   hadoop

HDFS Hadoop Distributed File System

Security, Metadata/Lineage, Administration

Query   Result

Results

Dashboards

Business Intelligence Reports

Business Analytics Reports

Search Customer Application

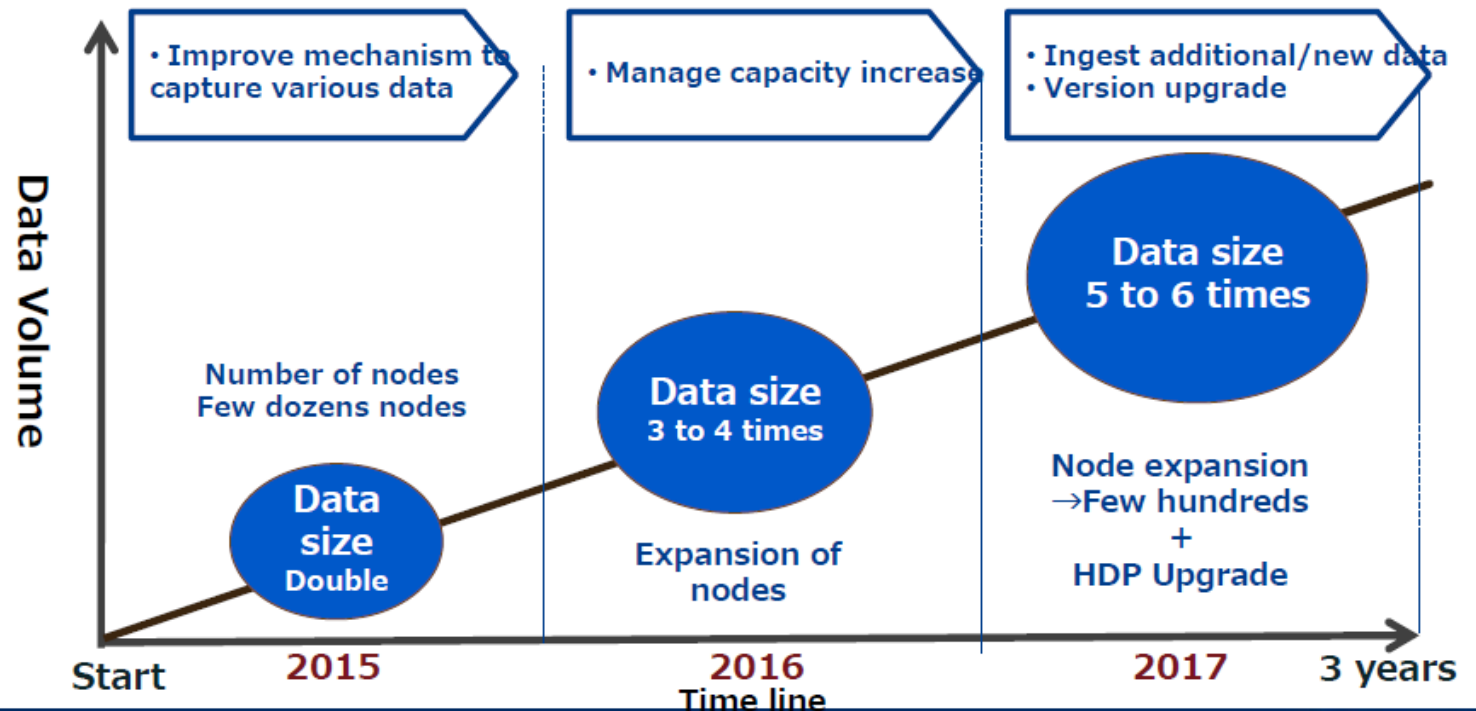\Orchestrating a brighter world   NEC

Solve the Challenge of Multiple Siloes System by Implementing Modern Data Lake

Eliminate data siloes and manage continuous data growth

- Unification of customer data siloes
- Addition of new data for business use and capacity expansion due to data volume increase
- Long term platform support for new technology adoption using Hadoop version upgrade, expansion etc.

Automate and improve the way to capture various data through Apache NiFi to a centralized platform and data management, and provide support for increasing data volumes and technological advancements

- Due to limited system capabilities, retention period for customer transaction data including other information like device, network data was only for few months, additionally, historical data is not optimally utilized for customer trend analysis

- NEC Data Platform for Hadoop, helped customer in collecting data from various sources and provides easy scalability, effective utilization of data and reduced the cost. Additionally provided continuous support for expansion due to gradual integration of siloes data, optimization and Hadoop cluster maintenance support

- Improve mechanism to capture various data
- Manage capacity increase
- Ingest additional/new data
- Version upgrade

Data Volume

Number of nodes
Few dozens nodes

Data size Double

Data size 3 to 4 times

Expansion of nodes

Data size 5 to 6 times

Node expansion
→Few hundreds
+
HDP Upgrade

Start   2015   2016   2017   3 years
Time line

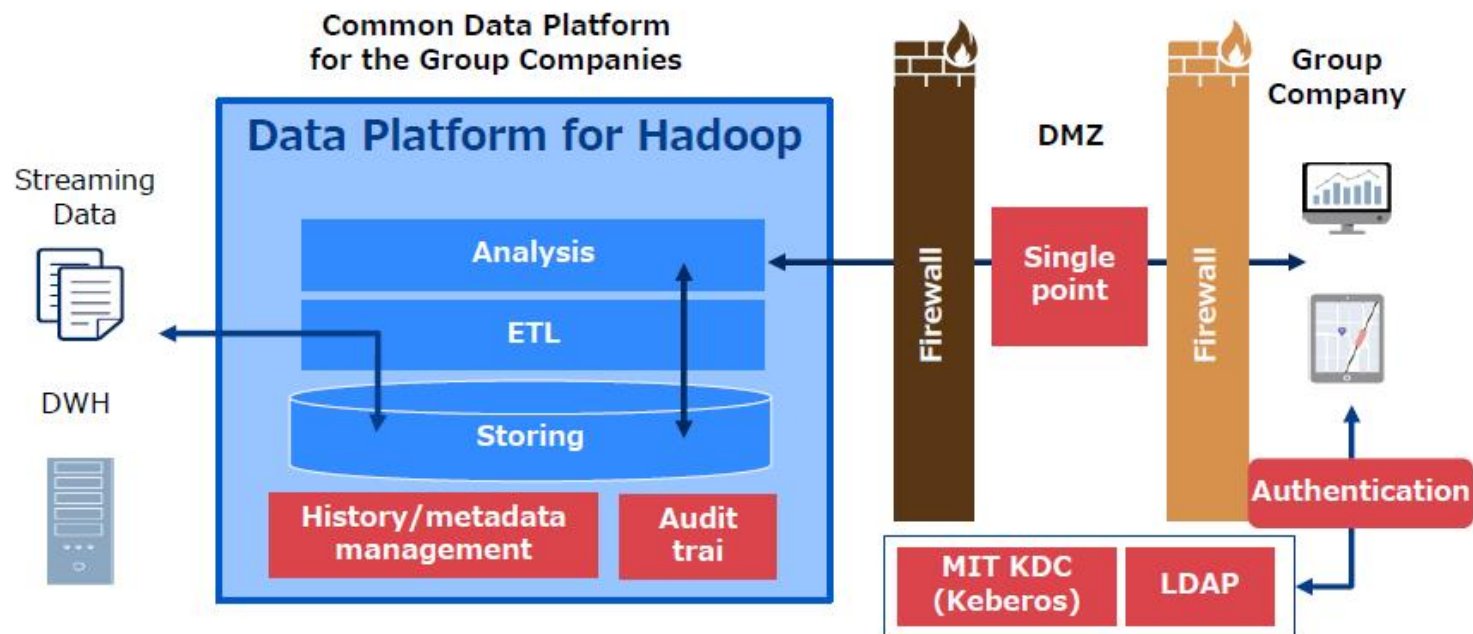\Orchestrating a brighter world   NEC

Data Protection and Compliance by Implementing GDPR

GDPR compliant security and governance

- Centralized user access control (authentication & authorization)
- Single entry point for common data services for group companies
- Visualization of access records and data history

Centralization of user access authentication and data exchanged with in group companies. Common data platform for data utilization, equipped with GDPR compliant security and governance policies

- Group companies want to collate and analyze the streaming and DWH data for enhancing customer experience, for which data access control such as GDPR compliance was the pre-requisite.

- A single entry point for user authentication and group companies was implemented. Data was further grouped and access management could be implemented for respective groups and users.

- Using data history management function, audit logs of the entire system could be consolidated, searched and confirmed through an integrated view. Implemented management system for checking unauthorized access/data tampering.

Common Data Platform for the Group Companies

Data Platform for Hadoop

Streaming Data

Analysis

ETL

DWH

Storing

History/metadata management · Audit trai

DMZ · Group Company

Firewall · Single point · Firewall

Authentication

MIT KDC (Keberos) · LDAP

Orchestrating a brighter world **NEC**

Phillips – Sales Forecasting

t	Year	Quarter	Yt Sales	Smooth Moving Avg(4)	Baseline CMA	Yt/CMA St x It	St	Yt/St Deseasonalize	Y=B0+B1*t Tt	Forcast
1	2015	1	21.6				0.507331	42.57576816	73.8119633	37.44708
2		2	80.1				1.548308	51.73390424	69.77715713	108.0365
3		3	32.8	56.575	62.25	0.526907631	0.91623	35.79885714	65.74235095	60.23514
4		4	91.8	67.925	71.9875	1.275221393	1.36601	67.203	61.70754478	84.29315
5	2016	1	67	76.05	80.7	0.83023544	0.507331	132.0637253	57.6727386	29.25916
6		2	112.6	85.35	84.5	1.332544379	1.548308	72.72456451	53.63793243	83.04802
7		3	70	83.65	76.4	0.916230366	0.91623	76.4	49.60312625	45.44789
8		4	85	69.15	62.225	1.366010446	1.36601	62.225	45.56832008	62.2468
9	2017	1	9	55.3	48.8	0.18442623	0.507331	17.7399034	41.5335139	21.07123
10		2	57.2	42.3	32.425	1.764070933	1.548308	36.94356208	37.49870773	58.05954
11		3	18	22.55			0.91623	19.64571429	33.46390155	30.66064
12		4	6				1.36601	4.392352941	29.42909538	40.20045
13	2018	1					0.507331		25.39428921	12.88331
14		2					1.548308		21.35948303	33.07105
15		3					0.91623		17.32467686	15.8734
16		4					1.36601		13.28987068	18.1541

Source : Phillips Thailand, Sales Forecasting

Phillips – Sales Forecasting

SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.4258999
R Square	0.1813908
Adjusted R Squar	0.0995298
Standard Error	32.413165
Observations	12

ANOVA

	df	SS	MS	F	Significance F
Regression	1	2327.9915	2327.991504	2.215840625	0.167443222
Residual	10	10506.132	1050.613243		
Total	11	12834.124			

	Coefficients	Standard Erro	t Stat	P-value	Lower 95%	Upper 95%	Lower 95.0%	Upper 95.0%
Intercept	77.846769	19.948924	3.902304213	0.002949939	33.39779725	122.2957	33.39779725	122.2957417
X Variable 1	-4.034806	2.710525	-1.488569993	0.167443222	-10.07423223	2.00462	-10.07423223	2.004619878

THANK YOU