Software Engineering by ALT-F1

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CONTENTS

Building software requires multiple competencies : understand the business, the regulations, the IT system, the operations, the testing process, the technical debt ...

By reading this book, you should find sufficient information to manage the manufacturing of software in a systematic method.

Contact us : http://www.alt-f1.be

- OUR COMMITMENT : We strive for superior performance, unmatched work ethic, simple and pragmatic approach, jargon-free language and insightful ideas
- ALT-F1 supports your industry with software, data, analytics & lean optimisations
- ALT-F1 designs, implements, deploys and supports secure, large-scale software solutions for diverse industries:
  - Manufacturing
  - MRO Maintenance Repair and Overhaul
  - Warehouse
  - Broadcasting
  - Bank
  - Insurance
  - Defense
  - Automotive
  - Law Enforcement
  - Justice and Serious International Crime

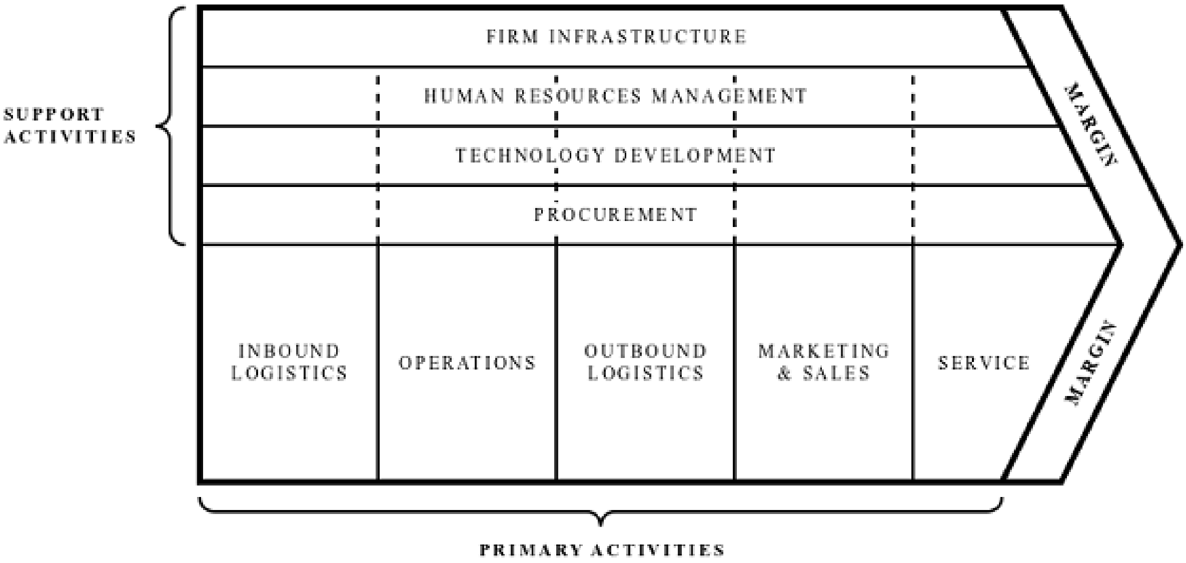
CHAPTER

ONE

INTRODUCTION

The book is chaptered using the Porter value chain enabling business readers to survive the IT jargon.

```
01-01.Inbound Logistics
01-02.Operations
01-03.Outbound Logistics
01-04.Marketing and Sales
01-05.Services
02-01.Procurement
02-02.Technology development
02-03.HR management
02-04.Firm infrastructure
```



1.1 Primary activities

Inbound logistics include the receiving, warehousing, and inventory control of input materials.

Operations are the value-creating activities that transform the inputs into the final product.

Outbound logistics are the activities required to get the finished product to the customer, including warehousing, order fulfillment, etc.

Marketing & Sales are those activities associated with getting buyers to purchase the product, including channel selection, advertising, pricing, etc.

Service activities are those that maintain and enhance the product's value including customer support, repair services, etc.

1.2 Support Activities

The primary value chain activities described above are facilitated by support activities. Porter identified four generic categories of support activities, the details of which are industry-specific.

Procurement - the function of purchasing the raw materials and other inputs used in the value-creating activities.

Technology Development - includes research and development, process automation, and other technology development used to support the value-chain activities.

Human Resource Management - the activities associated with recruiting,development, and compensation of employees.

Firm Infrastructure - includes activities such as finance, legal, quality management, etc.

Support activities often are viewed as "overhead", but some firms successfully have used them to develop a competitive advantage, for example, to develop a cost advantage through innovative management of information systems.

Source : http://www.quickmba.com/strategy/value-chain

CHAPTER

TWO

INBOUND LOGISTICS

Inbound logistics include the receiving, warehousing, and inventory control of input materials.

Todo: How to retrieve the assets required to build the software : office files, requirements, images, web services definitions

2.1 Speech analogy for Data Vis

Source : https://classroom.udacity.com/courses/ud507/lessons/3063188874/concepts/30639889250923

Parts of speech are to sentences what visual encoding are to charts

POS::Sentences::visual encodings::charts

- Parts of speech are composed of sentences
- charts are composed of visual encodings applied to data types and combined with relationship between those data

Note: data types are continuous or categorical

dimensions are drawn in 1D, 2D, 3D

Geographic charts

- choropleth = geographic + color
- cartogram : geographix + size
- dotmap : georgraphic + shape

2.1.1 The Lie factor

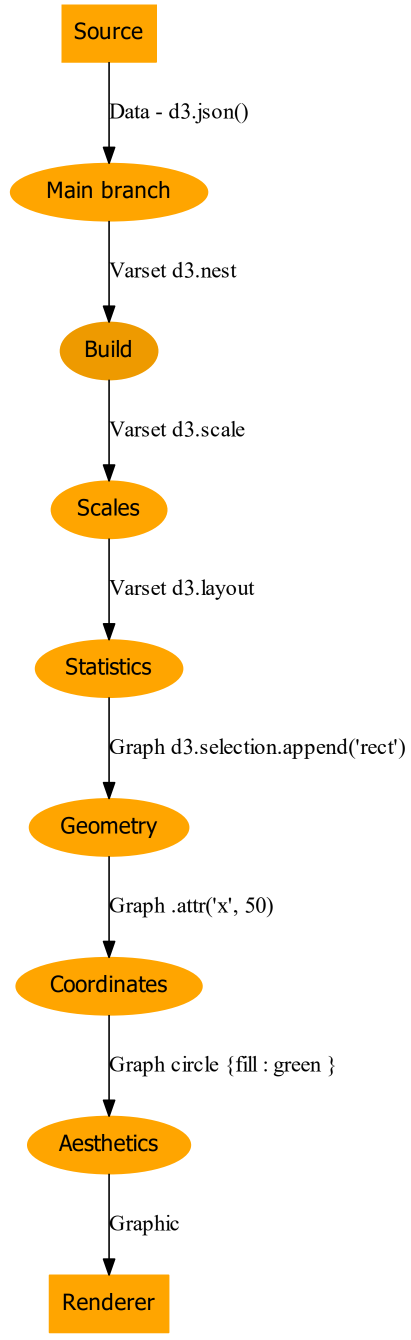
- Lie factor describes the integrity of a graphic. if the lie factor is comprised within [0.95 < lie factor < 1.05] then the graphic representative of the data.

$$\text{Lie factor} = \frac{\text{size fo the effect shown in the graphic}}{\text{size of the effect shown in the data}}[0.95 < liefactor < 1.05] \tag{2.1}$$

2.1.2 Separation of the visual elements and the structure of data

- transform data without changing visual representation
- allow for collaboration across teams

2.1.3 Grammar of the Graphics pipeline



Grammar of Graphics pipeline v2019-05-21

A. d3.layout : applies common transformations on predefined chart objects

B. d3.nest : groups data based on particular keys and returns an array of JSON

C. d3.selection.attr : changes a characteristic of an element such as position or fill

D. d3.json : loads a data file and returns an array of Javascript objects

E. d3.selection.append : inserts HTML or SVG elements into a web page

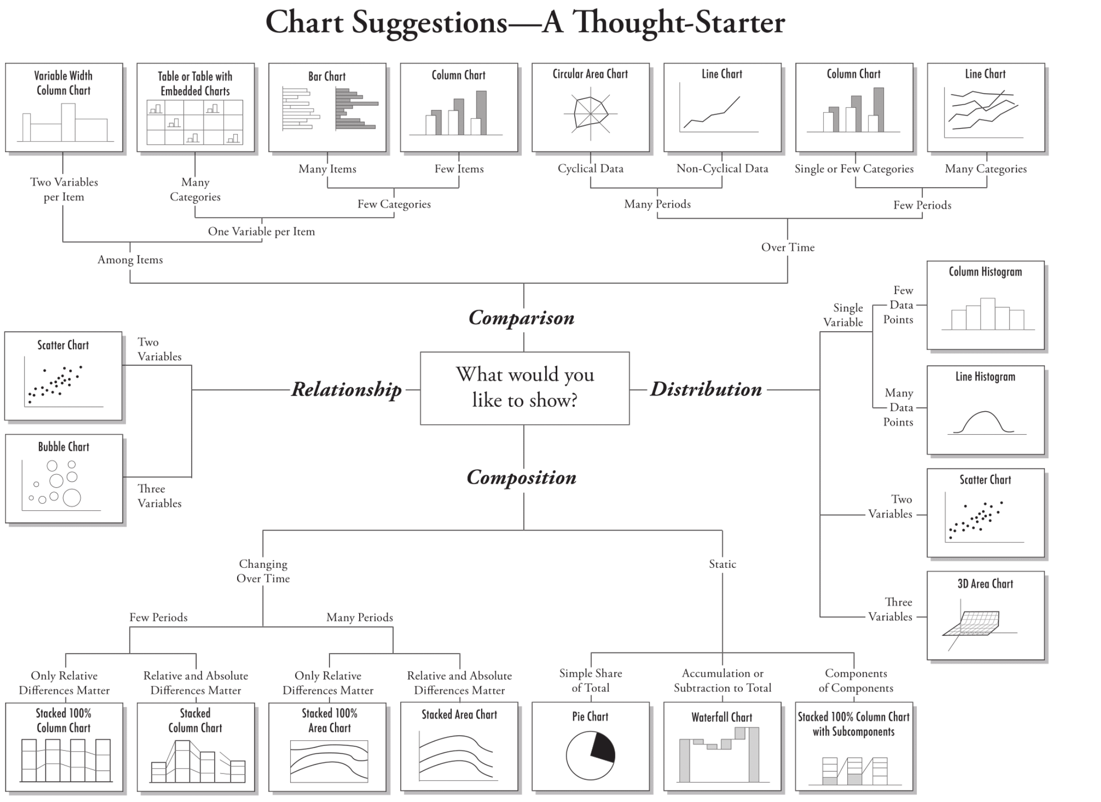
F. d3.scale : converts data to a pixel or color value that can be displayed

2.1.4 Process

- Pre-attentive processing : https://en.wikipedia.org/wiki/Pre-attentive_processing
- Common chart types and how to choose a chart? https://youtu.be/xD2_AU6atqA

2.1.5 Choosing the right chart

- Chart chooser tool : http://labs.juiceanalytics.com/chartchooser/index.html
- Graph selection matrix : http://www.perceptualedge.com/articles/misc/Graph_Selection_Matrix.pdf
- Visualization types : https://guides.library.duke.edu/datavis/vis_types
- When to use stacked bar charts ? https://solomonmg.github.io/blog/2014/when-to-use-stacked-barcharts/
- Box plots explained : http://www.physics.csbsju.edu/stats/box2.html
- Selecting the Right Graph for Your Message by Stephen Few :
  - http://www.storytellingwithdata.com/blog/2013/04/chart-chooser
  - http://www.perceptualedge.com/articles/ie/the_right_graph.pdf



www.ExtremePresentation.com
© 2009 A. Abela — a.v.abela@gmail.com

2.1.6 Choose free tools to draw charts

- https://dimplejs.org
- https://d3js.org
- https://plot.ly
  - US civilian unemployment : https://plot.ly/~Jay-Oh-eN/1
- https://public.tableau.com/s
- https://rawgraphs.io
- https://observablehq.com
- http://openrefine.org
- https://bl.ocks.org

2.1.7 Reviziting the receipt

Source : https://twitter.com/DataToViz/status/1124752405973782528

CHAPTER THREE

OPERATIONS (PM, CI-CD, BACKUP, ENGINEERING)

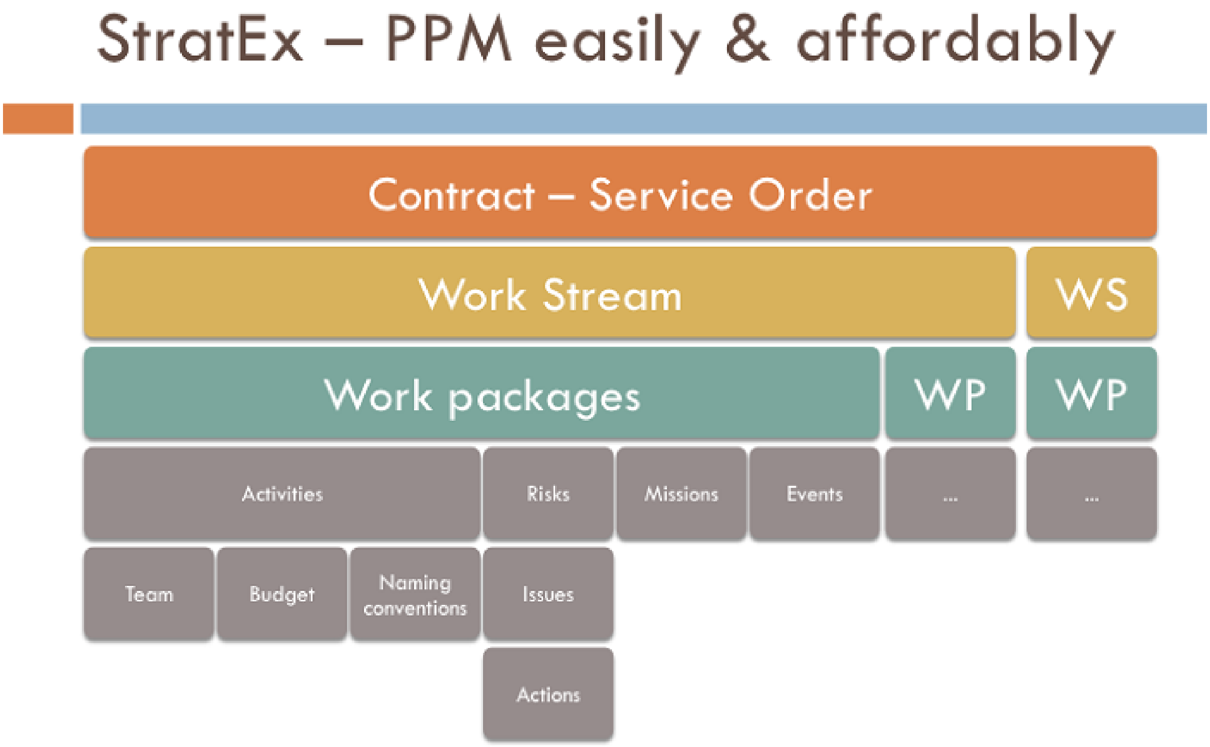
Operations are the value-creating activities that transform the inputs into the final product.

Application deployment and operations required to build a software.

3.1 Project management

StratEx is a web application enabling Managers to control the delivery using customer' processes enforced by conventions shared amongst the team members.

- StratEx App: https://www.stratexapp.com
- StratEx App documentation : https://doc.stratexapp.com



StratEx – PPM easily & affordably

Contract – Service Order

Work Stream

WS

Work packages

WP

WP

Activities

Risks

Missions

Events

...

...

Team

Budget

Naming conventions

Issues

Actions

3.2 Software engineering

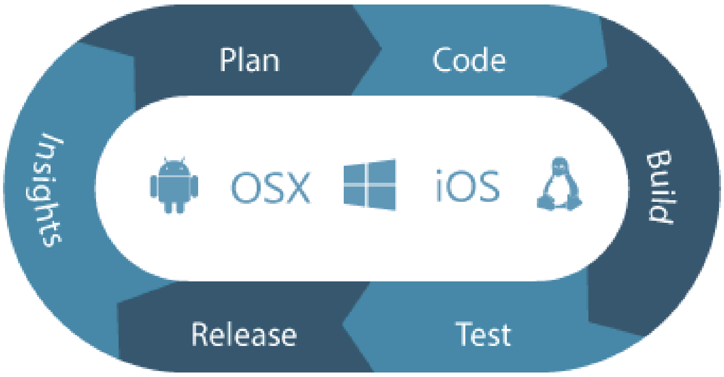
Note: The Joel Test - 12 Steps to Better Code

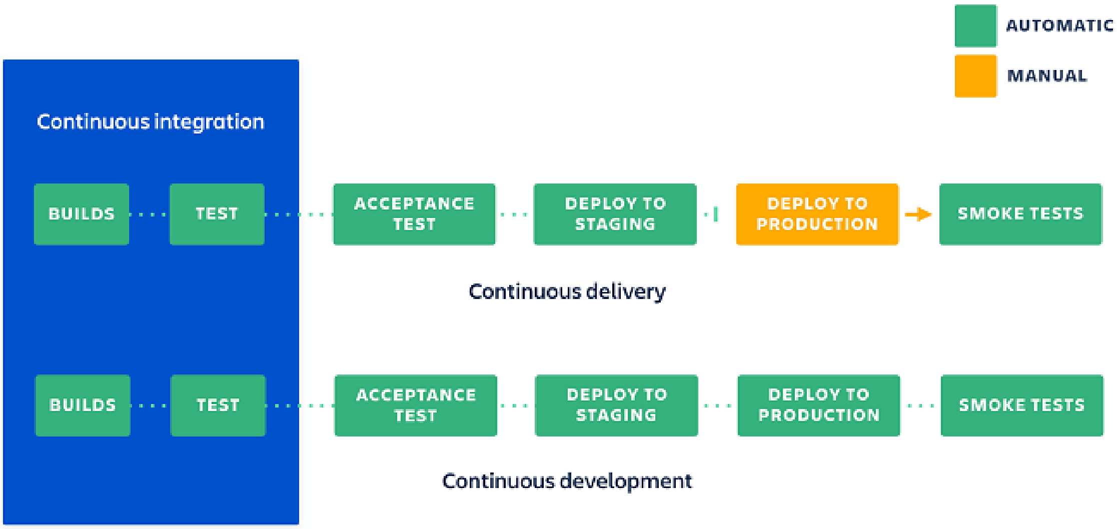
1. Do you use source control?
2. Can you make a build in one step?
3. Do you make daily builds?
4. Do you have a bug database?
5. Do you fix bugs before writing new code?
6. Do you have an up-to-date schedule?
7. Do you have a spec?
8. Do programmers have quiet working conditions?
9. Do you use the best tools money can buy?
10. Do you have testers?
11. Do new candidates write code during their interview?
12. Do you do hallway usability testing?

Note: The Simple Programmer Test

1. Can you use source control effectively?
2. Can you solve algorithm-type problems?
3. Can you program in more than one language or technology?
4. Do you do something to increase your education or skills every day?
5. Do you name things appropriately?
6. Can you communicate your ideas effectively?
7. Do you understand basic design patterns?
8. Do you know how to debug effectively?
9. Do you test your own code?
10. Do you share your knowledge?
11. Do you use the best tools for your job?
12. Can you build an actual application?

3.3 Continous Integration-Continuous Delivery

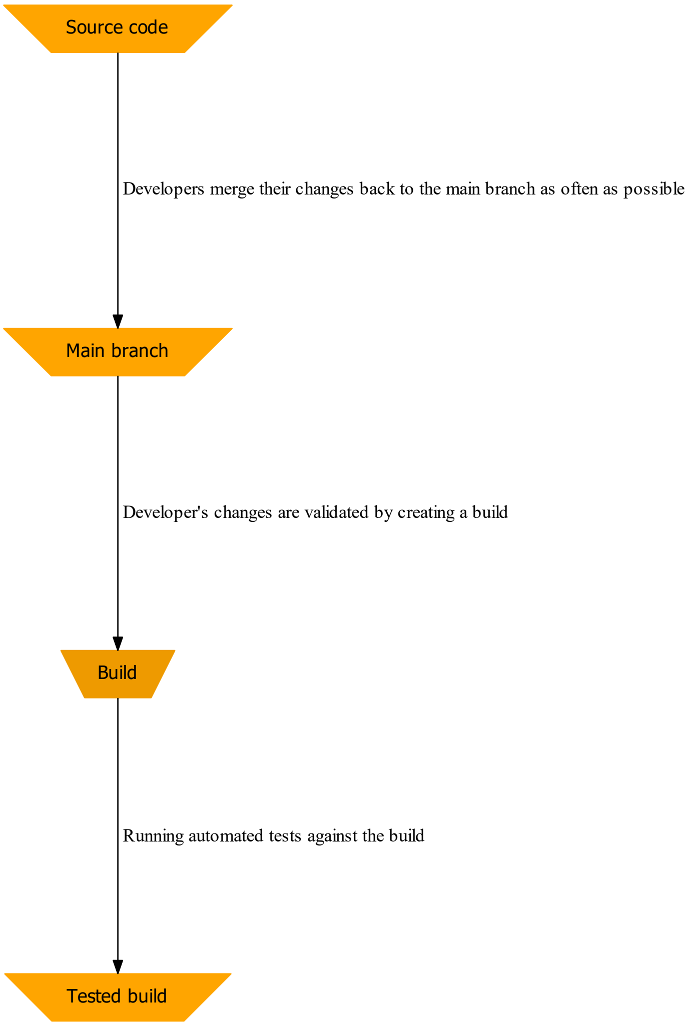




3.3.1 Continuous Integration

Continuous Integration (CI) is straightforward and stands for continuous integration, a practice that focuses on making preparing a release easier. The acronym CD) can either mean continuous delivery or continuous deployment.

source : Continuous integration vs. continuous delivery vs. continuous deployment


Source code
Developers merge their changes back to the main branch as often as possible
Main branch
Developer's changes are validated by creating a build
Build
Running automated tests against the build
Tested build

Continous Integration v2019-04-27

3.3.2 Continuous Delivery

Continuous delivery (CD) is an extension of continuous integration to make sure that you can release new changes to your customers quickly in a sustainable way.

You automate your release process and deploy your application at any point of time by clicking on a button on a daily, weekly, fortnightly basis.

source : Continuous integration vs. continuous delivery vs. continuous deployment

3.3.3 Continuous Deployment

Continuous deployment (CD) implies that every change that passes all stages of your production pipeline is released to your customers. There's no human intervention, and only a failed test will prevent a new change to be deployed to production.

source : Continuous integration vs. continuous delivery vs. continuous deployment

3.4 Backup

3.4.1 Which ressources do you need to backup?

- Virtual machines running an Operating system (Windows, MacOSX, Linux. . .)
- Databases (Microsoft SQL Server, MongoDB, Oracle Database, MySQL. . .)
- File systems (Directories containing documents, images. . .)

3.4.2 Which strategy do you need to apply?

- Store forever one full backup per year from January the 1st (Year Y1, Y2. . .)
- Store everyday day one incremental backup for each resource
  - Store a full backup the first of each month
  - Store an incremental backup from Day 2 to the end of the month (31-1 backups)
  - Replace the incremental backup performed one month earlier (Month M-1)
  - Keep the full backup made once a month

3.4.3 Wrap up

- Store in total :
  - 12 full backups per year for each month (1st day of each month)
  - 31 incremental backups for the last 31 days
  - 1 full backup per year
- Example:
  - Year 1 : 12 + 31 backups
  - Year 2 : 12 + 31 + 1 backups
  - Year 3 : 12 + 31 + 2 backups

CHAPTER

FOUR

OUTBOUND LOGISTICS (DEPLOYMENT CI/CD)

Outbound logistics are the activities required to get the finished product to the customer, including warehousing, order fulfillment, etc.

Todo: How to deliver the software : package, virtual machine, deployed application on the cloud

CHAPTER

FIVE

MARKETING AND SALES

Marketing & Sales are those activities associated with getting buyers to purchase the product, including channel selection, advertising, pricing, etc.

Todo: tools and tasks required to design the offer, market the product and then sell it offline or online

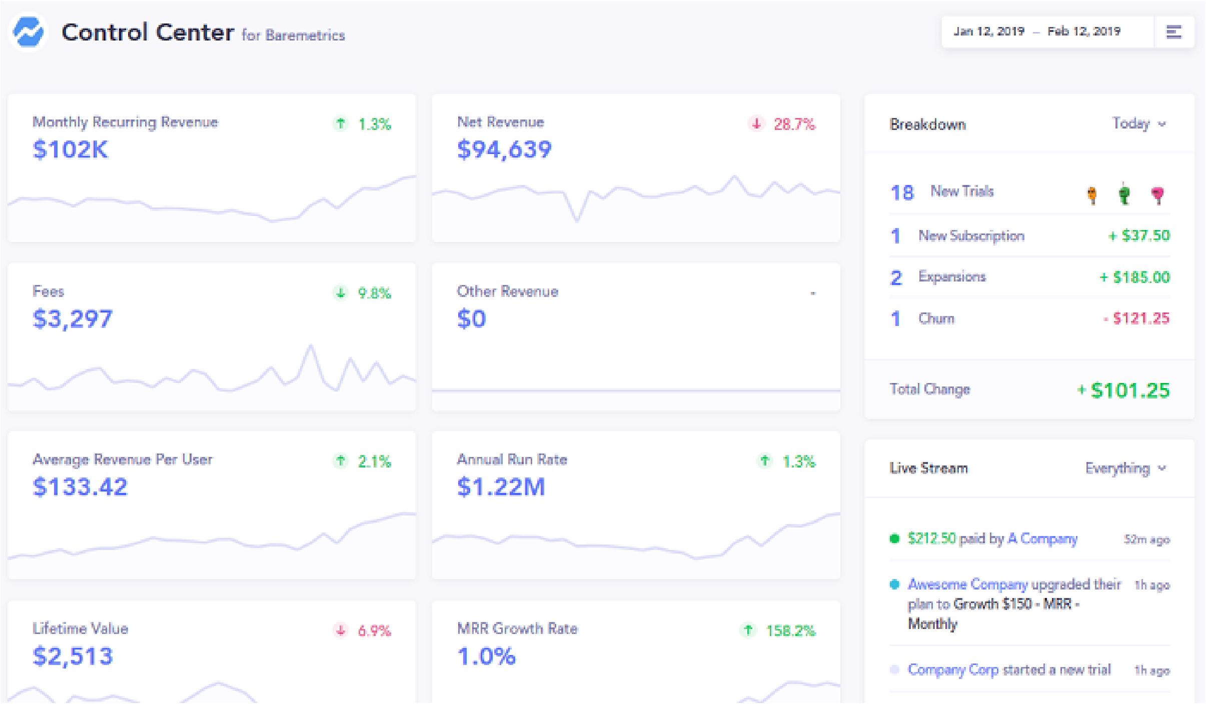
5.1 Sales automation

- Use Zoho CRM : https://www.zoho.com/crm/

1. Créer des **leads** (nom, prénom, email address, nom de société) pour XYZ digital au minimum
2. Convertissez des **leads** en **Contact** (personne physique travaillant pour une personne morale) et **Account** (personne morale)
3. Ajouter un **deal** lorsque vous convertissez un **lead** en **Contact**
4. Créer des **deals** (projets signés ou en cours)

5.2 Sales Dashboard

Baremetrics : https://demo.baremetrics.com



18	New Trials	
1	New Subscription	+ $37.50
2	Expansions	+ $185.00
1	Churn	- $121.25
	Total Change	+ $101.25

$212.50 paid by A Company 52m ago

Awesome Company upgraded their plan to Growth $150 - MRR - Monthly 1h ago

Company Corp started a new trial 1h ago

5.3 Contracts management

- The Service Provider
  - **is** Shareholder of the customer
    - the Service Provider Lowers the price
  - **is not** Shareholder of the customer
    - the Service Provider asks for a regular price
- The contract includes
  - 3rd parties with whom the Service Provider **has no** liabilities towards the 3rd party
    - The Service Provider has NOTHING to do contractually
  - 3rd parties with whom the Service Provider **has** liabilities towards the 3rd party
    - A contract describing the governance MUST be written

CHAPTER

SIX

SERVICES

Service activities are those that maintain and enhance the product's value including customer support, repair services, etc.

Todo: Tools required to support the customer during the usage of the software such as https://readthedocs.org

CHAPTER SEVEN

PROCUREMENT

Procurement - the function of purchasing the raw materials and other inputs used in the value-creating activities.

Todo: How to buy efficiently the software, computers, network devices, IoT devices you use to build your solutions

CHAPTER

EIGHT

TECHNOLOGY DEVELOPMENT (TOOLS GIT, NGROK)

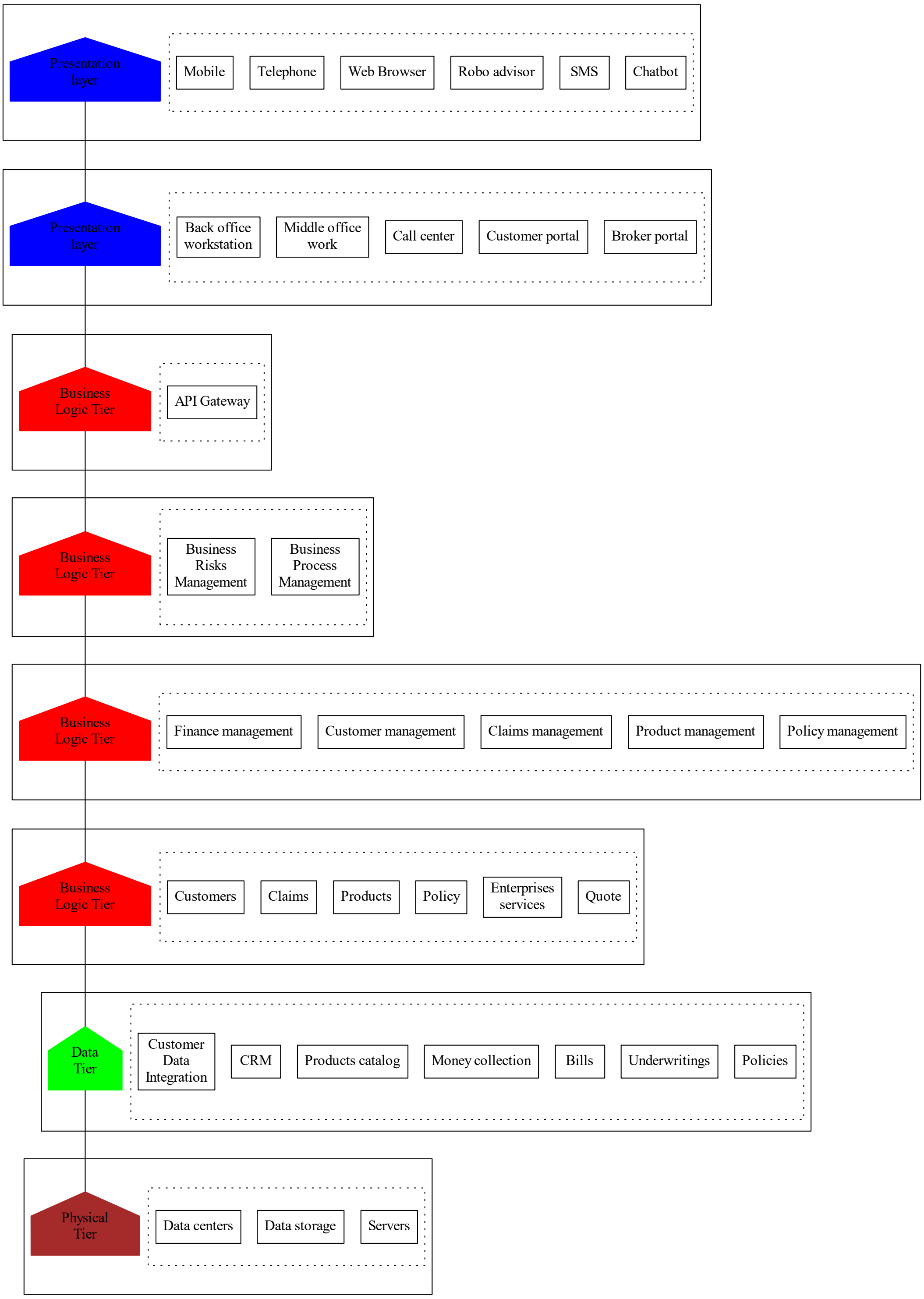
Technology Development - includes research and development, process automation, and other technology development used to support the value-chain activities.

8.1 The digitization

The *digitization* is *“Digitization, less commonly digitalization, is the process of converting information into a digital (i.e. computer-readable) format, in which the information is organized into bits.”*

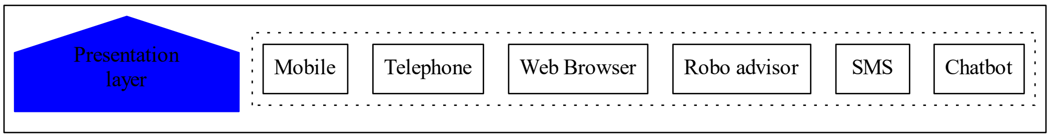
In short, developing software mimicking manual processes while adding new capabilities such enabling the communication between IT systems from different companies that couldn’t have been integrated using another way.

8.1.1 Digitization for the Insurance industry



Digitization of the Insurance industry v2019-09-12

Presentation layer



The presentation layer is the layer that is in connection with your customers through several means or devices :

Telephone

A service desk supporting the requests on the phone

Robo advisor

A *Robo advisor is a class of financial adviser that provide financial advice or Investment management online with moderate to minimal human intervention*

- The *Robo advisor* scans and dematerializes your documents
- The *Robo advisor* compares the available offers and optimize the portfolio of your customers
- The customer interacts with the trusted Robo advisors via the web, mobile chat or email

Mobile or Smartphone

Mobile phones accessing the insurer' services through SMS, email, voice of mobile app means

SMS

The customer interacts with the Insurer using SMS. The answers to the SMS are made by a *Robo advisor*, a *Chatbot* or a human. The help desks uses an IT system and (s)he is not necessarily answering using a mobile phone.

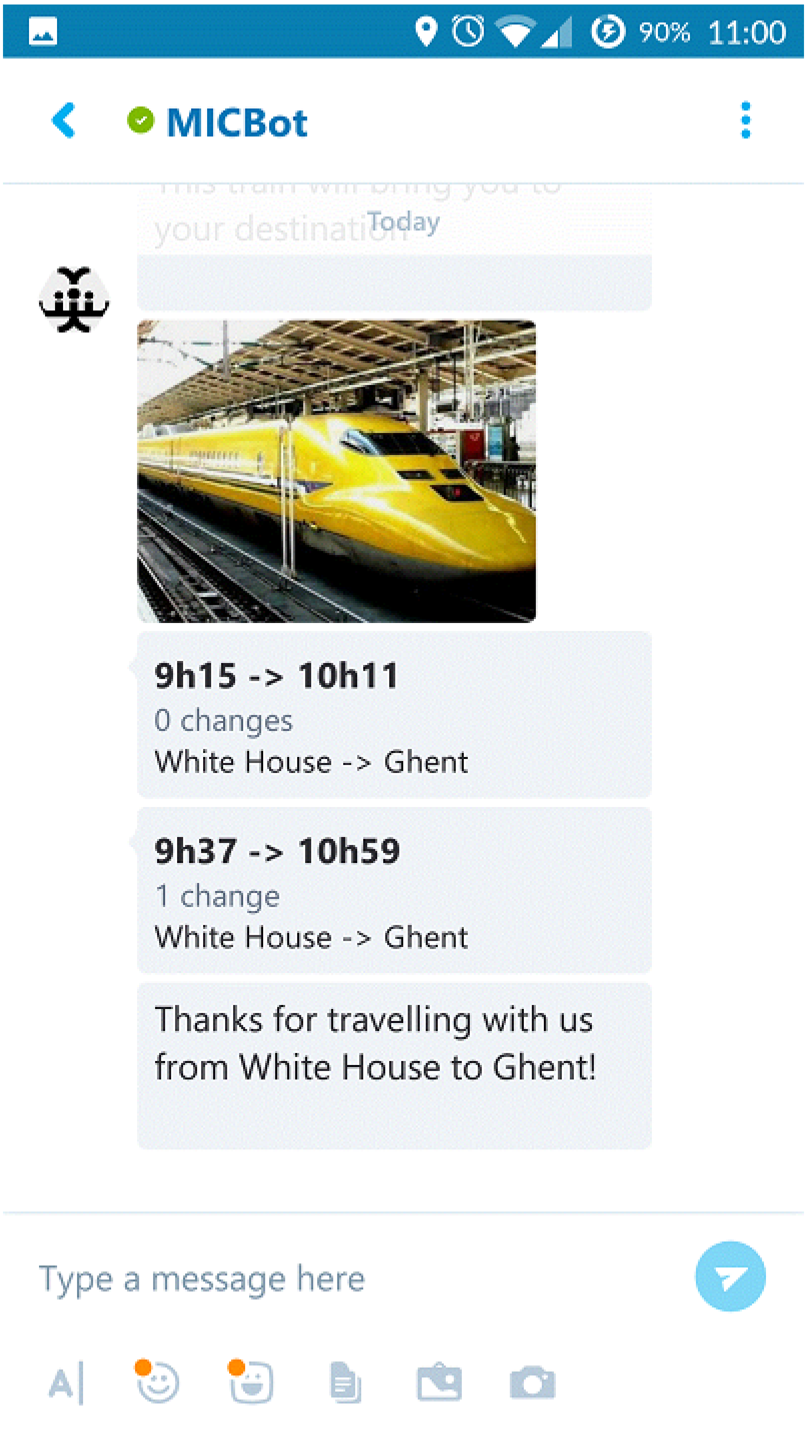
Web Browser

a software used to access the Web site of the insurer or the *underwriter* (i.e. Firefox, Opera, Ecosia, Microsoft Internet Explorer, Google Chrome, Microsoft Edge, Safari)

Chatbot

The *Chatbot* is a piece of software that conducts a conversation via auditory or textual methods.

The *Chatbot* tries to answer customers' questions that human would have had as a conversation. Some chatbots use sophisticated natural language processing systems but are most of time supported by a service desk run by humans when the *Chatbot* can't understand the demands made by the customer.

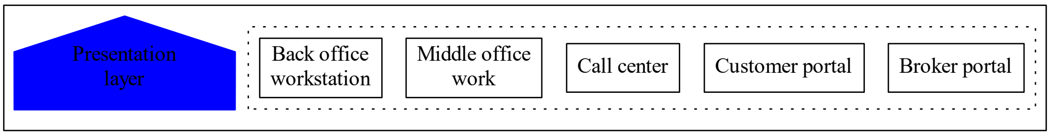


This train will bring you to your destination

9h15 -> 10h11
0 changes
White House -> Ghent

9h37 -> 10h59
1 change
White House -> Ghent

Thanks for travelling with us from White House to Ghent!



The presentation layer counts the front office as well as the back office. The *back office is all the resources of the company that are devoted to actually producing a product or service and all the other labor that isn't seen by customers, such as administration or logistics*.

Back office workstation

Those are the collaborators managing the operations ensuring the correct exection of the processes :

- quote an offer
- validate personal data
- validate the filling of a form
- perform the dunning services duties

The back office requires documentation, software and reports to perform their duties.

Middle office workstation

The *middle office is made up of the risk managers and the information technology managers who manage risk and maintain the information resources.*

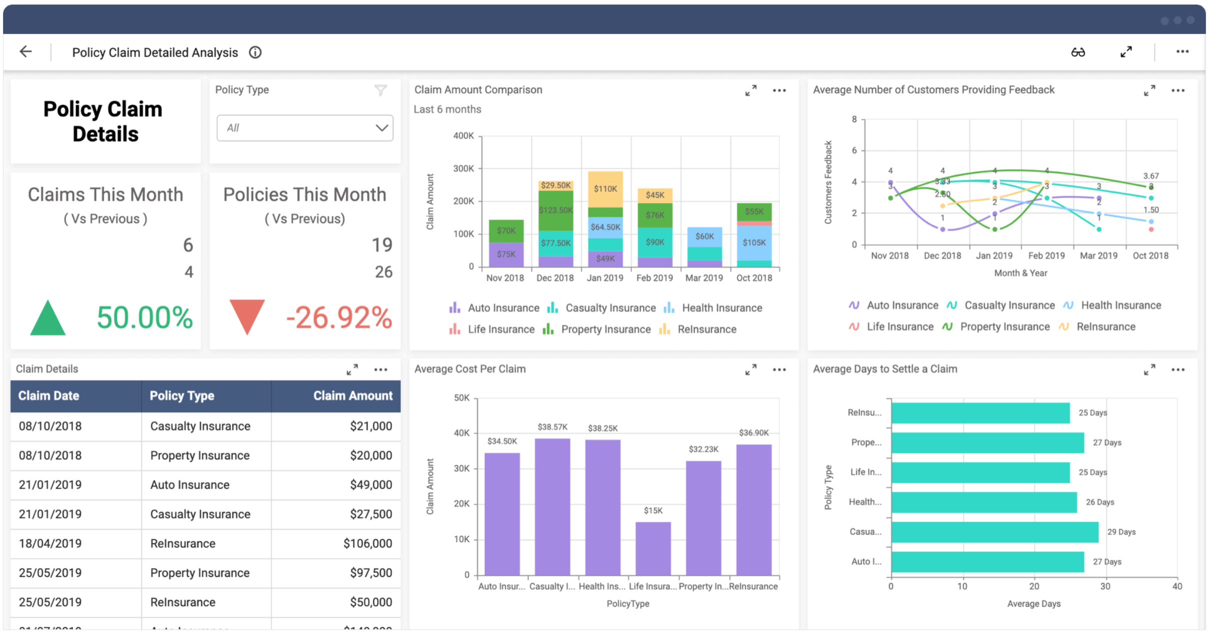
- Track claim settlement times
- Customer satisfation ratings
- Long-term trends in customer activity

Data collected during the operations are stored into IT systems operated by a multitude of managers (risks, operations, HR, Marketing)

Those data are analysed and supports the value chain (logistics, operations, marketing, sales, support) by giving a broad and exact view of the financial situation of the company.

After a careful analysis, the data are shared with the back office who can act and interact with prospects, customers and suppliers depending on the situation (dunning service, quotation, billing, closing off the contract)

Tip: Try the Insurance claims analysis dashboard



Policy Claim Detailed Analysis

Policy Claim Details

Policy Type: All

Claims This Month
(Vs Previous)
6
4
▲ 50.00%

Policies This Month
(Vs Previous)
19
26
▼ -26.92%

Claim Details

Claim Date	Policy Type	Claim Amount
08/10/2018	Casualty Insurance	$21,000
08/10/2018	Property Insurance	$20,000
21/01/2019	Auto Insurance	$49,000
21/01/2019	Casualty Insurance	$27,500
18/04/2019	ReInsurance	$106,000
25/05/2019	Property Insurance	$97,500
25/05/2019	ReInsurance	$50,000

Call centre

Three types of call centres might be operated by a financial service company:

- An *inbound call center* is operated by a company to administer incoming product or service support or information enquiries from consumers.
- An *outbound call center* is operated for telemarketing, for solicitation of charitable or political donations, debt collection, market research, emergency notifications, and urgent/critical needs blood banks.
- A *contact center*, further extension to call centers administers centralized handling of individual communications, including letters, faxes, live support software, social media, instant message, and e-mail.

Customer portal

A website accessible through a Web browser or a mobile phone enabling the customer to access all the aspects of his duties and rights towards the insurer.

The portal gives access to diverse functionalities:

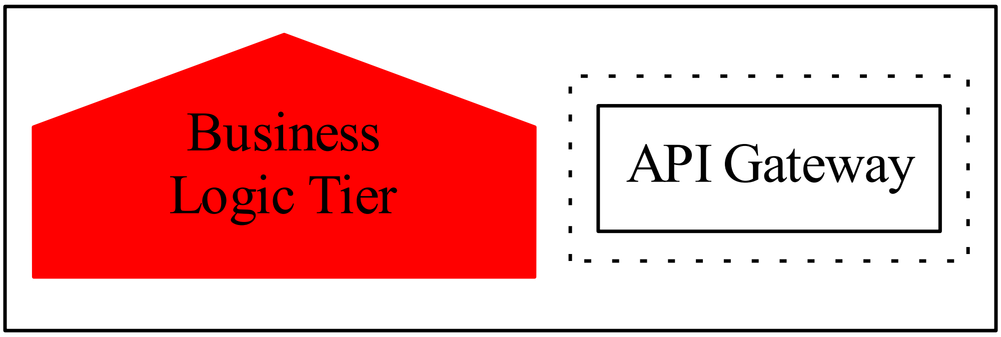
- Information platform: share details about the products and services, how to contact the insurer
- Transaction platform: create, update or delete information, stop a current insurance, pay electronically the remaining Bills
- Sales platform: generate up-sell and cross-sell opportunities, promote the *Robo advisor* capabilities
- **Rewards platform: Insurers retain their customers through the Perceived Value of the customer, the Affinity that the**
    - Perceived value: does the customer feels that (s)he has coverage at a competitive and fair price?
    - Affinity: do the customer has a emotional connection with the customer? Insurance products may tend to have a limited value due to the commoditized nature of the product
    - Barriers to Exit: does the customer has strong and effective reasons to do not leave an insurer? the lack of competition, the increase of costs, the loss of a unique protection, a decrease of the quality of service

Broker portal

A broker portal is a website enabling the *broker* to perform her/his duties

- Information platform: share details about the products and services, how to contact the insurer, the customers
- Sales platform: support the sales process (from a quote to a signed contract), generate up-sell and cross-sell opportunities
- Marketing platform: identify new sales opportunites by advertising the products and identify the most profitable or potential prospects
- CRM platform: maintain data related to the prospects and customers (contact details, online and offline interactions)
- Dunning service platform: inform and give the tools to enable the broker to run after unpaid invoices till the termination of the contract

Business logic tier



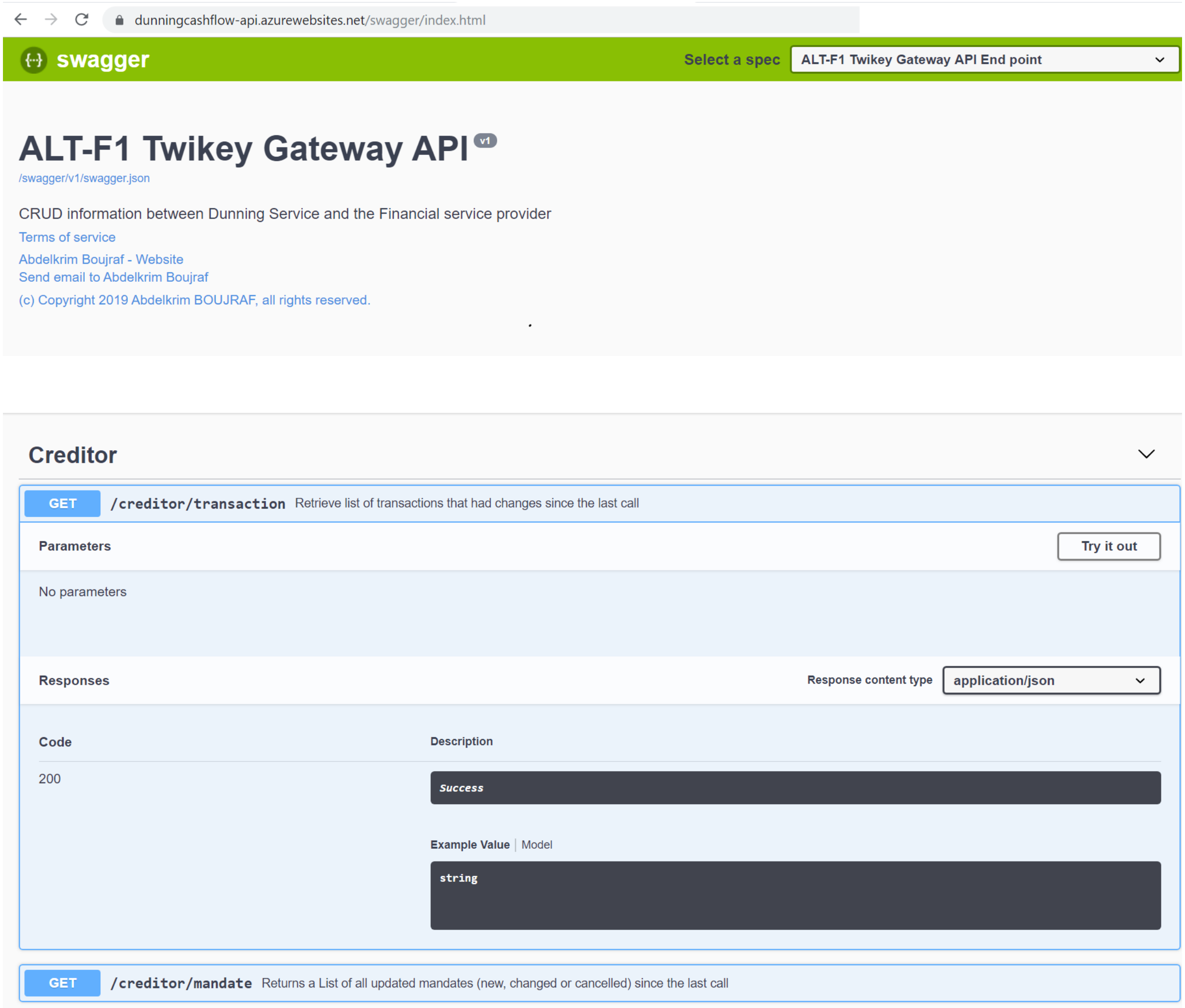
API Gateway

The API (Application Programming Interface) describes the functions or the interfaces available between a client and a server.

APIs are enablers of the platform economy, and allow users to enhance and add services over existing products.

For example: An API enables an application 'A' to query a system 'B' and collects the schedule of the public transportation (See https://opendata.stib-mivb.be/store/data)

Tip: Look at the description of the API from a dunning Service https://dunningcashflow-api.azurewebsites.net/swagger/index.html



dunningcashflow-api.azurewebsites.net/swagger/index.html

swagger — Select a spec: ALT-F1 Twikey Gateway API End point

ALT-F1 Twikey Gateway API v1

/swagger/v1/swagger.json

CRUD information between Dunning Service and the Financial service provider

Terms of service

Abdelkrim Boujraf - Website

Send email to Abdelkrim Boujraf

(c) Copyright 2019 Abdelkrim BOUJRAF, all rights reserved.

Creditor

GET `/creditor/transaction` Retrieve list of transactions that had changes since the last call

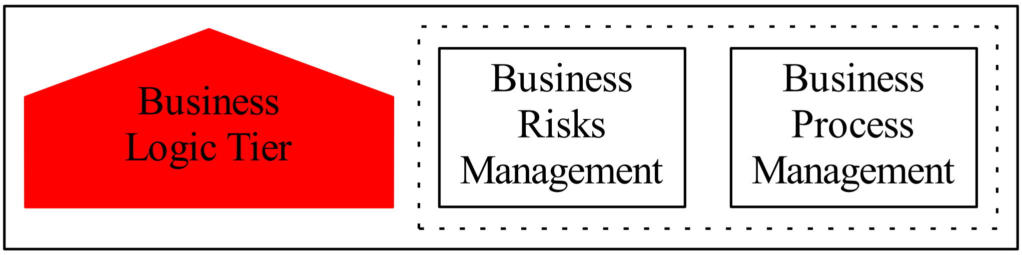
Parameters — Try it out

No parameters

Responses — Response content type: application/json

Code	Description
200	Success Example Value | Model `string`

GET `/creditor/mandate` Returns a List of all updated mandates (new, changed or cancelled) since the last call



Business Risk Management

The financial services must comply with a multitude of risks.

Here are a list of pure risks (loss or no loss only) that an insurer or a *underwriter* may be confronted with:

- Regulatory Compliance: Invoice compliance, MiFID ii, MiFID 2, Solvency II, Solvency 2
- Tax Compliance: Tax determination, Fiscal reporting, VAT reporting
- Liability risk exposure: product liability risks, or contractual liability risks
- Operational risk: mistakes in process and procedure
- Intellectual property violation risk
- Mortality and morbidity risk at the societal and global level

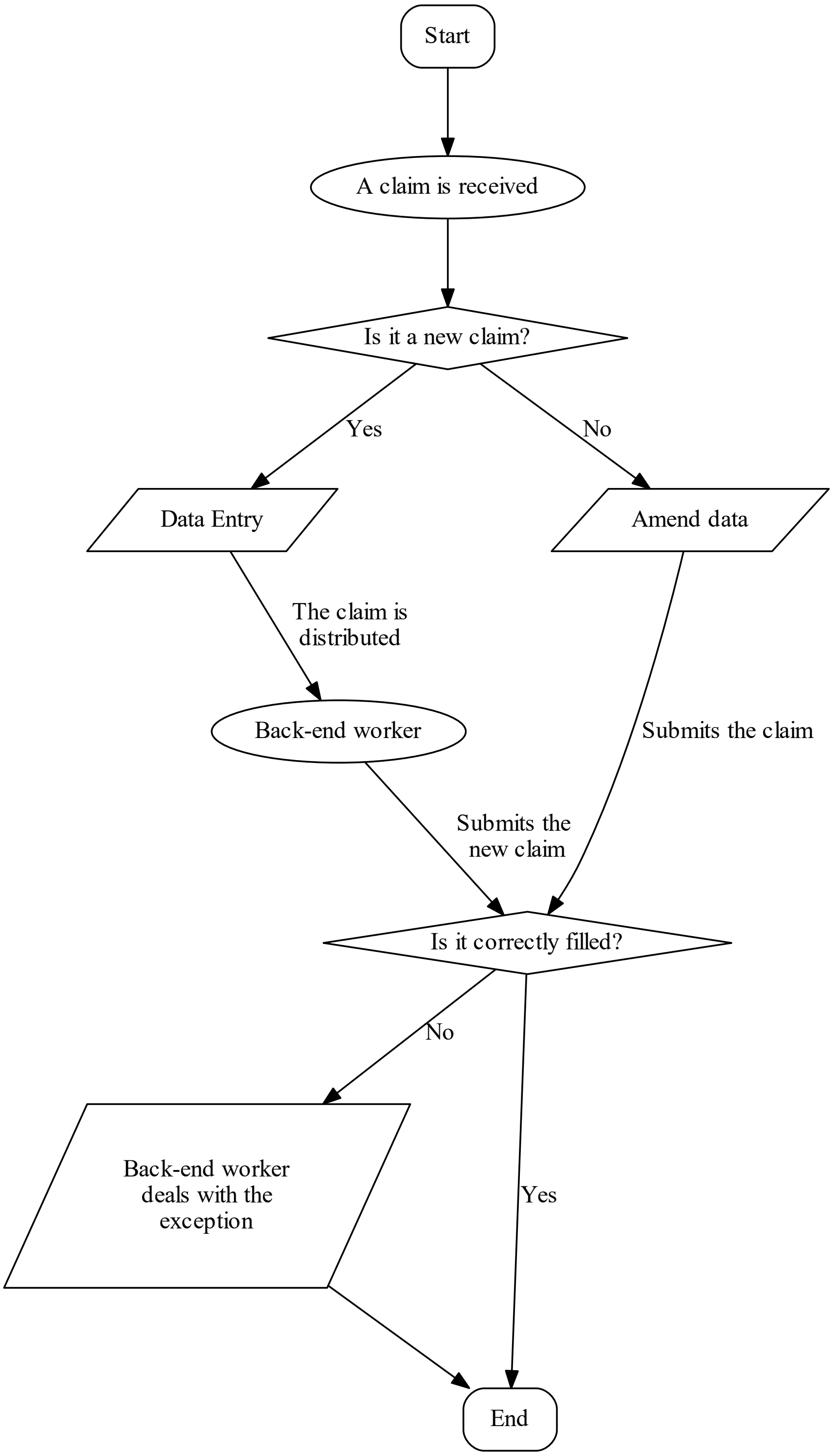
Warning:

- Speculative risks are not described in this documents. i.e. market risk, reputational risk, brand risk, product success risk…

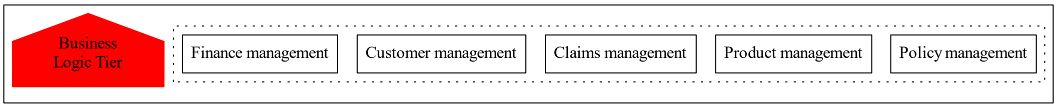
Business Process Management

The *Business Process Management is a discipline aimed at managing all aspect of the business processes; from process design to modeling and analysis to execution and improvement.*

Note: Here is the description of a process: Data entry of a claim



Insurance: Claim data entry



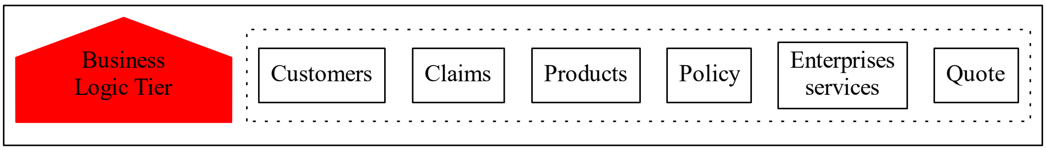
Finance management

Customer management

Claims management

Product management

Policy management



Customers

Claims

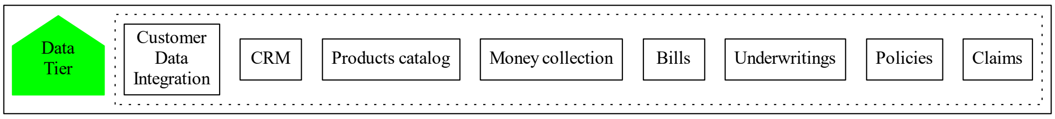
Products

Policies

Entreprise services

Quotes

Data tier



CDI (Customer Data Integration)

CDI (Customer Data Integration)

CRM (Customer Relationship Management)

CRM (Customer Relationship Management)

Products catalog

Money collection

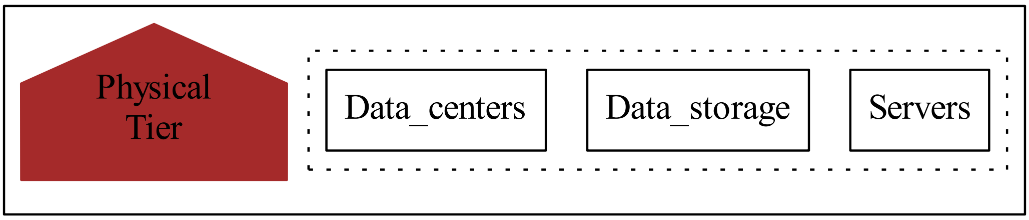
Bills

Underwritings

Policies

Claims

Physical tier



Data Centers

Data storage

Servers

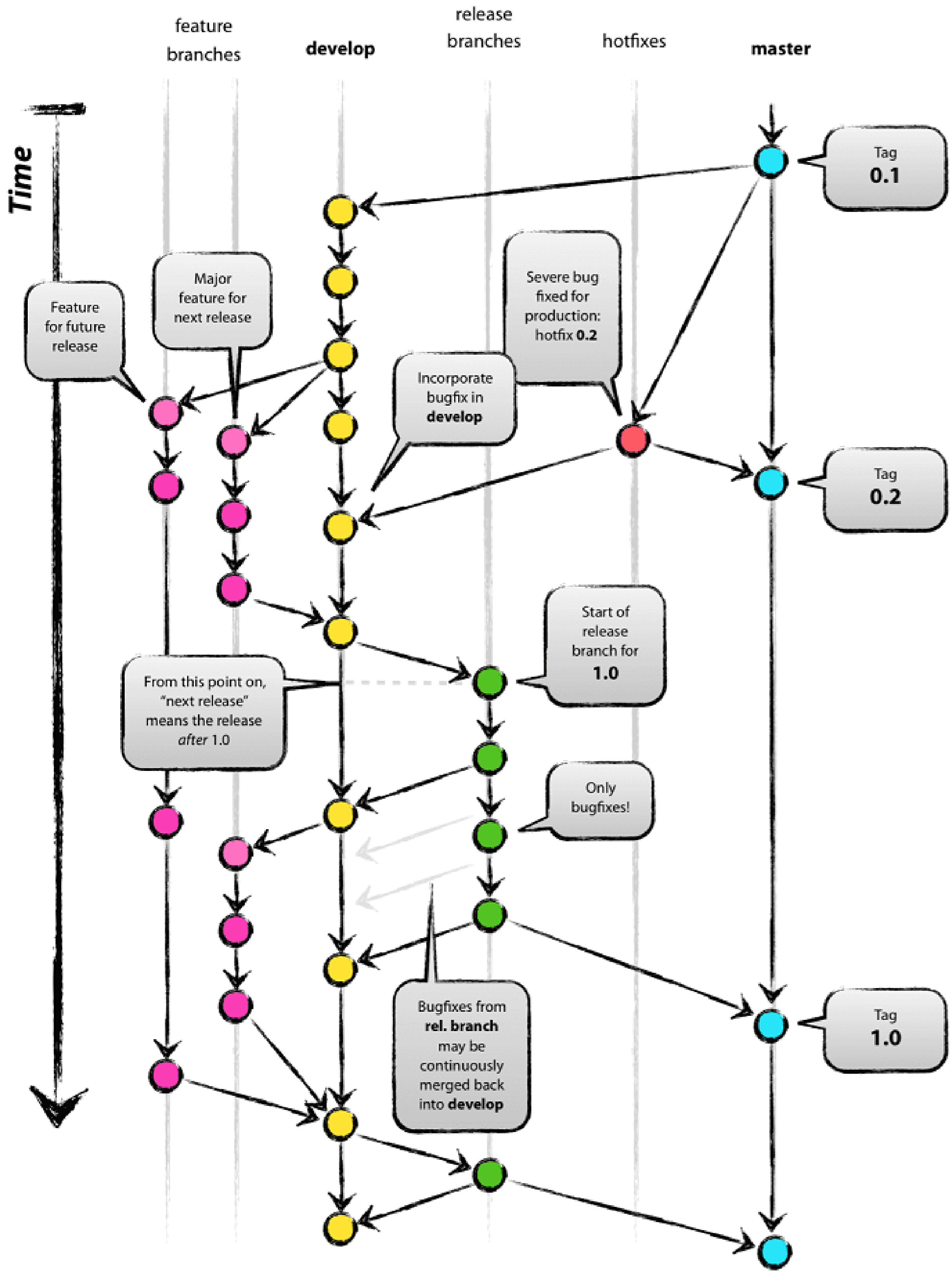
8.2 GIT lifecycle

Description of how to manage the versions, branches in a git repository as well the operations of the software

How to write relevant commits?

8.2.1 A successful git branching model

A successful Git branching model : https://nvie.com/posts/a-successful-git-branching-model/


feature branches
develop
release branches
hotfixes
master
Time
Tag 0.1
Feature for future release
Major feature for next release
Severe bug fixed for production: hotfix **0.2**
Incorporate bugfix in **develop**
Tag 0.2
Start of release branch for **1.0**
From this point on, "next release" means the release *after* 1.0
Only bugfixes!
Bugfixes from **rel. branch** may be continuously merged back into **develop**
Tag 1.0

8.2.2 GIT : commit conventions

source : conventional commits : https://github.com/conventional-commits

Semantic messages: http://seesparkbox.com/foundry/semantic_commit_messages

```
build
chore (maintain i.e. updating grunt tasks etc; no production code change)
ci (continuous integration)
docs (documentation)
feat (feature)
fix (bug fix)
perf (performance improvements)
refactor (refactoring production code)
revert
style (formatting, missing semi colons, ...)
test (adding missing tests, refactoring tests; no production code change)
```

- enumeration : https://github.com/conventional-changelog/commitlint/tree/master/%40commitlint/config-conventional#type-enum
- Install commitlint : https://conventional-changelog.github.io/commitlint/#/

Example of commits

Source : https://github.com/conventional-commits/conventionalcommits.org/commits/master

8.2.3 GIT : how to manage the versions, branches . . . ?

- **GIT** : Create a branch : [BRANCH-DEV] – [BRANCH-PARENT]
- **DEV** : Local development on Software engineer machine
- **MERGE GIT** : Merge the [BRANCH-DEV] with the [BRANCH-PARENT]
  - The code is merged into the [BRANCH-DEV]
- **STAGING** : The Software is deployed on the staging environment
- **MERGE GIT** : Merge the [BRANCH-DEV] with the [BRANCH-PARENT]
  - The code is merged into the [BRANCH-PARENT]
- **PROD** : Test the PROD version of the software
- **LIVE** : deploy the PROD version of the software on the PROD server

8.2.4 GIT LFS Large File System

- git commands
- Install git lfs https://git-lfs.github.com
- **Locks**
  - git lfs lock images/foo.jpg
  - git lfs locks
  - git lfs unlock images/foo.jpg
- git lfs push origin master –all

Create a .gitattributes file

```
.. include:: .gitattributes
```

Commands to add files into the repository, and push the code

```
git lfs install
git lfs track "*.jpg" --lockable
git lfs track "*.JPG" --lockable
git lfs track "*.png" --lockable
git lfs track "*.zip" --lockable
git lfs track "*.mp4" --lockable
git lfs track "*.MP4" --lockable
git lfs track "*.docx" --lockable
git lfs track "*.svg" --lockable
git lfs track "*.gif" --lockable
git lfs track "*.psd" --lockable
git lfs track "*.sketch" --lockable
git lfs track "*.ai" --lockable

git add "*.jpg" "*.JPG" "*.png" "*.zip" "*.mp4" "*.MP4" "*.docx" "*.svg" "*.gif"

git lfs ls-files
git lfs env

git config lfs.https://inlsprl.visualstudio.com/[ProjectName]/_git/[ProjectName].
↪git/info/lfs.locksverify true
git push origin master
git lfs push origin master --all
```

- https://github.com/git-lfs/git-lfs/wiki/File-Locking

8.3 ngrok - Public URLs for exposing your local web server

Use ngrok to grant access to your localhost to anyone

1. Install https://ngrok.com/download
2. open the port where the web server is located. run the following command :
    1. **[path to ngrok]**\ngrok.exe http **[port to open on your localhost]** -host-header=rewrite
3. share the URL to the person who needs to access your local machine. i.e. https://a1cc816e.ngrok.io

```
ngrok by @inconshreveable

Session Status online Account [the account name] (Plan: Free) Update update␣
↪available (version 2.2.8, Ctrl-U to update) Version 2.2.3
Region United States (us) Web Interface http://127.0.0.1:4040
Forwarding http://a1cc816e.ngrok.io -> localhost:4624 Forwarding

https://a1cc816e.ngrok.io -> localhost:4624
```

8.4 How to write a bug report?

1. Copy paste the content hereunder
2. Create a new issue: https://bitbucket.org/altf1be/software-architecture/issues/new

```
## WHAT STEPS WILL REPRODUCE THE PROBLEM?

1. Open the page
2.
3.

## WHAT IS THE EXPECTED OUTPUT?

*  StratEx is loaded


## WHAT DO YOU SEE INSTEAD?

* The screenshot attached to this email
* StratEx cannot be opened because of a problem

## WHAT VERSION OF THE PRODUCT ARE YOU USING?

* Version: 3.5.6245.20028
* on [https://www.stratexapp.com](https://www.stratexapp.com)
* on [https://staging.stratexapp.com](https://staging.stratexapp.com)
* on [https://develop.stratexapp.com](https://develop.stratexapp.com)


## ON WHAT OPERATING SYSTEM, BROWSER, ETC.?

* Windows 7.1
   * Chrome Version 54
   * Internet Explorer 11
   * Opera Version 41
* Windows 10
   * Internet Explorer
   * Edge
* Mac OS X 10.9 (13A603)
   * Safari Version 7.0 (9537.71)
   * Chrome Version 31.0.1650.57

## PLEASE PROVIDE ANY ADDITIONAL INFORMATION BELOW.

* None
* Extra files are available on [StratExApp files on Google Drive]
* Find the private [Videos generated on GDrive]
* Find the public [Videos on StratEx YouTube channel]
* Find the public [Documentation on Read The Docs]

## Bug report (if any)

* None

[StratExApp files on Google Drive]: https://drive.google.com/a/alt-f1.be/
↪folderview?id=0B9L2cx0TUjLGUFZBSkF6WlFCYms&usp=sharing#list
[Videos generated on GDrive]: https://drive.google.com/a/alt-f1.be/folderview?
↪id=0B9L2cx0TUjLGa190N1ZURHBpUFE&usp=sharing
[Videos on StratEx YouTube channel]: https://www.youtube.com/channel/
↪UCuwGfoVoozq0ZTmHJ3WCvTQ
[Documentation on Read The Docs]: http://stratexapp-docs.readthedocs.org/en/latest/
```

8.5 Research & Development topics

0. Prerequisite:
    - Use Technologies supported by Microsoft
        - ASP.NET - https://docs.microsoft.com/en-us/aspnet/overview
        - ASP.NET Core - https://docs.microsoft.com/en-us/aspnet/core/
        - Microsoft Azure: https://portal.azure.com
1. Single Page Application (SPA)
    - Build a SPA such as Microsoft Azure for our customers
    - Test SPA App
2. IT Automation best practices
    - Reading : https://www.joelonsoftware.com/2000/08/09/the-joel-test-12-steps-to-better-code/
    - In general we should go for 1-click test/deployment
    - Design
    - Development
    - Test (SPA, Web apps)
        - Unit
        - UAT (user acceptance test)
    - Deployment
    - Documentation
        - Design
        - Code
        - User manual

- Security

8.6 Open Authentication (OAuth)

OAuth is an open standard for access delegation, commonly used as a way for Internet users to grant websites or applications access to their information on other websites but without giving them the passwords.

Source: Wikipedia contributors. (2019, March 19). OAuth. In Wikipedia, The Free Encyclopedia. Retrieved 12:20, March 23, 2019, from https://en.wikipedia.org/w/index.php?title=OAuth&oldid=888559139

8.6.1 Use case for Open Authentication

A user requires access to a resource on a web application (eg StratEx) using her credentials from another website (eg Microsoft Office365).

1. She needs to login using the form from Office365
2. Office365 will generate a token
3. The token is used by StratEx ensuring that the user is effectively logged using her Office365 credentials
4. StratEx can use the resources made available by Office365 such as username, firstname, lastname, email address, read access to OneDrive, write and send new emails…

8.6.2 Open authentication using Office365

Microsoft graph documentation makes available Office365 resources of each registrered user:

- https://developer.microsoft.com/en-us/graph
- https://docs.microsoft.com/en-us/graph/overview

Request an access token to Office 365:

- https://login.microsoftonline.com/common/oauth2/v2.0/authorize?client_id=f5d835b0-4bc1-98e7-f98cb4aaef31&scope=https%3A%2F%2Fgraph.microsoft.com%2Fuser.read&response_type=code&redirect_uri=https%3A%2F%2Ftimesheet-stg-inlsprl.azurewebsites.net%2Fsignin-microsoft&state=Ao8m01yi1E76wQIXPJW-F92Fq1v

Description of each parameter (see use-the-authorization-code-to-request-an-access-token):

- https://login.microsoftonline.com/common/oauth2/v2.0/**authorize**
- ? **client_id** =f5d835b0-4bc1-98e7-f98cb4aaef31
- & **scope** =https%3A%2F%2Fgraph.microsoft.com%2Fuser.read
- & **response_type** =code
- & **redirect_uri** =https%3A%2F%2Ftimesheet-stg-inlsprl.azurewebsites.net%2Fsignin-microsoft
- & **state** =Ao8m01yi1E76wQIXPJW-F92Fq1v

CHAPTER

NINE

HR MANAGEMENT (CURRICULUM)

Human Resource Management - the activities associated with recruiting,development, and compensation of employees.

9.1 .NET Curriculum

9.1.1 Documentation

- sphinx : https://www.sphinx-doc.org/en/master/usage/restructuredtext/basics.html
    1. install sphinx
    2. install template rtfd

Todo:

3. create a public repo on github presenting a template for sphinx projects

9.1.2 Testing

- Creating Unit Tests for ASP.NET MVC Applications (C#) :
    - https://docs.microsoft.com/en-us/aspnet/mvc/overview/older-versions-1/unit-testing/creating-unit-tests-for-asp-net-mvc-applications-cs
- Testing and debuggin ASP.NET Web API :
    - Testing and Debugging ASP.NET Web API
- SeleniumHQ Browser automation :
    - https://www.seleniumhq.org
- End to end testing angular :
    - https://www.protractortest.org

9.1.3 Software engineering

- The Joel Test - 12 Steps to Better Code
- The Joel Test For Programmers (The Simple Programmer Test)

9.1.4 Software development .NET

- Microsoft .NET : C#
- Debugging code back-end (Visual Studio)
- Debugging code front-end (Browser, Visual Studio)
- Debugging code on Azure (Browser, Visual Studio)
- MVC : ASP.NET MVC Model-View-Controller
- CSS : https://developer.mozilla.org/en-US/docs/Web/CSS
- Bootstrap 4 : https://getbootstrap.com/
- Authentication/Authorization: .net identity
- REST API: securization by token containing a UUID + Claims. Log using MS Account -> Get VSTS tokens -> display Personal projects
- REST API (documentation/deployment): SWAGGER
- REST API (test) : POSTMAN
- SPA Single Page Application
  - ANGULAR
    - Linter : https://angular.io/cli/lint
  - Typescript
    - Linter : https://github.com/Microsoft/dtslint
- NUGET: back-end code + database + migration database + INL/Metis repository

9.1.5 DATA MODELING .NET and Azure

- Entity framework: Code first
- Database:
  - SQL (SQL Server), Azure SQL Server classic (do not use elastic pool)
  - NoSQL: CosmosDB
- File storage (SMB 3.0)
- Media (photo, video, sound): Azure Media services

9.1.6 GENERATE OFFICE FILES

- File Format APIs : https://www.aspose.com

9.1.7 DEPLOYMENT

- Team Services: Understand the agile methodology
- Azure Web App : https://portal.azure.com
- Azure Pipelines : https://azure.microsoft.com/en-us/services/devops/pipelines
- Jenkins supports building, deploying and automating any project.: https://jenkins.io/

9.1.8 Artificial intelligence / Machine learning / Big data analysis

- Artificial intelligence: https://azure.microsoft.com/en-us/services/cognitive-services
- Machine learning: https://azure.microsoft.com/en-us/services/machine-learning-services
- NTLK Natural Language Toolkit : https://www.nltk.org

9.1.9 Reproducible research

- Tools
  - Jupyter notebook are documents produced by the Jupyter Notebook App, which contain both computer code (e.g. python) and rich text elements (paragraph, equations, figures, links, etc): http://jupyter.org
  - nteract and create with data, words, and visuals : https://nteract.io/
  - Microsoft Azure Notebooks : http://notebooks.azure.com
  - Colabotary : https://colab.research.google.com/
- Theory
  - Reproducable research: https://mg.readthedocs.io/reproducible_research.html
  - Reproducibility Workshop: Best practices and easy steps to save time for yourself and other researchers: https://codeocean.com/workshop/caltech

9.2 Excel Curriculum

9.2.1 Lookups

- Introduction
- VLOOKUP
- VLOOKUP Exact Match
- HLOOKUP
- HLOOKUP Exact Match

9.2.2 Conditional Logic

- Introduction
- IF Statement
- Nested IF
- AND
- OR
- NOT
- IFERROR
- SUMIF
- AVERAGEIF
- COUNTIF & COUNTIF
- SUMIFS
- AVERAGEIFS

9.2.3 Data Tools

- Introduction
- Data Validation
- Drop-Down Lists
- Removing Duplicates
- Text To Columns
- Goal Seek
- Scenario Manager

9.2.4 PivotTables

- Introduction
- Creating PivotTables
- Choosing Fields
- PivotTable Layout
- Filtering PivotTables
- Modifying PivotTable Data
- PivotCharts

9.2.5 Collaboration

- Introduction
- Document Properties
- Inserting Hyperlinks
- Sharing a Workbook
- Track Changes
- Accept/Reject Changes
- Mark as Final

9.2.6 Printing

- Introduction
- Page Orientation
- Page Breaks
- Print Area
- Margins
- Print Titles
- Headers and Footers
- Scaling
- Sheet Options

9.2.7 Macros

- Introduction and Macro Security
- Recording a Macro
- Assign a Macro to a Button or Shape
- Run a Macro upon Opening a Workbook
- How to Inspect and Modify a Macro

9.3 Secure and Private Artificial Intelligence

- course source :
  - https://classroom.udacity.com/courses/ud185
  - other course : https://www.udacity.com/school-of-ai

9.3.1 Deep learning with PyTorch

- https://research.fb.com/category/facebook-ai-research
- Notebooks : https://github.com/udacity/deep-learning-v2-pytorch

Install Python3

- create a python3.7.X environment : *conda create -n py37 python=3.7 anaconda*
- activate the environment *conda activate py37*
- deactivate the environment *conda deactivate*
- determining my environment : *conda info –envs*

Install PyTorch an Conda

- Install Conda
  - install Anaconda : https://docs.anaconda.com/anaconda/install and https://conda.io/en/latest
  - or install Miniconda : https://docs.conda.io/en/latest/miniconda.html
  - Some commands
    - managing environments : https://conda.io/projects/conda/en/latest/user-guide/getting-started.html#managing-environments
    - example of commands : *conda search scipy*, *conda install scipy*, *conda build my_fun_package*, *conda update conda*
- Install PyTorch https://pytorch.org/get-started/locally
  - for old GPU (does not work on Geforce GT 520M *conda install pytorch torchvision cudatoolkit=9.0 -c pytorch -c defaults -c numba/label/dev*
  - *conda install pytorch torchvision cudatoolkit=10.0 -c pytorch*
- Install numpy, jupyter and notebook
  - *conda install numpy jupyter notebook*

Launching Jupyter Notebook App

- *jupyter notebook* - https://jupyter-notebook-beginner-guide.readthedocs.io/en/latest/execute.html

9.3.2 Udacity course : Deep Learning with PyTorch

This repo contains notebooks and related code for Udacity's Deep Learning with PyTorch lesson. This lesson appears in our [AI Programming with Python Nanodegree program](https://www.udacity.com/course/ai-programming-python-nanodegree–nd089).

- **Part 1:** Introduction to PyTorch and using tensors
- **Part 2:** Building fully-connected neural networks with PyTorch
- **Part 3:** How to train a fully-connected network with backpropagation on MNIST
- **Part 4:** Exercise - train a neural network on Fashion-MNIST
- **Part 5:** Using a trained network for making predictions and validating networks
- **Part 6:** How to save and load trained models
- **Part 7:** Load image data with torchvision, also data augmentation

- **Part 8:** Use transfer learning to train a state-of-the-art image classifier for dogs and cats

9.3.3 Tools for Artificial Intelligence

- Gym is a toolkit for developing and comparing reinforcement learning algorithms. It supports teaching agents everything from walking to playing games like Pong or Pinball. https://gym.openai.com
- ONNX is an open format to represent deep learning models. With ONNX, AI developers can more easily move models between state-of-the-art tools and choose the combination that is best for them. ONNX is developed and supported by a community of partners. https://onnx.ai
- Machine learning cheatsheet : https://ml-cheatsheet.readthedocs.io

CHAPTER

TEN

FIRM INFRASTRUCTURE (COPYRIGHTS, CISSP, GDPR)

Firm Infrastructure - includes activities such as finance, legal, quality management, etc.

10.1 Copyrights

- Choose a creative commons license : https://creativecommons.org/choose/
- Software Licenses in Plain English : https://tldrlegal.com/

10.2 CISSP

10.2.1 Business Continuity Plan

When business is disrupted, it can cost money. Lost revenues plus extra expenses means reduced profits. Insurance does not cover all costs and cannot replace customers that defect to the competition. A business continuity plan to continue business is essential. Development of a business continuity plan includes four steps:

- Conduct a business impact analysis to identify time-sensitive or critical business functions and processes and the resources that support them.
- Identify, document, and implement to recover critical business functions and processes.
- Organize a business continuity team and compile a business continuity plan to manage a business disruption.
- Conduct training for the business continuity team and testing and exercises to evaluate recovery strategies and the plan.
- Source Official website of the Department of Homeland Security : https://www.ready.gov/business/implementation/continuity

10.2.2 Disaster Recovery Plan

An information technology disaster recovery plan (IT DRP) should be developed in conjunction with the business continuity plan. Priorities and recovery time objectives for information technology should be developed during the business impact analysis. Technology recovery strategies should be developed to restore hardware, applications and data in time to meet the needs of the business recovery.

Source Official website of the Department of Homeland Security : https://www.ready.gov/business/implementation/IT

10.3 GDPR - Règlement général sur la protection des données

Le règlement no 2016/679, dit règlement général sur la protection des données (RGPD, ou encore GDPR, de l'anglais General Data Protection Regulation), est un règlement de l'Union européenne qui constitue le texte de référence en matière de protection des données à caractère personnel1. Il renforce et unifie la protection des données pour les individus au sein de l'Union européenne.

Après quatre années de négociations législatives, ce règlement a été définitivement adopté par le Parlement européen le 14 avril 2016. Ses dispositions sont directement applicables dans l'ensemble des 28 États membres de l'Union européenne à compter du 25 mai 2018.

Ce règlement remplace la directive sur la protection des données personnelles adoptée en 1995 (article 94 du règlement) ; contrairement aux directives, les règlements n'impliquent pas que les États membres adoptent une loi de transposition pour être applicables2.

Les principaux objectifs du RGPD sont d'accroître à la fois la protection des personnes concernées par un traitement de leurs données à caractère personnel et la responsabilisation des acteurs de ce traitement. Ces principes pourront être appliqués grâce à l'augmentation du pouvoir des autorités de régulation.

- European Commission : https://ec.europa.eu/info/law/law-topic/data-protection_en
- Wikipedia : https://en.wikipedia.org/wiki/General_Data_Protection_Regulation

10.3.1 PROCESS

- Describe the project
- Ensure that a clear consent is described and the user clicks on the checkbox (sentence is in the active voice + describe with precision the kind of treatment)
- Describe the treatments of personal data
- Describe the sub contracts such as Microsoft AppInsight, Google Analytics, Insurance, Bank

10.3.2 DATA MODEL

How to store the consent?

How to build the audit trail? - application name - which operation has been triggered? - who performed the operation - list the dossiers that have been exported (csv format) - Current dateTime - url used to generate the log

LOG THE CONSENT

- application name - user who consent - date of the consent- version of the consent - the text of the consent

10.4 Legal Regulations Compliance

- FSMA : https://www.fsma.be/fr
- GDPR : https://ec.europa.eu/info/law/law-topic/data-protection_en
- PSD2 : https://ec.europa.eu/info/law/payment-services-psd-2-directive-eu-2015-2366_en

CHAPTER

ELEVEN

MISC.

11.1 Technologies

11.1.1 www.stoic.com

http://www.stoic.com (tool generating applications from a spreadsheet) - but as you have said, this won't work at EADS because they don't allow javascritps to run on their browsers Technologies used by stoic: https://bitbucket.org/altf1be/software-architecture/wiki/Technologies

11.1.2 how to stoic.com generate an application from a spreadsheet?

When I have met the founder of stoic last week he told me they generate the applications in this way:

1. they import the spreadsheet and they try to automatically recognize the fields (date, name, address, etc.)
2. they store the data into 3 different databases:
    1. http://www.postgresql.org/ - relational database to do basic queries
    2. http://www.mongodb.org/ - nosql database storing all the documents
    3. http://www.elasticsearch.org/ - to search into the 2 previous databases
3. They give the means (widgets) for business users to create rules, user interfaces and perspectives (different views of the same application e.g. calendar view, google maps view. . . .)
4. they run the application on www.nodejs.org
5. They deploy the application on http://www.cloudfoundry.com/

11.1.3 stoic.com business model

Their business model is based on SaaS subscriptions; they plan to deliver a package one could deploy on its own servers.

11.1.4 stoic.com competitive advantage

Stoic founder claims that he can generate an application like a sales force automation or www.stackoverflow.com applications within 3-4 days with business experts

11.1.5 stoic.com uses those Javascript technologies

src : http://stoic.com/stack/#/questions/446

- (http://josscrowcroft.github.com/accounting.js/) accounting.js (currency formatting)
- (http://segmentio.github.com/analytics.js/) Analytics.js (web analytics)
- (http://angularjs.org/) AngularJS (user interface framework)
- (http://angular-ui.github.com/) AngularUI (user interface components)
- (http://jhollingworth.github.com/bootstrap-wysihtml5/) bootstrap-wysihtml5 (rich text editor)
- (https://github.com/substack/node-browserify) Browserify (dependency manager)
- (http://hughsk.github.com/colony/) Colony (graph visualization)
- (http://www.eyecon.ro/bootstrap-colorpicker/) Colorpicker for Bootstrap (color picker)
- (http://www.senchalabs.org/connect/) Connect (middleware framework)
- (http://www.jacksasylum.eu/ContentFlow/) ContentFlow (coverflow)
- (http://code.google.com/p/cookie-js/) Cookie.js (cookie library)
- (http://d3js.org/) D3 (visualization library)
- (https://github.com/visionmedia/debug/) debug (logger)
- (https://github.com/eleith/emailjs) emailjs (SMTP client)
- (https://github.com/bnoguchi/everyauth/) everyauth (authentication and authorization package)
- (http://bgrins.github.com/ExpandingTextareas/) Expanding Textareas (expanding textareas)
- (http://expressjs.com/) express (web application framework)
- (https://github.com/cloudhead/eyes.js/tree/) eyes (value inspector)
- (http://fortawesome.github.com/Font-Awesome/) Font Awesome (icon font)
- (http://stoic.com/formula/) Formula.js (formula functions)
- (http://arshaw.com/fullcalendar/) FullCalendar (calendar)
- (https://github.com/jquery/globalize/) Globalize (globalization and localization library)
- (https://github.com/jeff-optimizely/Guiders-JS) Guiders.js (on-page guidance)
- (http://gotwarlost.github.com/istanbul/) istanbul (code coverage tool)
- (http://jade-lang.com/) Jade (template engine)
- (http://silentmatt.com/javascript-expression-evaluator/) JavaScript Expression Evaluator (expression evaluator)
- (http://slexaxton.github.com/Jed/) Jed (internationalization library)
- (http://www.jplayer.org/) jPlayer (media player)
- (http://jquery.com/) jQuery (HTML library)
- (http://masonry.desandro.com/) jQuery Masonry (dynamic layout)
- (http://jquerymobile.com/) jQuery Mobile (mobile user interface library)
- (http://omnipotent.net/jquery.sparkline/) jQuery Sparklines (sparklines)
- (http://jqueryui.com/) jQuery UI (user interface library)
- (http://miller.mageekbox.net/) jQuery.miller.js (miller columns)
- (https://github.com/sgruhier/jquery-addresspicker) jquery-addresspicker (address picker)
- (http://code.google.com/p/jquery-ui-map/) jquery-ui-map (maps)

- (http://jsdox.org) jsdox (API documentation generator)
- (https://github.com/jshint/jshint/) JSHint (code analysis tool)
- (http://jsoneditoronline.org/) JSON Editor Online (JSON editor)
- (http://jstat.org/) jStat (statistics library)
- (http://learnboost.github.com/kue/) Kue (job queue)
- (http://lesscss.org/) LESS (dynamic stylesheet compiler)
- (http://lodash.com/) Lo-Dash (functional programming library)
- (http://github.com/sutoiku/mapperjs/) mapper.js (object data mapper)
- (http://github.com/chjj/marked) marked (markdown compiler)
- (http://digitalbush.com/projects/masked-input-plugin/) Masked Input (input mask library)
- (http://masonry.desandro.com/) Masonry (dynamic layout)
- (http://www.mathjax.org/) MathJax (mathematics display engine)
- (https://github.com/mikejihbe/metrics) Metrics (metrics library)
- (http://visionmedia.github.com/mocha/) mocha (test framework)
- (http://modernizr.com/) Modernizr (feature detection)
- (http://momentjs.com/) Moment.js (date library)
- (http://josscrowcroft.github.com/money.js/) money.js (currency conversion)
- (https://github.com/brianc/node-postgres/) node-postgres (PostgreSQL client)
- (https://github.com/broofa/node-uuid/) node-uuid (UUID generator)
- (https://github.com/C2FO/nools) Nools (business rules engine)
- (http://numeraljs.com/) Numeral.js (number library)
- (http://numericjs.com/) Numeric Javascript (numeric library)
- (http://parseqjs.com) parseq.js (control-flow library)
- (http://phantomjs.org/) PhantomJS (headless WebKit)
- (http://code.shutterstock.com/rickshaw/) Rickshaw (time series graphs)
- (https://github.com/visionmedia/should.js/tree/) should (assertion library)
- (https://github.com/mleibman/SlickGrid) SlickGrid (grid)
- (http://socket.io/) Socket.IO (socket library)
- (https://github.com/fschaefer/Stately.js) Stately.js (finite state machine)
- (http://vojtajina.github.com/testacular/) Testacular (test runner)
- (http://timeline.verite.co/) TimelineJS (timeline)
- (http://twitter.github.com/bootstrap/) Twitter Bootstrap (HTML5 toolkit)
- (https://github.com/mishoo/UglifyJS/) UglifyJS (parser, compressor, beautifier)
- (http://epeli.github.com/underscore.string/) Underscore.string (string library)
- (http://vexflow.com/) VexFlow (music notation rendering)
- (https://github.com/ryanmcgrath/wrench-js) wrench.js (recursive file operations library)

CHAPTER

TWELVE

GLOSSARY

Activation function An activation function calculates a "weighted sum" of its input, adds a bias and then decides whether it should be "fired" or not

See Activation Functions

See Understanding Activation Functions in Neural Network $y = f(\sum_i wixi + b)$

alt-f1 ALT-F1 designs, implements, deploys and supports secure, large-scale software solutions for diverse industries: Manufacturing, MRO, Warehouse, Broadcasting, Bank, Insurance, Law Enforcement, Justice & Serious International Crime

See http://www.alt-f1.be

autograd Module that PyTorch uses to calculate gradients for training neural networks

See https://pytorch.org/docs/stable/notes/autograd.html

Back office *The back office is all the resources of the company that are devoted to actually producing a product or service and all the other labor that isn't seen by customers, such as administration or logistics.*

Source: Wikipedia contributors. (2019, July 19). Back office. In Wikipedia, The Free Encyclopedia. Retrieved 07:53, September 19, 2019, from https://en.wikipedia.org/w/index.php?title=Back_office&oldid=906961159

Broker *"An insurance broker sells, solicits, or negotiates insurance for compensation."*

Source: Wikipedia contributors. (2019, September 12). Insurance broker. In Wikipedia, The Free Encyclopedia. Retrieved 10:33, September 13, 2019, from https://en.wikipedia.org/w/index.php?title=Insurance_broker&oldid=915277342

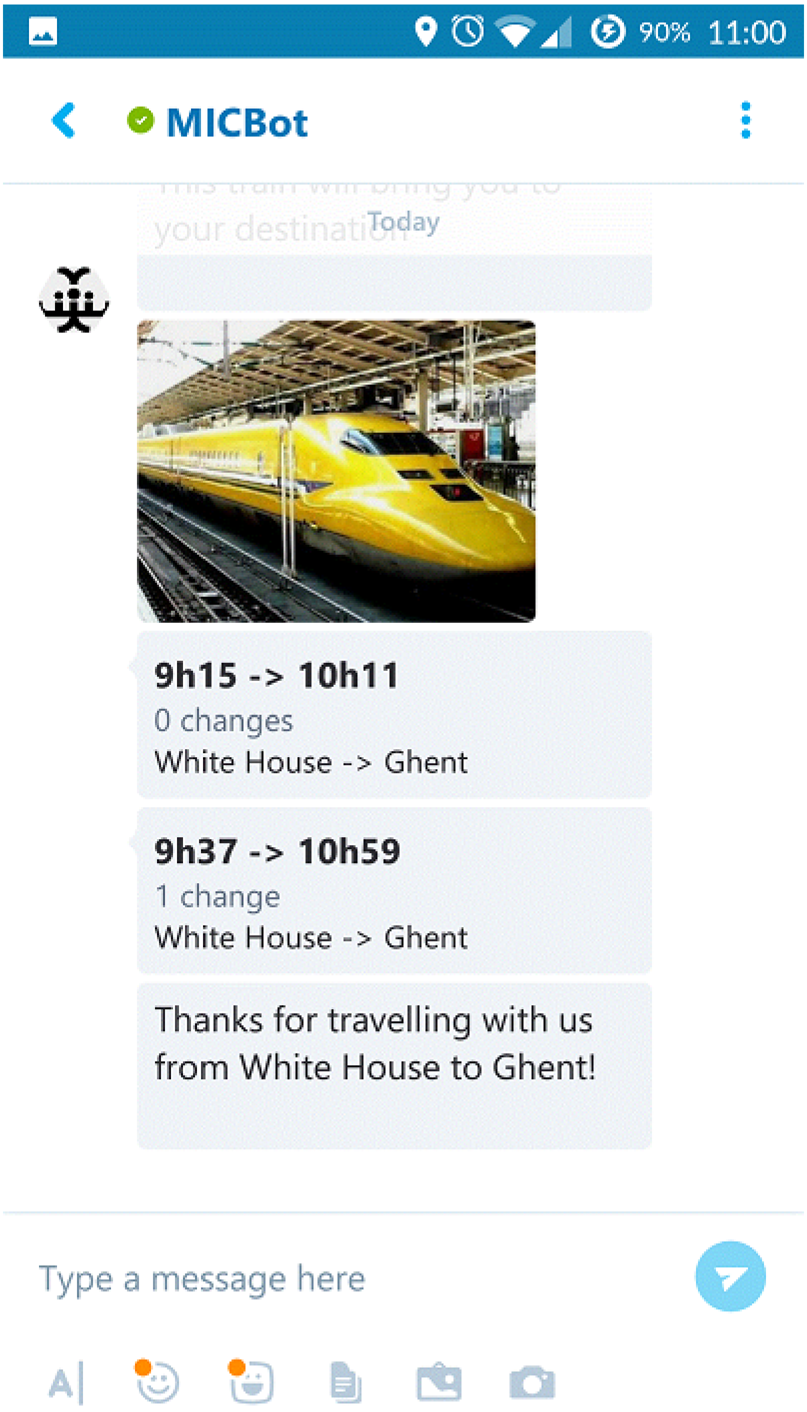
Business Process Management Business Process Management *is a discipline aimed at managing all aspect of the business processes; from process design to modeling and analysis to execution and improvement*

Source: https://www.ipdsolution.com/ipdblog/bpm-workflows

CDI See term:*Customer Data Integration*

Chatbot "*A chatbot is a piece of software that conducts a conversation via auditory or textual methods."*

Source: Wikipedia contributors. (2019, September 9). Chatbot. In Wikipedia, The Free Encyclopedia. Retrieved 14:26, September 12, 2019, from https://en.wikipedia.org/w/index.php?title=Chatbot&oldid=914875664



9h15 -> 10h11
0 changes
White House -> Ghent

9h37 -> 10h59
1 change
White House -> Ghent

Thanks for travelling with us from White House to Ghent!

Conda Package, dependency and environment management for any language—Python, R, Ruby, Lua, Scala, Java, JavaScript, C/ C++, FORTRAN

Contact center *A contact center, further extension to call centers administers centralized handling of individual communications, including letters, faxes, live support software, social media, instant message, and e-mail.*

Source: Wikipedia contributors. (2019, September 15). Call centre. In Wikipedia, The Free Encyclopedia. Retrieved 08:59, September 19, 2019, from https://en.wikipedia.org/w/index.php?title=Call_centre&oldid=915792349

Cross-entropy loss Cross-entropy loss, or log loss, measures the performance of a classification model whose output is a probability value between 0 and 1.

A perfect model would have a log loss of 0.

See Neural networks - Cross Entropy

See PyTorch - Cross entropy loss function

CUDA PyTorch uses a library called CUDA to accelerate operations using the GPU

Customer Data Integration *"Customer data integration (CDI) is the process of defining, consolidating and managing customer information across an organization's business units and systems to achieve a "single version of the truth" for customer data."*

Source: https://searchdatamanagement.techtarget.com/definition/customer-data-integration

Digitization Digitization is *"Digitization, less commonly digitalization, is the process of converting information into a digital (i.e. computer-readable) format, in which the information is organized into bits."*

Source: Wikipedia contributors. (2019, August 28). Digitization. In Wikipedia, The Free Encyclopedia. Retrieved 07:13, September 12, 2019, from https://en.wikipedia.org/w/index.php?title=Digitization&oldid=912864588

Epoch One Epoch is when an ENTIRE dataset is passed forward and backward through the neural network only ONCE.

See Epoch vs Batch Size vs Iterations

Gradient descent The gradient is the slope of the loss function and points in the direction of fastest change. To get to the minimum in the least amount of time, we then want to follow the gradient (downwards). You can think of this like descending a mountain by following the steepest slope to the base.

See Intro to PyTorch - Notebook Workspace

Gradients Gradient descent is an optimization algorithm used to minimize some function by iteratively moving in the direction of steepest descent as defined by the negative of the gradient.

In machine learning, we use *gradient descent* to update the parameters of our model. Parameters refer to coefficients in Linear Regression and weights in neural networks.

See https://ml-cheatsheet.readthedocs.io/en/latest/gradient_descent.html

A gradient is a partial derivative - why partial? Because one computes it with respect to (w.r.t.) a single parameter. We have two parameters, a and b, so we must compute two partial derivatives

See Understanding PyTorch with an example: a step-by-step tutorial

Hidden Layers Sits between the input and output layers and applies an activation function before passing on the results.

There are often multiple hidden layers in a network.

In traditional networks, hidden layers are typically fully-connected layers - each neuron receives input from all the previous layer's neurons and sends its output to every neuron in the next layer.

See https://ml-cheatsheet.readthedocs.io/en/latest/nn_concepts.html?highlight=hidden#layers

Inbound call center *An inbound call center is operated by a company to administer incoming product or service support or information enquiries from consumers.*

Source: Wikipedia contributors. (2019, September 15). Call centre. In Wikipedia, The Free Encyclopedia. Retrieved 08:59, September 19, 2019, from https://en.wikipedia.org/w/index.php?title=Call_centre&oldid=915792349

Layers The first layer shown on the bottom here are the inputs, understandably called the input layer. The middle layer is called the hidden layer, and the final layer (on the right) is the output layer.

Source: Intro to PyTorch - Notebook Workspace

Logit In statistics, the logit function or the log-odds is the logarithm of the odds p/(1 - p) where p is probability. It is a type of function that creates a map of probability values from [0,1] to $-\infty, +\infty$

It is the inverse of the sigmoidal "logistic" function or logistic transform used in mathematics, especially in statistics.

See https://en.wikipedia.org/wiki/Logit

s function

A measure of our prediction error. (also called the cost)

mathjax See Short Math Guide for LATEX

See Math into LATEX An Introduction to LATEX and AMS-LATEX

Middle office *The middle office is made up of the risk managers and the information technology managers who manage risk and maintain the information resources.*

Source: Wikipedia contributors. (2019, August 9). Middle office. In Wikipedia, The Free Encyclopedia. Retrieved 08:36, September 19, 2019, from https://en.wikipedia.org/w/index.php?title=Middle_office&oldid=910135163

MNIST *The Modified National Institute of Standards and Technology database is a large database of handwritten digits that is commonly used for training various image processing systems.* Source https://en.wikipedia.org/wiki/MNIST_database

NumPy Interacts with term:*PyTorch*. NumPy is the fundamental package for scientific computing with Python. It contains among other things:

- a powerful N-dimensional array object
- sophisticated (broadcasting) functions
- tools for integrating C/C++ and Fortran code
- useful linear algebra, Fourier transform, and random number capabilities

See https://numpy.org/

OpenMined OpenMined is an open-source community focused on researching, developing, and promoting tools for secure, privacy-preserving, value-aligned artificial intelligence. https://www.openmined.org

Outbound call center *An outbound call center is operated for telemarketing, for solicitation of charitable or political donations, debt collection, market research, emergency notifications, and urgent/critical needs blood banks.*

Source: Wikipedia contributors. (2019, September 15). Call centre. In Wikipedia, The Free Encyclopedia. Retrieved 08:59, September 19, 2019, from https://en.wikipedia.org/w/index.php?title=Call_centre&oldid=915792349

PyTorch An open source machine learning framework that accelerates the path from research prototyping to production deployment.

See https://pytorch.org/

Robo advisor *a class of financial adviser that provide financial advice or Investment management online with moderate to minimal human intervention*

Source: Wikipedia contributors. (2019, August 29). Robo-advisor. In Wikipedia, The Free Encyclopedia. Retrieved 14:22, September 12, 2019, from https://en.wikipedia.org/w/index.php?title=Robo-advisor&oldid=912998258

Sigmoid function A sigmoid function is a mathematical function having a characteristic "S"-shaped curve or sigmoid curve.

See https://en.wikipedia.org/wiki/Sigmoid

SIREMIS Web Management Interface for Kamailio (OpenSER) SIP Server

See https://siremis.asipto.com

tensors The main data structure of PyTorch. the tensor is an array. A vector is a 1-dimensional tensor, a matrix is a 2-dimensional tensor, an array with three indices is a 3-dimensional tensor (RGB color images for example)

torchvision The torchvision package consists of popular datasets, model architectures, and common image transformations for computer vision.

See torchvision

Underwriter *"Insurance underwriters evaluate the risk and exposures of potential clients. They decide how much coverage the client should receive, how much they should pay for it, or whether even to accept the risk and insure them. Underwriting involves a measuring risk exposure and determining the premium that needs to be charged to insure that risk."*

See https://en.wikipedia.org/wiki/Underwriting#Insurance_underwriting

Source: Wikipedia contributors. (2019, August 9). Underwriting. In Wikipedia, The Free Encyclopedia. Retrieved 08:26, September 13, 2019, from https://en.wikipedia.org/w/index.php?title=Underwriting&oldid=910020948

Validation the action of checking or proving the validity or accuracy of the model generated by the Artificial Intelligence

Validation Dataset The sample of data used to provide an unbiased evaluation of a model fit on the training dataset while tuning model hyperparameters. The evaluation becomes more biased as skill on the validation dataset is incorporated into the model configuration.

See About Train, Validation and Test Sets in Machine Learning

CHAPTER

THIRTEEN

INDICES AND TABLES

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- search

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