Document ID	TBA
Document type	Slides
Document Status	
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Verified by	
Approved by	

ET PBS Database and Application

- Definition of the **PBS** as a Tree Structure :(it is a **tree** because every child has only one parent node)

- organizing and representing the hierarchical structure and relationships of the product components in a way that can be stored and queried in a database system.

- Each **component** has associated **Parameters**
- Each **component** belongs to a **Level**(in other saying,
- each line is a Level)

PBS components

Lev 1

Lev 2

Lev 3

Lev 4

Lev 5

Lev 6

Einstein Telescope

EIB

Computing infrastructures

Software & Data Processing Tools

Services

Workload Management System

Software frameworks & packaging distribution

Collaboration Services & Support

On-site computing infrastructure

Data Managing System

Interferometers Operations System

Chance Event Node

Low-latency/alert infrastructure

Data Pipelines

Low latency sotware & tools

Off-site analysis infrastructure

Custodial storage infrastructure

Computing/counting room

[resource pledges (tapes, disk) to T1 CCs]

Low latency sotware & tools

Administration Services & Support

Parameters

Parameters

Parameters

Parameters

09/10

PBS component <an Element example>

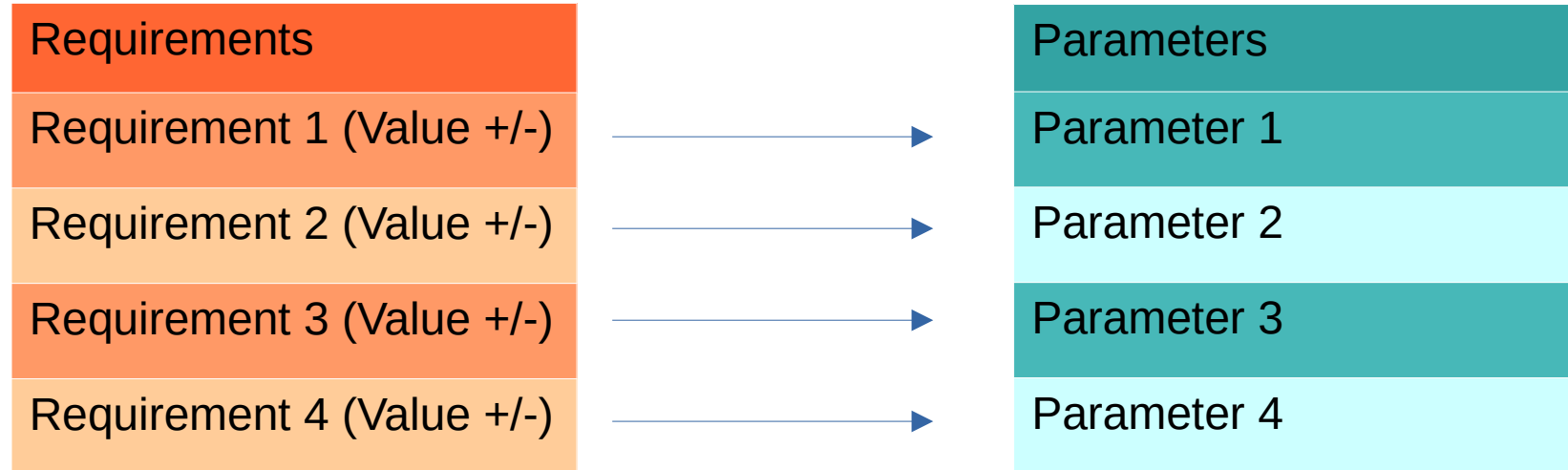| Requirements |
|---|
| Requirement 1 (Value +/-) |
| Requirement 2 (Value +/-) |
| Requirement 3 (Value +/-) |
| Requirement 4 (Value +/-) |

Parameters
Parameter 1
Parameter 2
Parameter 3
Parameter 4

Each Parameter is constrained to some requirement value range
Requirements: These define the acceptable range for parameters or values that components must adhere to.
Parameters: Variables or characteristics of components that can be constrained by requirements.
Components: Items or modules that have parameters, which can be changed through change requests.
Change Requests: These track the changes made to parameters or components, along with metadata (like who made the change, when it happened, and what was changed).

ET EINSTEIN TELESCOPE   ip2i

Change Requests

change requests process

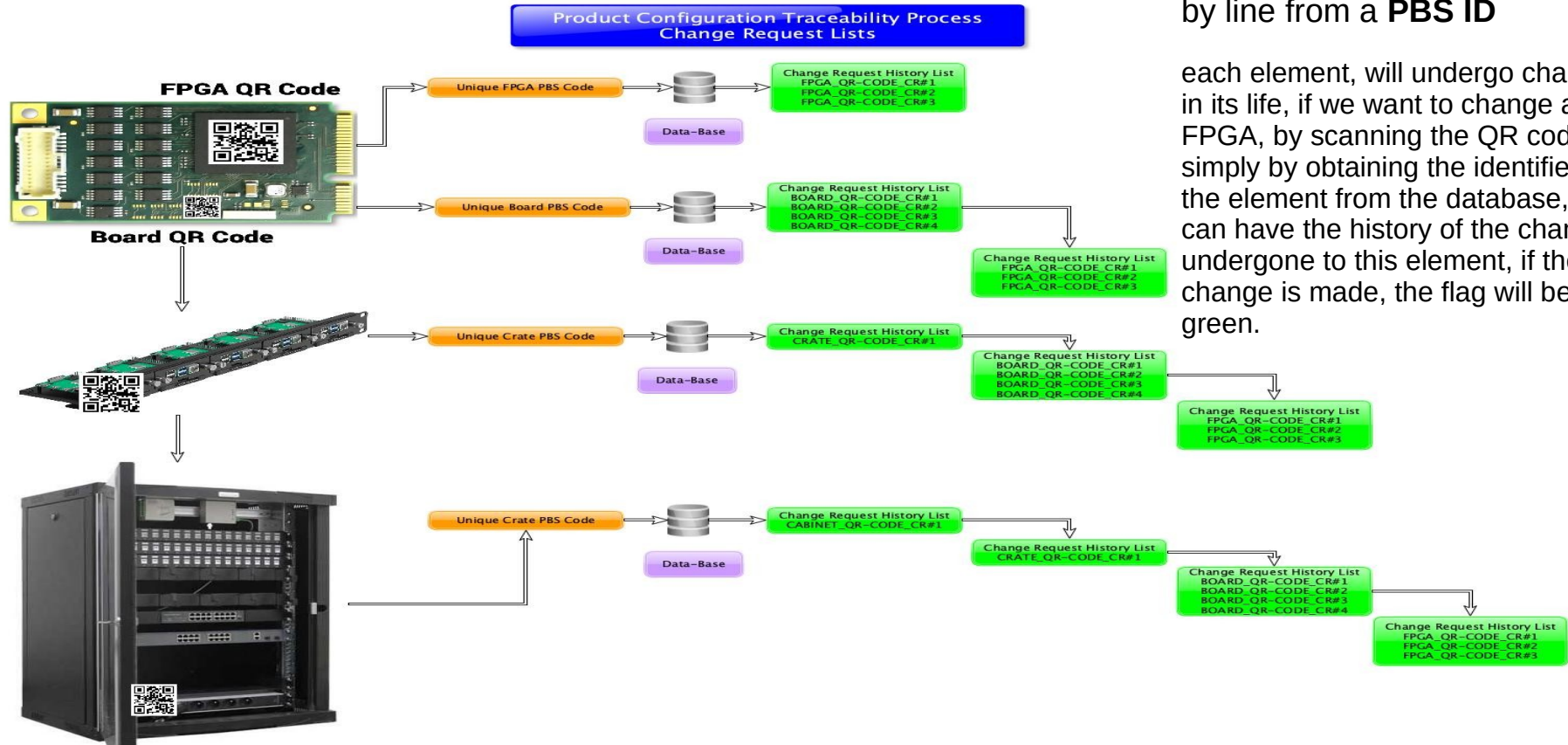Storage Fowchart in Data-Base & EDMS document
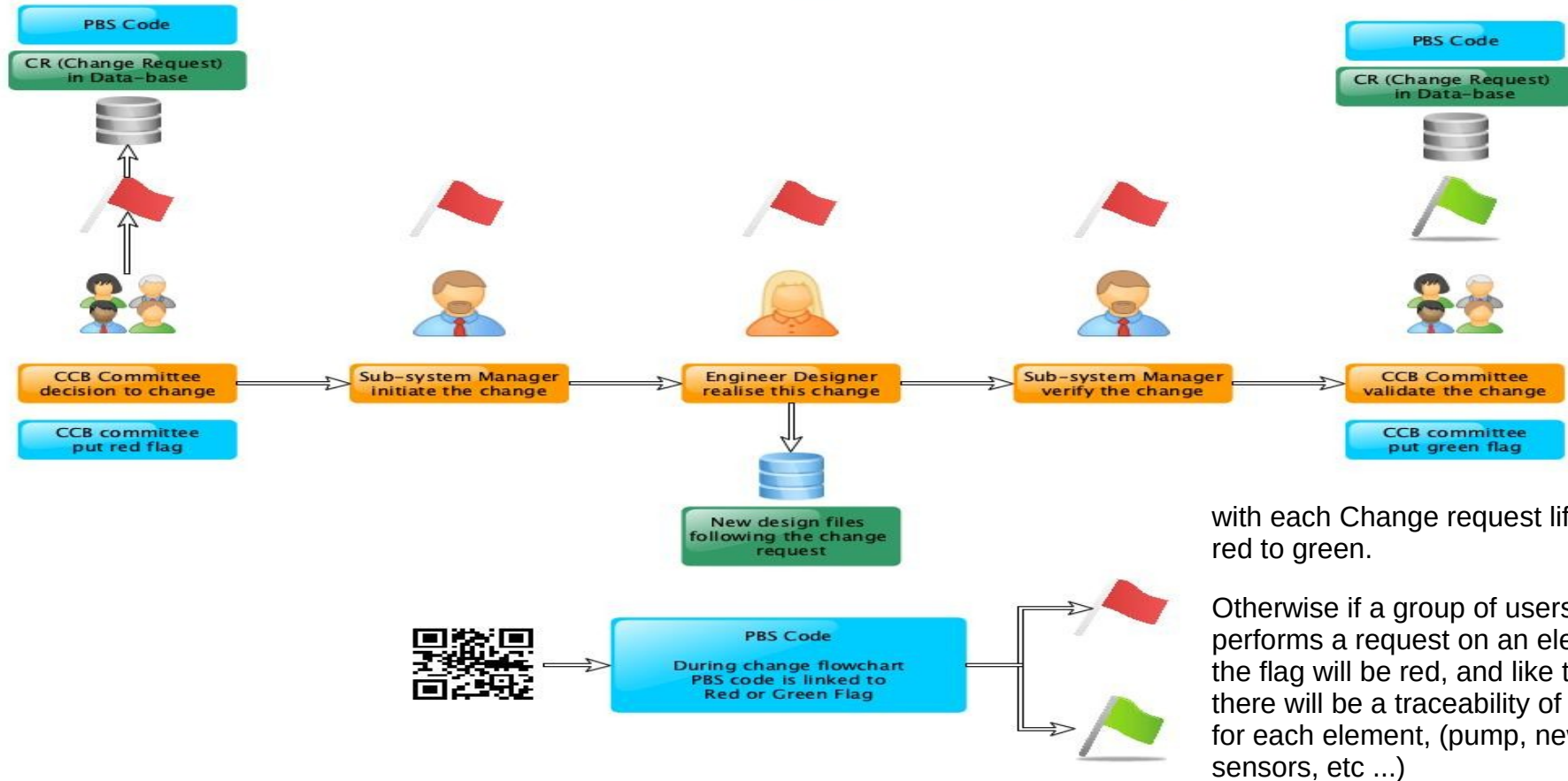
with each Change request life, from red to green.

Otherwise if a group of users performs a request on an element, the flag will be red, and like that there will be a traceability of change for each element, (pump, newtonian sensors, etc ...)
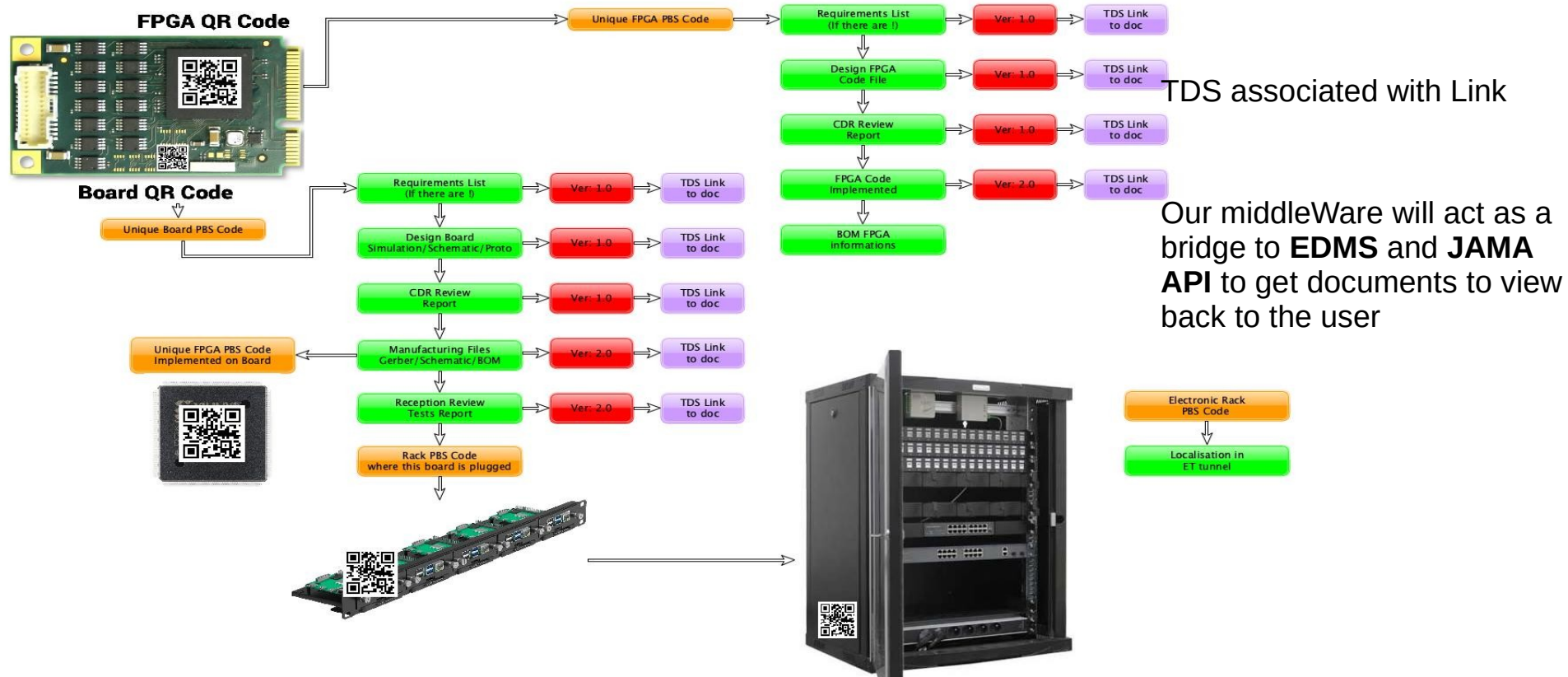
Change Requests

List of Change Requests, line by line from a **PBS ID**

each element, will undergo changes in its life, if we want to change a bar FPGA, by scanning the QR code, or simply by obtaining the identifier of the element from the database, we can have the history of the changes undergone to this element, if the change is made, the flag will be green.

Change Requests

TDS associated with Link

Our middleWare will act as a bridge to **EDMS** and **JAMA API** to get documents to view back to the user

What was done ?!

- Provide first definition of parameters (functional + interface)) for all PBS items
- Connect PBS items (1.5k+) to respective parameters (10+)
- Track 10k+ quantities ==> change management process
- (Version Control system that tracks changes of the Backend / FrontEnd and DB)
- Allow evolution of PBS and parameters
- Propagate information(crucial in ensuring that modifications to attributes are properly documented, reviewed, and propagated to maintain the integrity of the PBS.)

- Risks Management Plan, still in development mode

Role	PBS rights	RACI	Description
Technical coordinator	RWP	R	Responsible for the PBS editing and modification. Responsible for all process validation
Unit manager (level n)	RP	A	Responsible for the unit breakdown and for change request proposal
Unit manager (level n+1)	RP	A	Responsible for the unit breakdown and for change request proposal verification
System manager	RP	A	Responsible for the unit breakdown and for change request proposal validation
e-Infrastructure manager	RW	C	Responsible for the PBS e-Infrastructure management tool
Quality manager	RP	A	Responsible for the PBS quality process
Configuration manager	RP	A	Responsible for the PBS integration as configuration item (CI). Responsible for the change process definition
Review manager	R	I	Responsible for the PBS verification and validation reviews.
Safety manager	R	I	Responsible for PBS safety integration
Resources manager	R	I	Responsible for the PBS associated resources and budget

Users Roles

- The PBS management processes are described not only by their functional flowcharts, but also from the roles and responsibilities description with respect to the full PBS lifecycle. These are summarized in Table.

- PBS roles description. Rights may be of the type R= read, W=write, P=Propose (the modification). RACI acronyms are the classic Responsible,Accountable, Consulted, Informed

- a user must have role authority to make change requests to associated elements and their parameters, change requests can only be accessed by the correct change request manager group based on a **WBS name** added as an attribute to entity elements.

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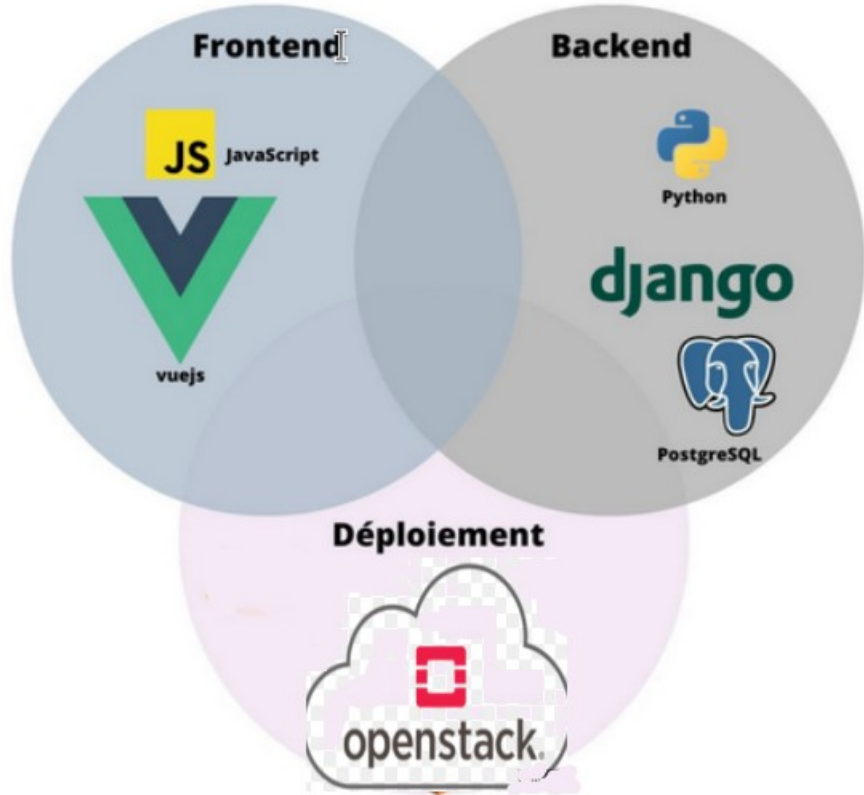
Backend Framwork Architecture

For the development of the frontend, we opted for the VueJS Framework being Open source.

The frontend is made up of components called "vue". Each view describes a part of the application or a feature.

Splitting the code into multiple views .vue is very important to improve readability and understanding of the code.
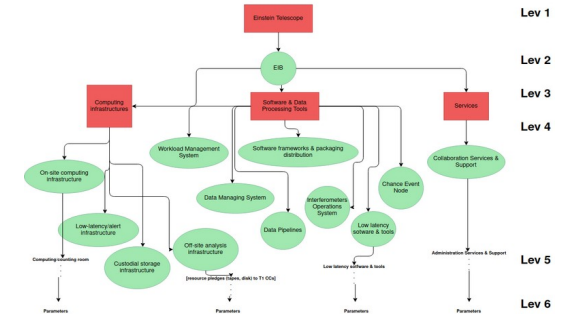
Change Management **Process**

(Version Control system that tracks changes in any set of computer files Track 10k+ quantities)

Splitting the code into multiple views is very important to improve readability and understanding of the code.

A crazy process from converting some tree of elements, we managed to make it to work,

If we ever change an element parent, or add a new child, we take care of the track process history, and also not break everything !

The admin can upload a bunch of files(400 .xlsx files) at runtime, we made sure that the stream upload work as fast as possible, With a feedback log from any files that didn't was inserted to the DB, why ? The file structure may be not respecting our rules :

the type of possible errors are :
1) - files PBS ID mismatch with the pbs code file name
2) - files PBS ID missing or misspelled - file pbs_unit_name 'pbs_unit_name' and pbscode 'pbscode'
3) - file pbs_unit_name 'pbs_unit_name' and pbscode ' pbscode' doesn't have element ==> means the file didn't an associated element from the pbs tree !
4) - file functional parameters columns misspelled or an-ordred for file with pbs_unit_name 'pbs_unit_name' and pbscode' pbscode
5) - file Integration parameters columns misspelled or an-ordred for file with pbs_unit_name 'pbs_unit_name' and pbscode' pbscode

DB

Show and Export the database with filtered Queries Included

{.json}

CSV

DB

MERCI

DB
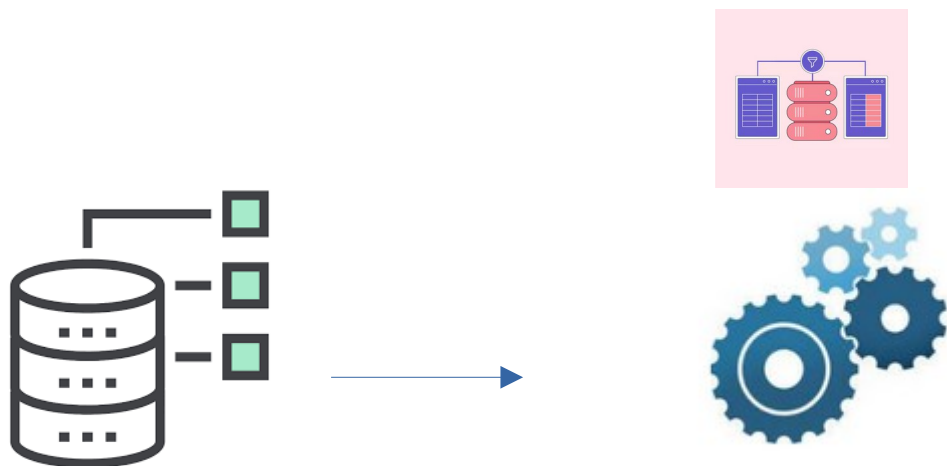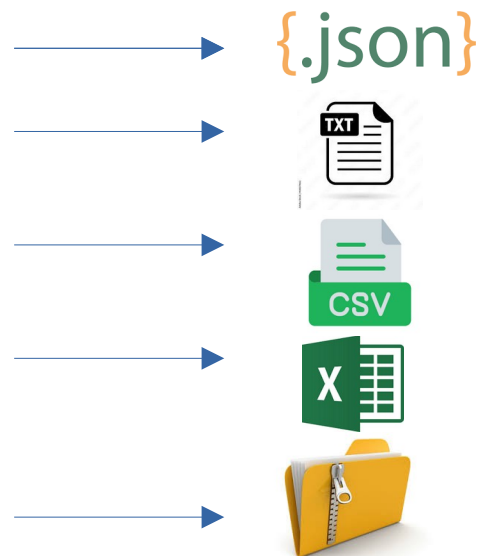
El Mecherfi, PBS Structure___
Long Term Solution