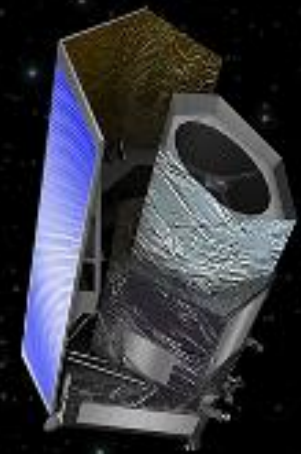


Euclid – continuous development, integration and deployment platform



M. Poncet (CNES)
On behalf of Euclid EC SGS System Team

JDEV 2017

- Euclid Project & SGS
- From Euclid pipeline to SGS Architecture
- From source code to processing nodes
- Continuous deployment
- SGS building
- Conclusions

- **Euclid Project & SGS**
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M2 mission in the framework of the **ESA Cosmic Vision Programme**

Euclid mission objective is to map the geometry and understand the nature of the dark Universe (**dark energy and dark matter**)

Actors in the mission: **ESA** and the **Euclid Consortium** (institutes from 14 European countries + USA + Canada, funded by their own national Space Agencies)

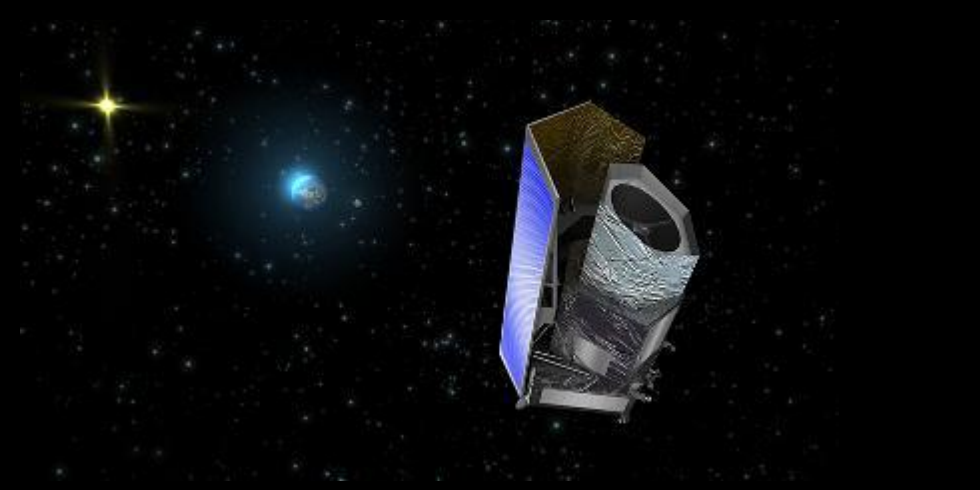
Euclid Consortium:

16 countries

220 labs

1447 members

One of the biggest collaboration!



<http://sci.esa.int/science-e/www/area/index.cfm?fareaid=102>

<http://www.euclid-ec.org>

Euclid at a glance



Soyuz@Kourou

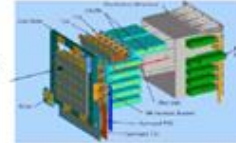
Q4 2020



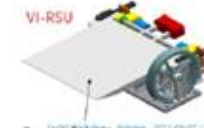
PLM+SVM: 2010-2019



VI-FPA



36 CCD's (153 K)



VIS imaging: 2010-2020

(VIS team)

VIS

NIR spectro-imaging

2010-2020 (NISP team)

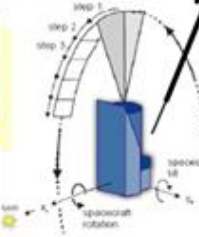
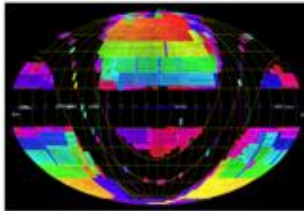
NISP

NI-OMA

CoLA (Connector Lens Assembly)



Surveys: 2010-2028 (Survey WG)



6 yrs - 15,000 deg²

Commissioning - SV

Euclid operation:

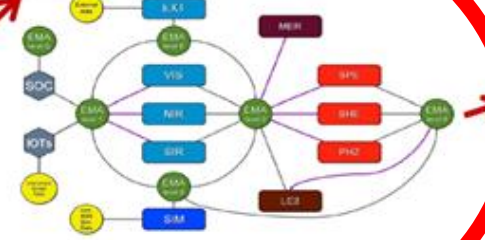
5.5 yrs: Euclid Wide+Deep

+ SNIa, mu-lens, MW?

Ground data



SGS: 2010-2028



20-30 PB data processing (EC-SGS team)



SWG:

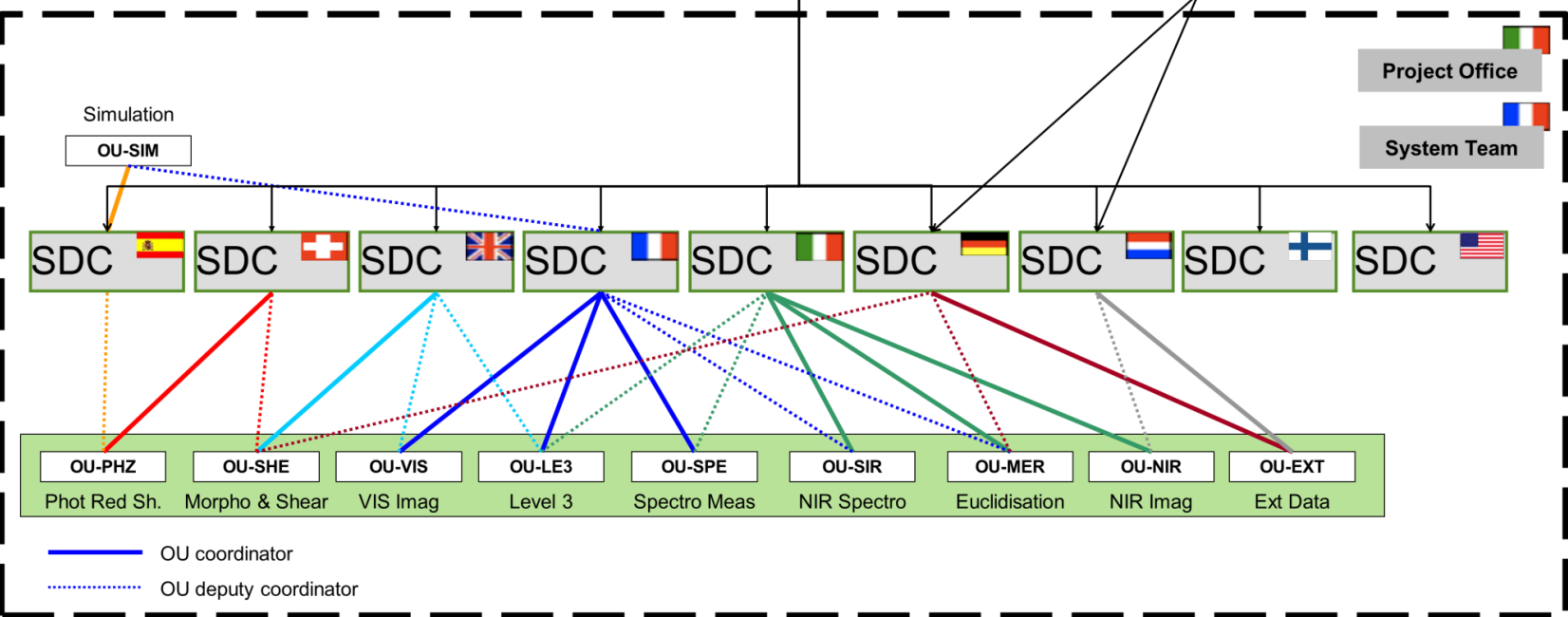
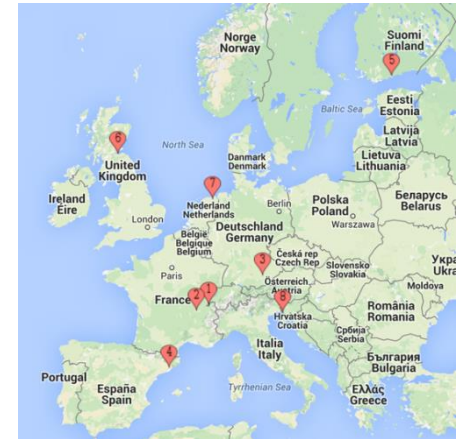
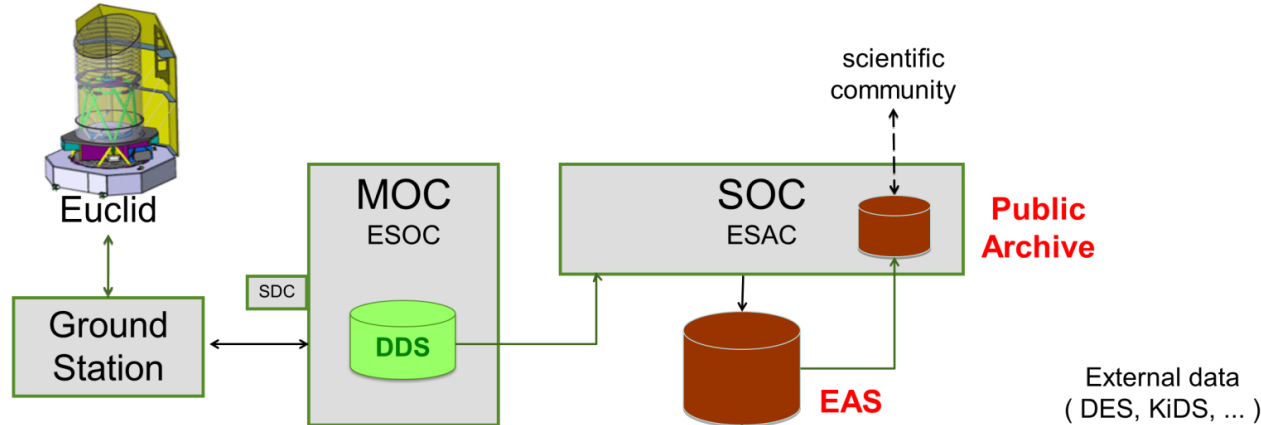


2019-2028

Science analyses

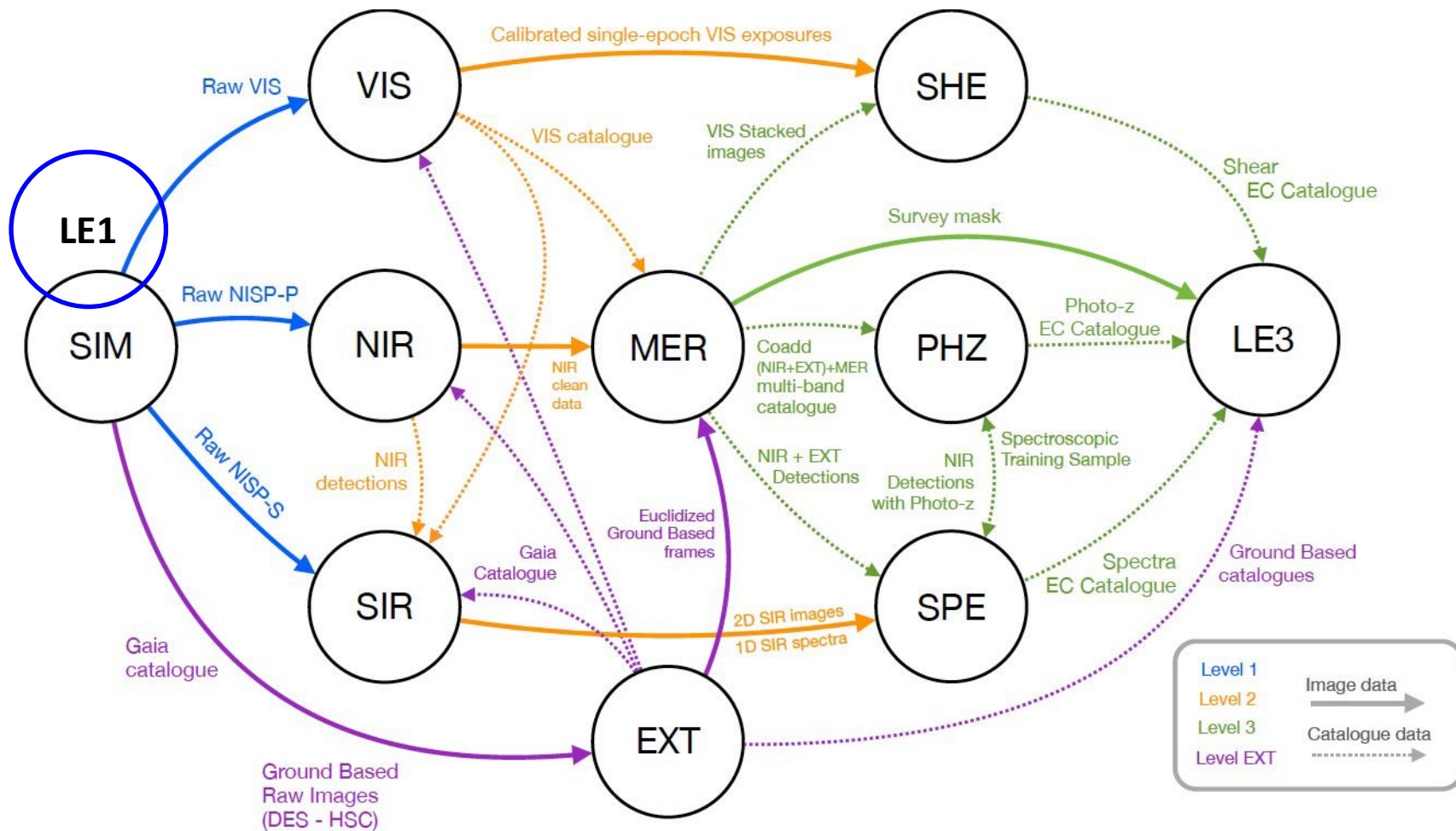


Euclid Science Ground Segment (SGS)



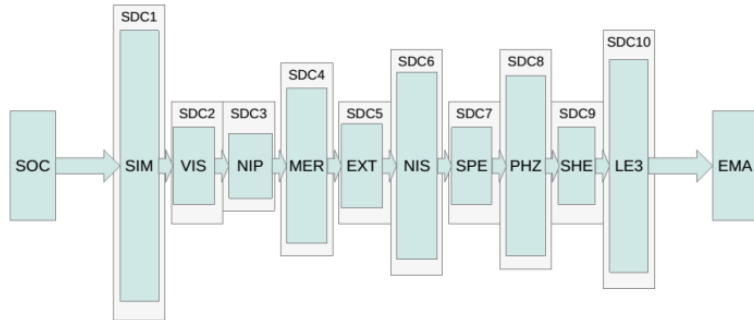
- Euclid Project & SGS
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Euclid pipeline

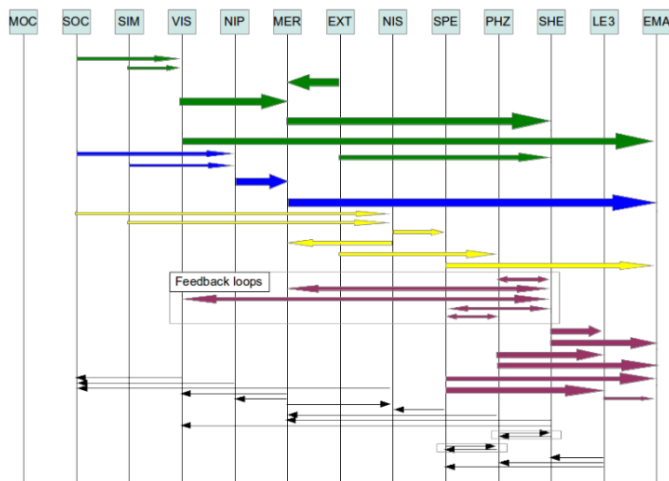


From dedicated SDCs to Federated SDCs

Dedicated SDCs



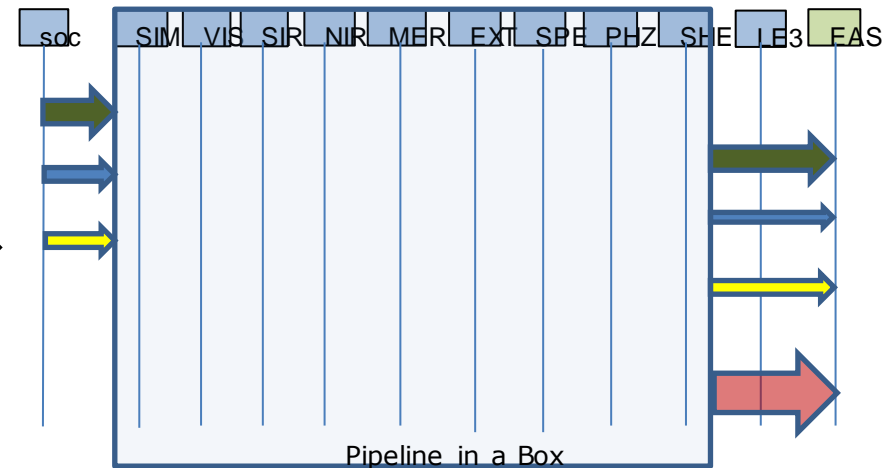
Unbalanced load



100+ PB in grand total

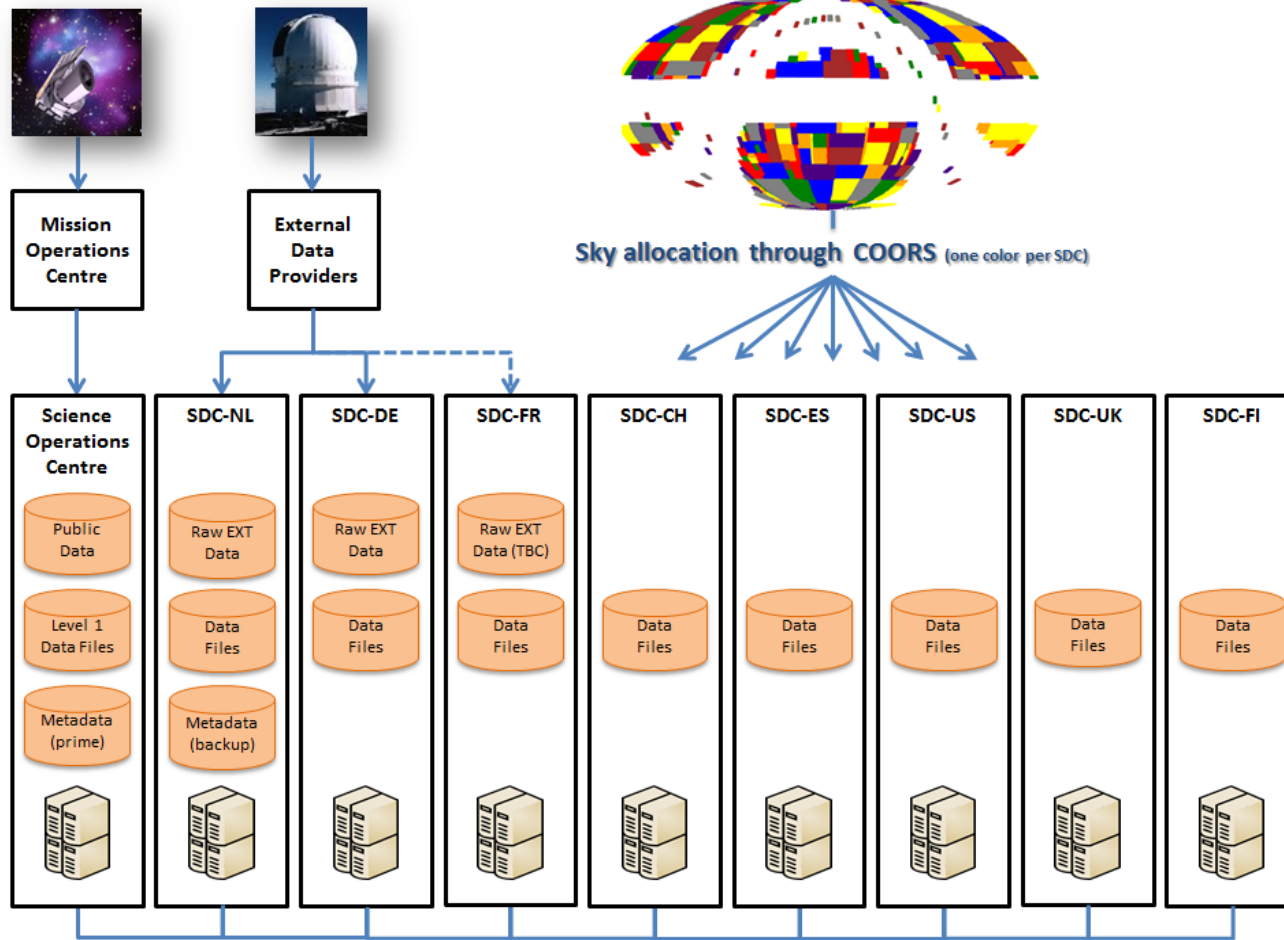
More Data transfer than processing ?

Whole pipeline in any SDC on quantum of data



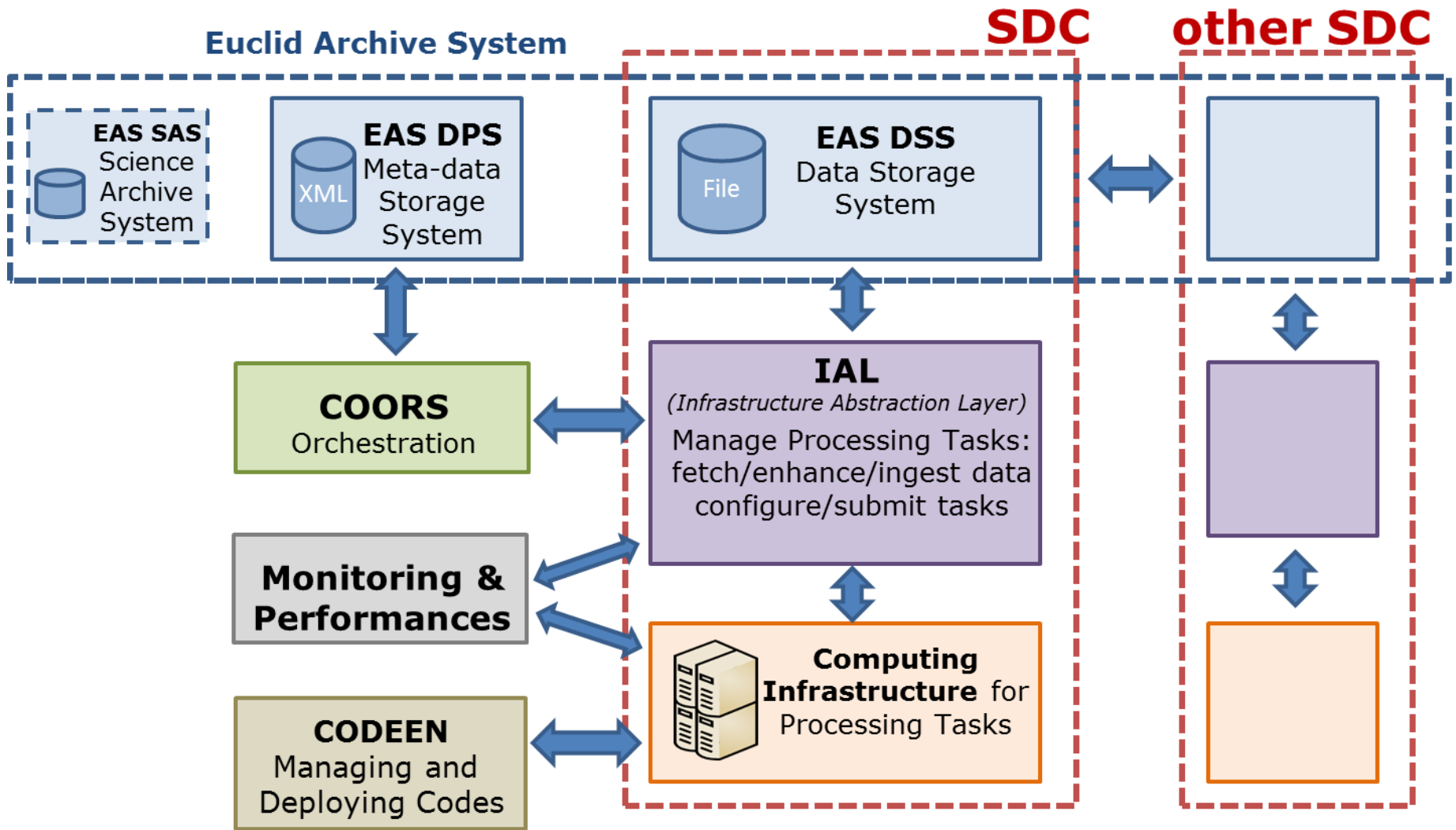
Move the code Not the data paradigm

Move the code not the Data



SDCs are both storage and processing nodes
Data storage and processing allocated by sky area

Euclid SGS Components

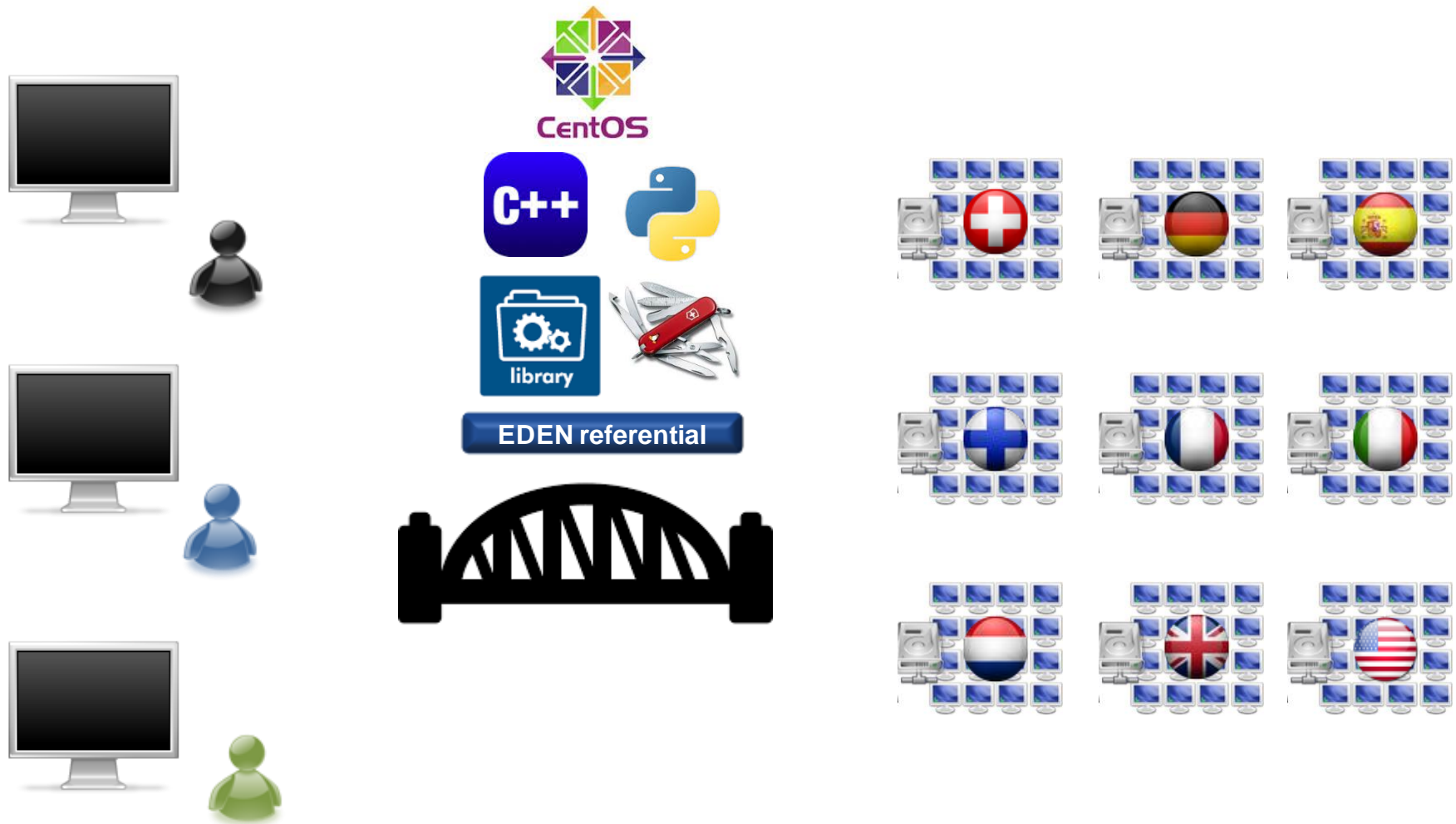


- Euclid Project & SGS
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- **From source code to processing nodes**
- Continuous deployment
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- Conclusions

From source code to production

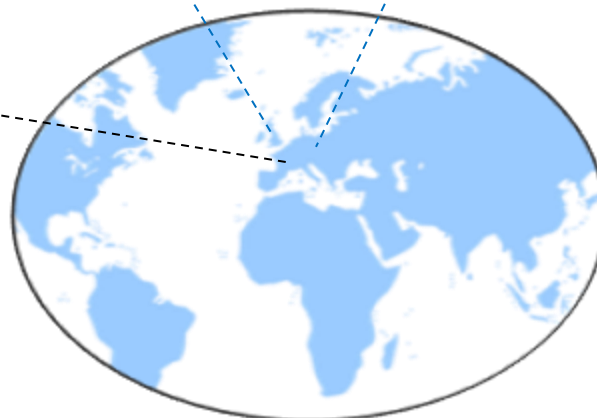


From source code to production





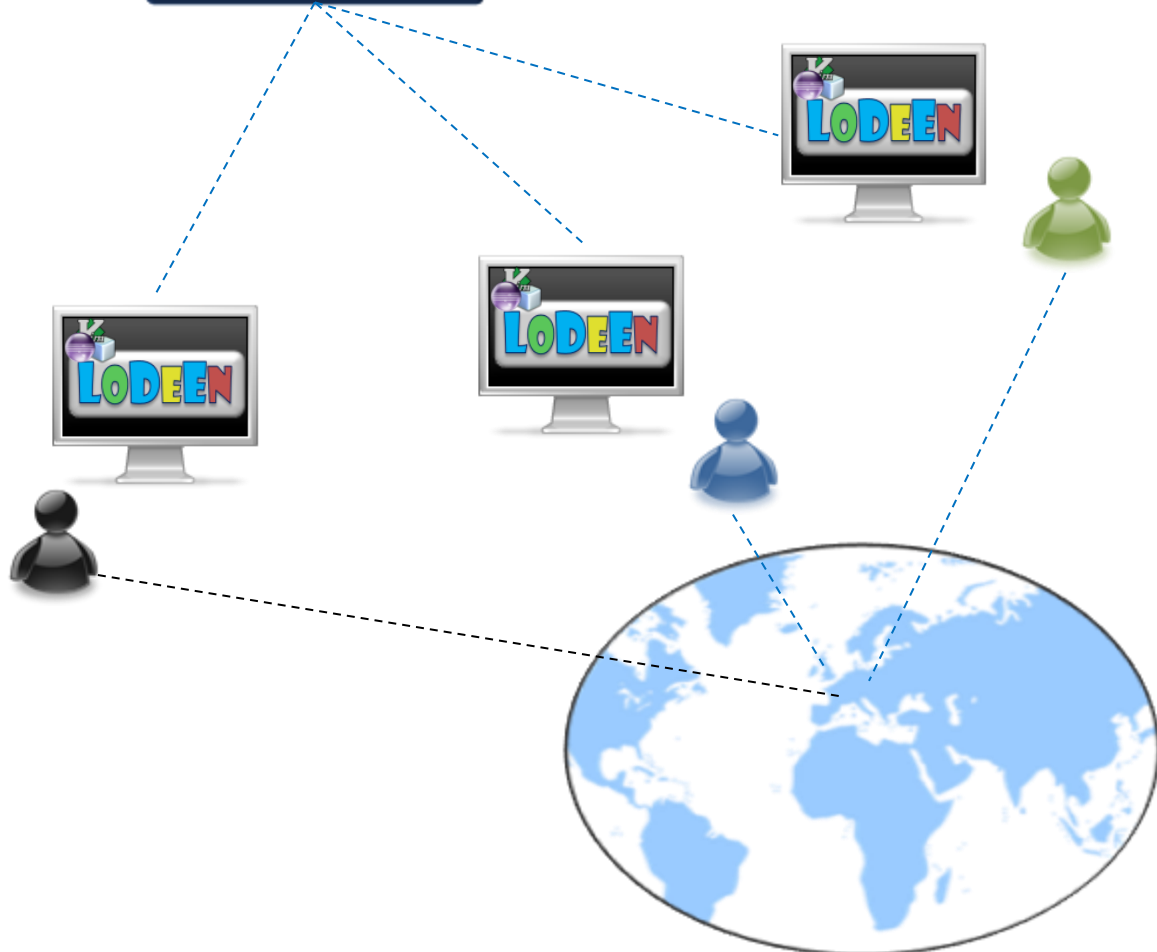
How to federate ?



...in collaboration with an international team..

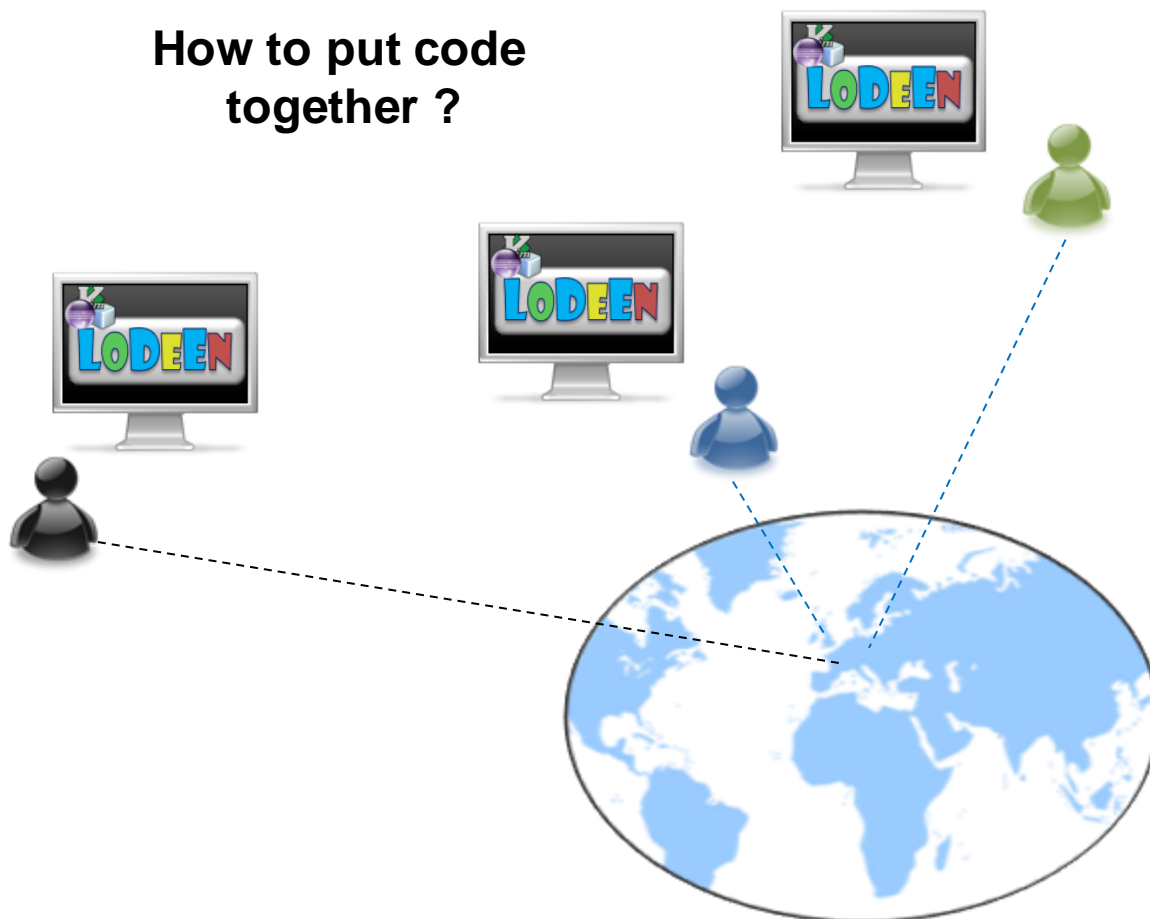


EDEN referential



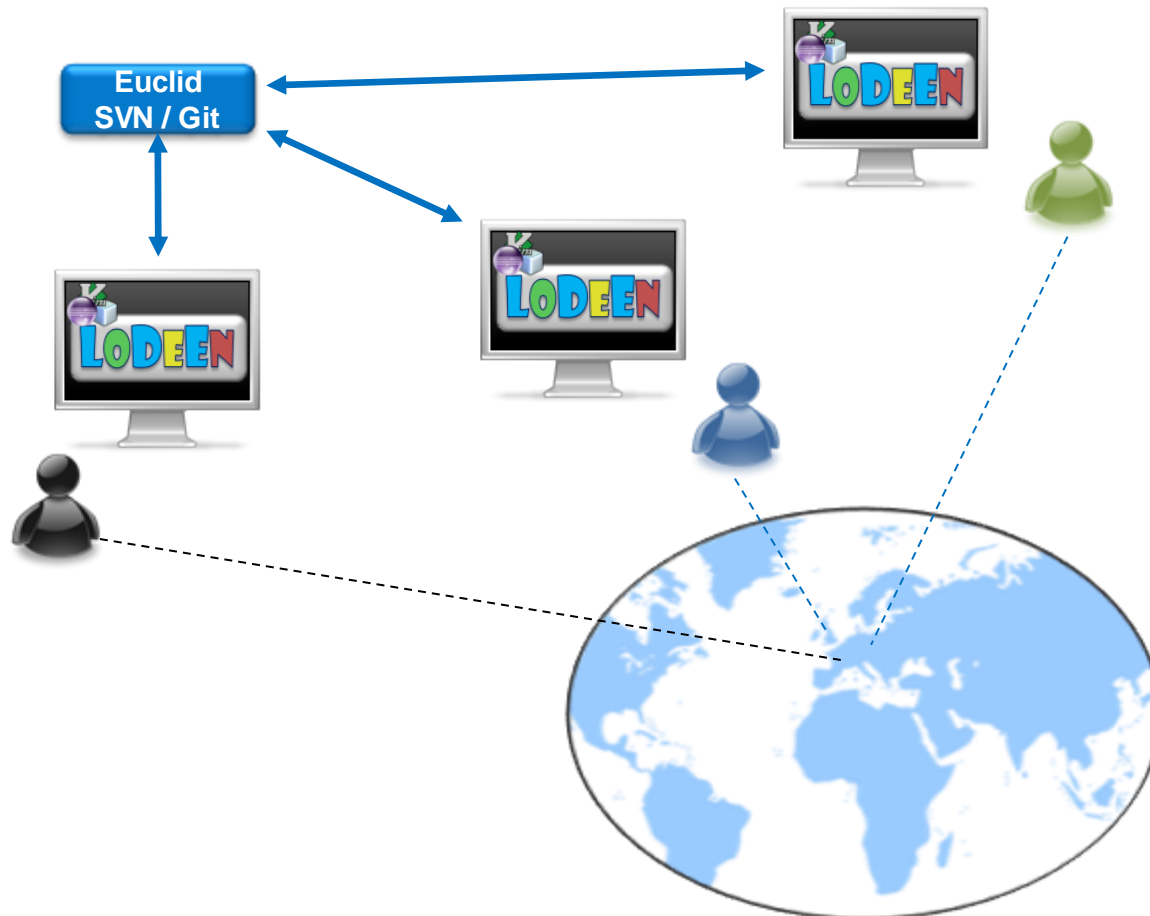


How to put code
together ?



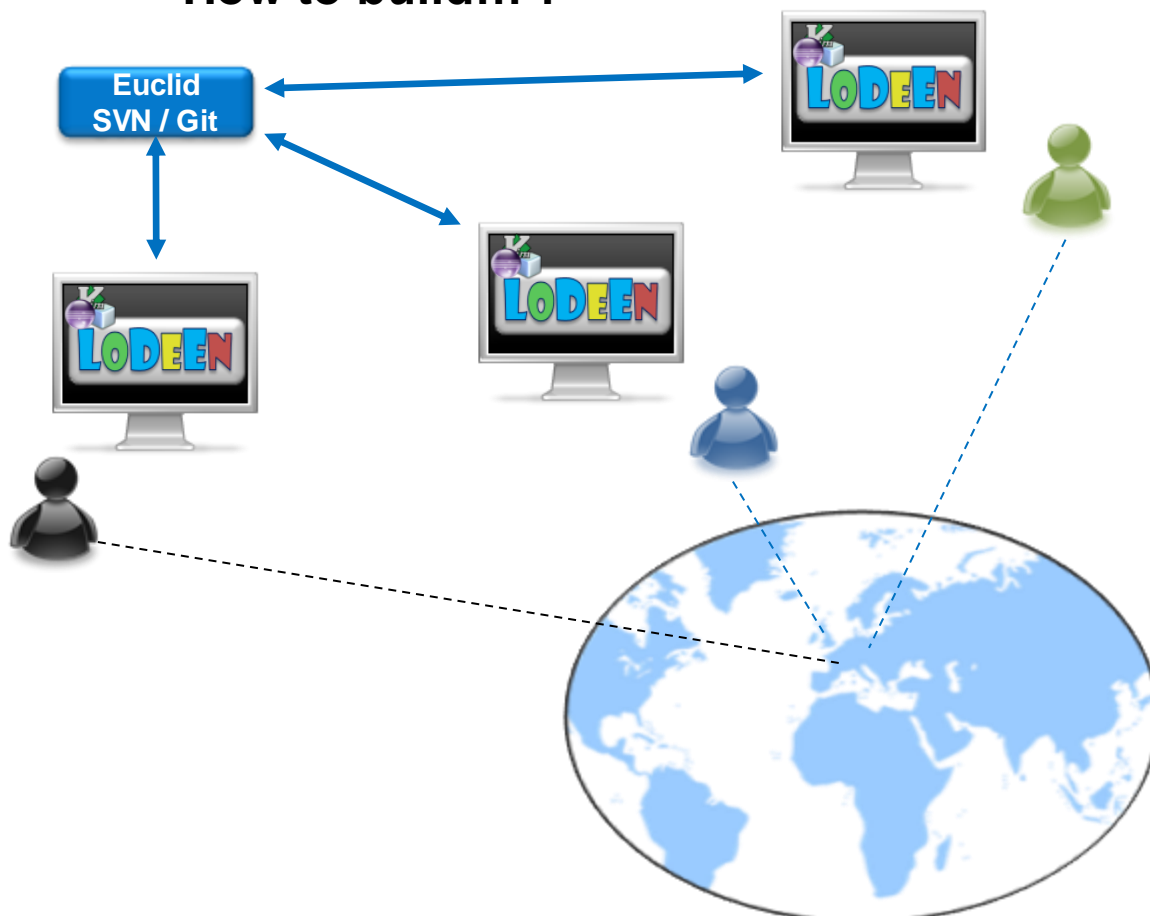


Configuration management





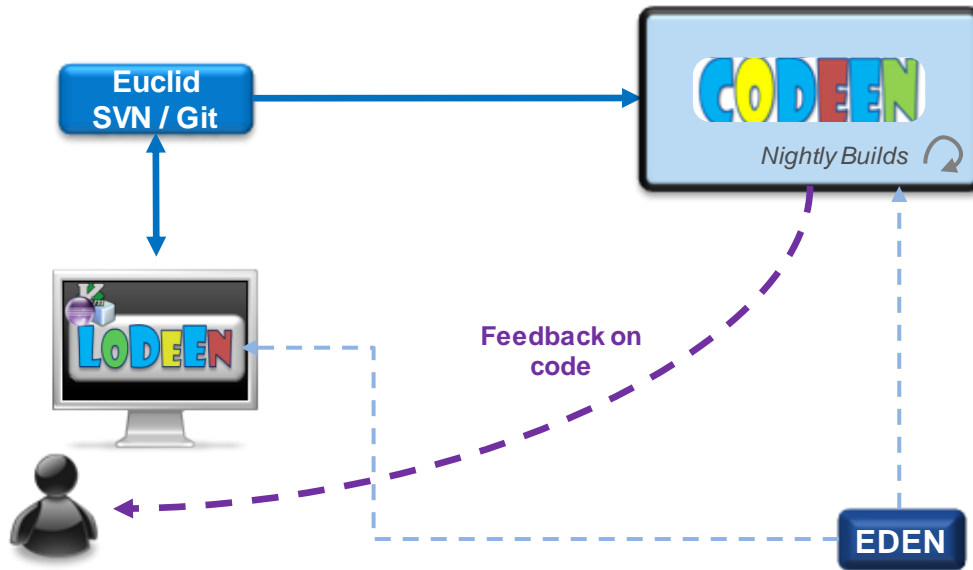
How to build... ?



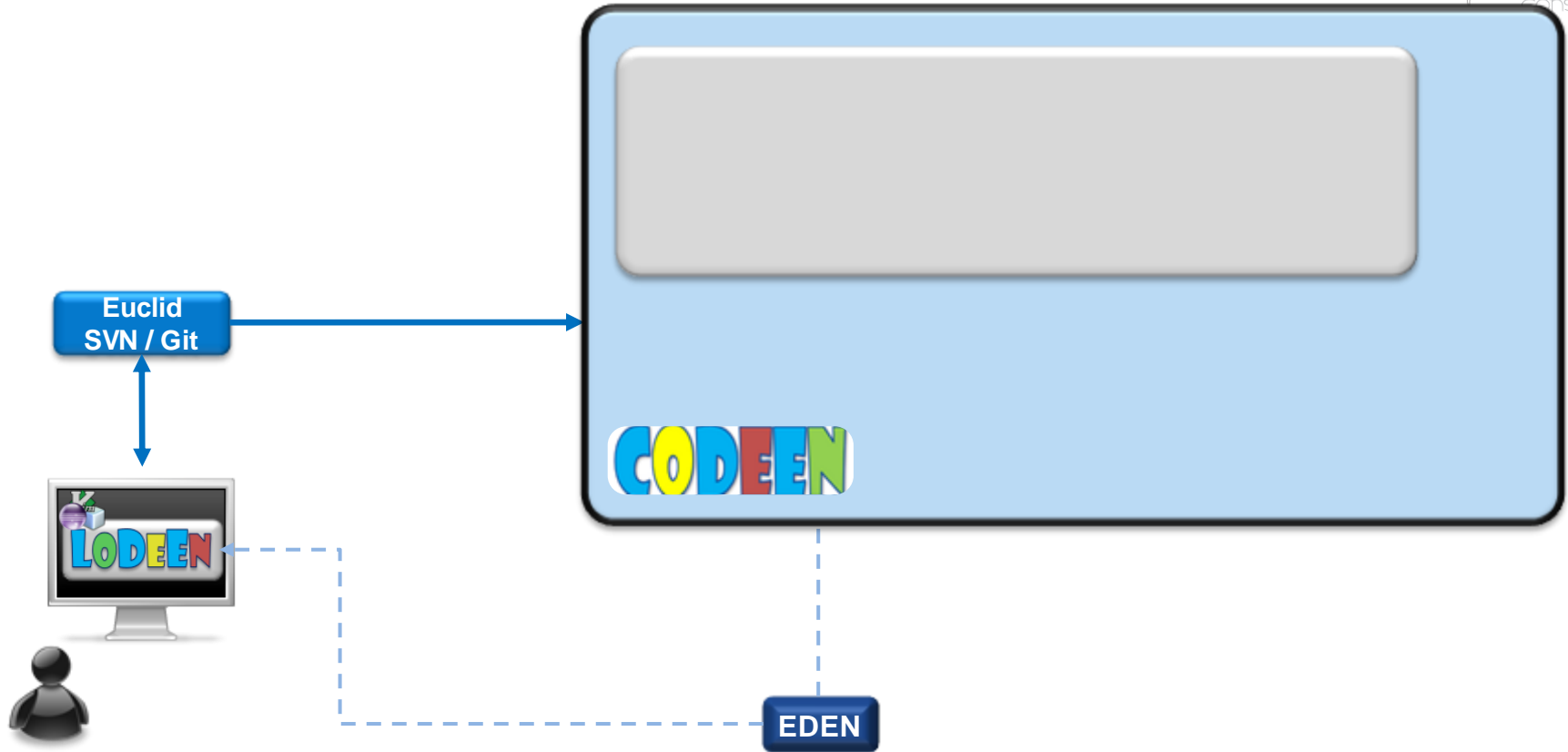
...continuously integrating its code...



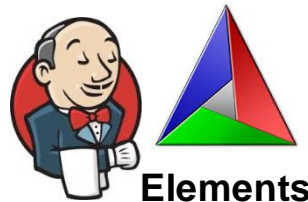
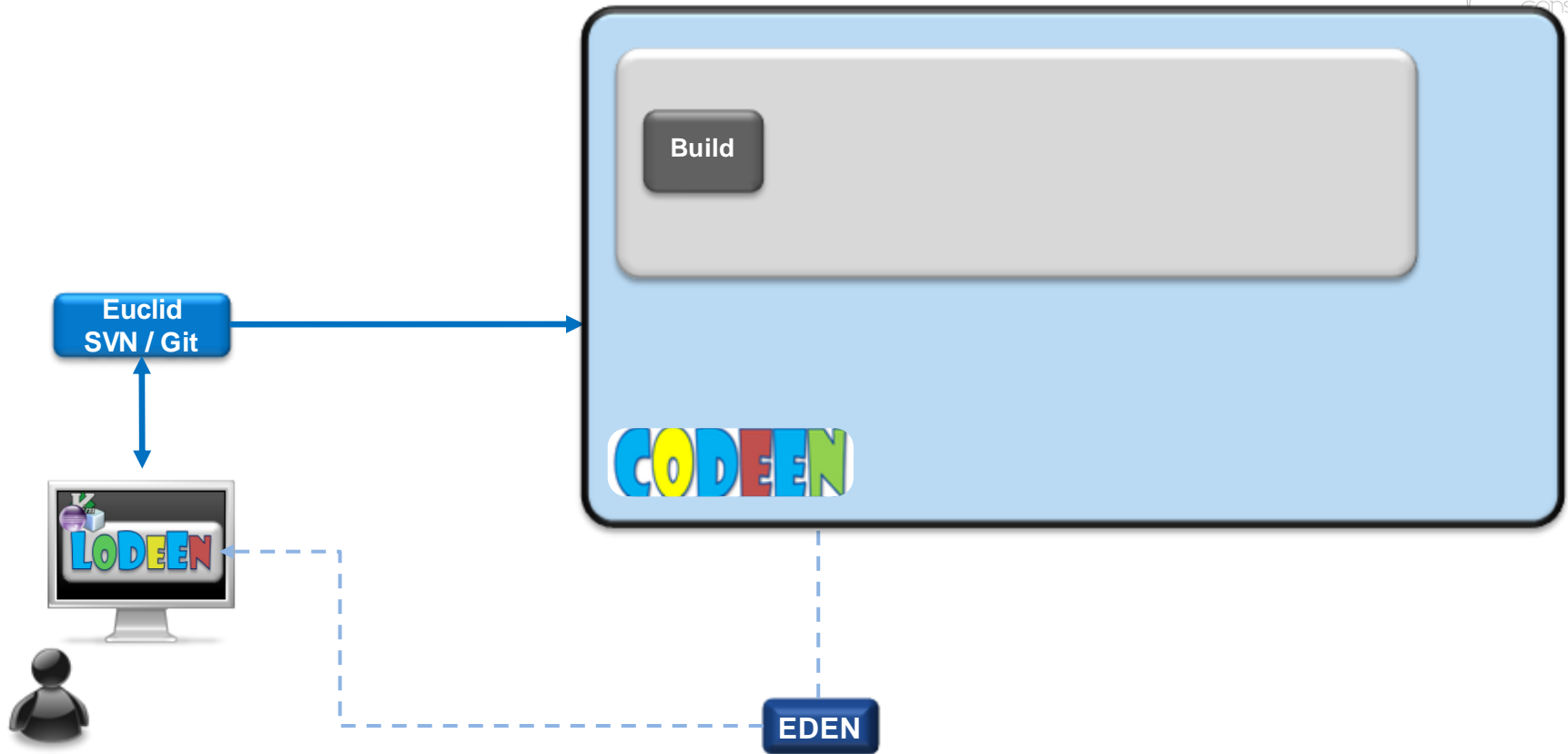
Continuous integration



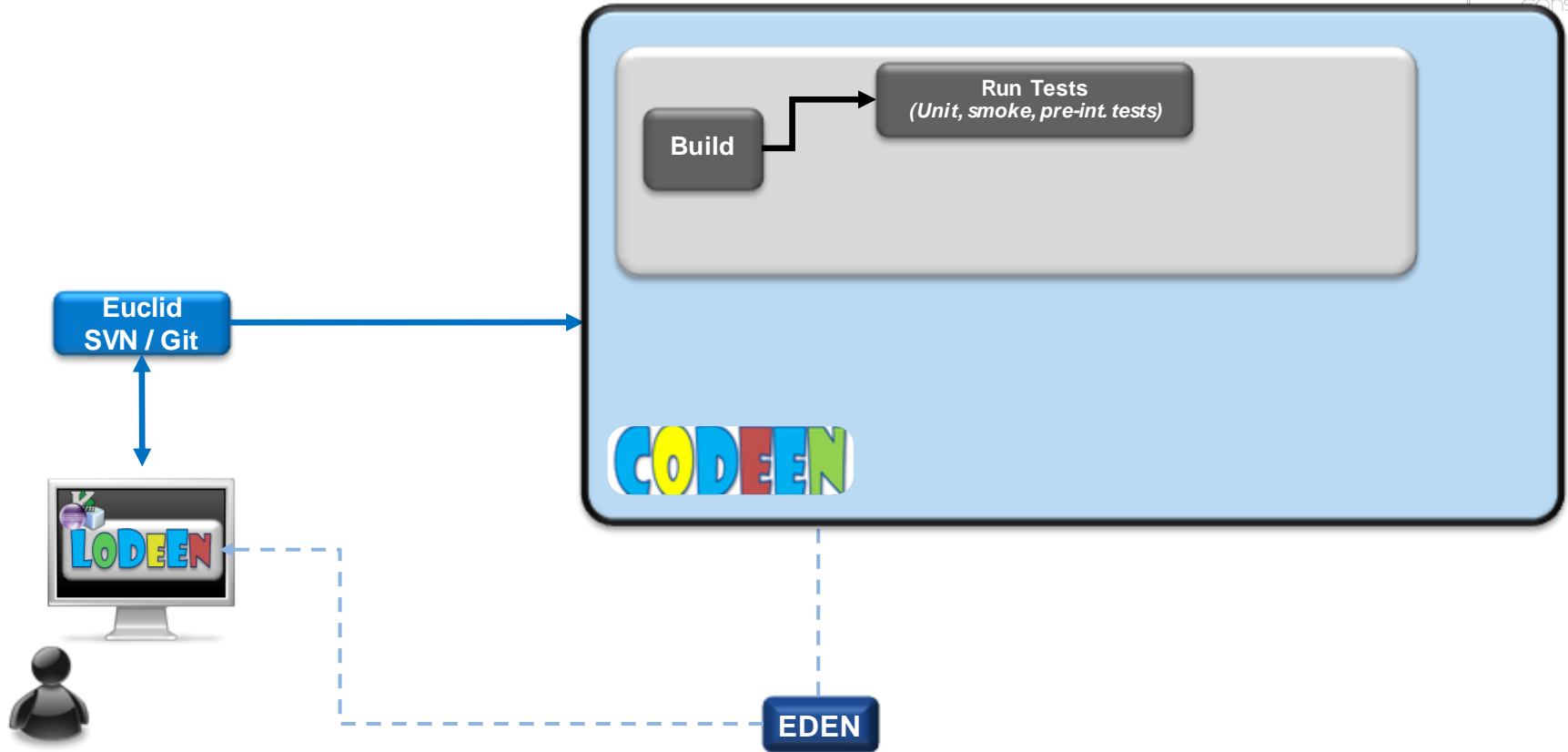
...continuously integrating its code...



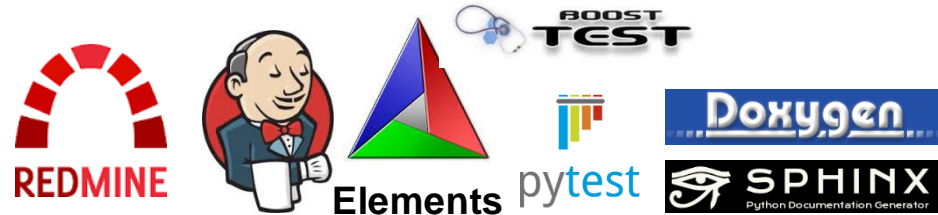
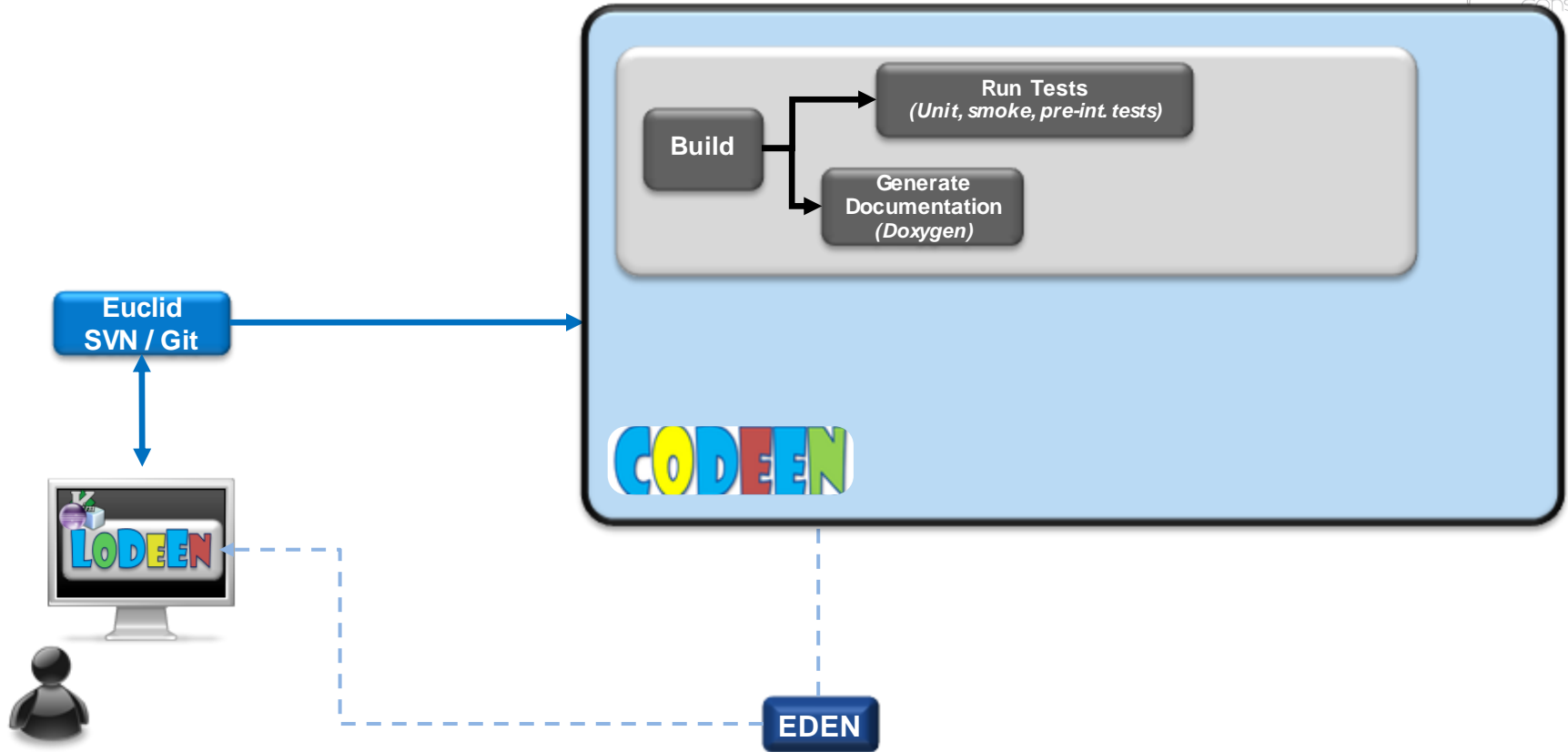
...continuously integrating its code...



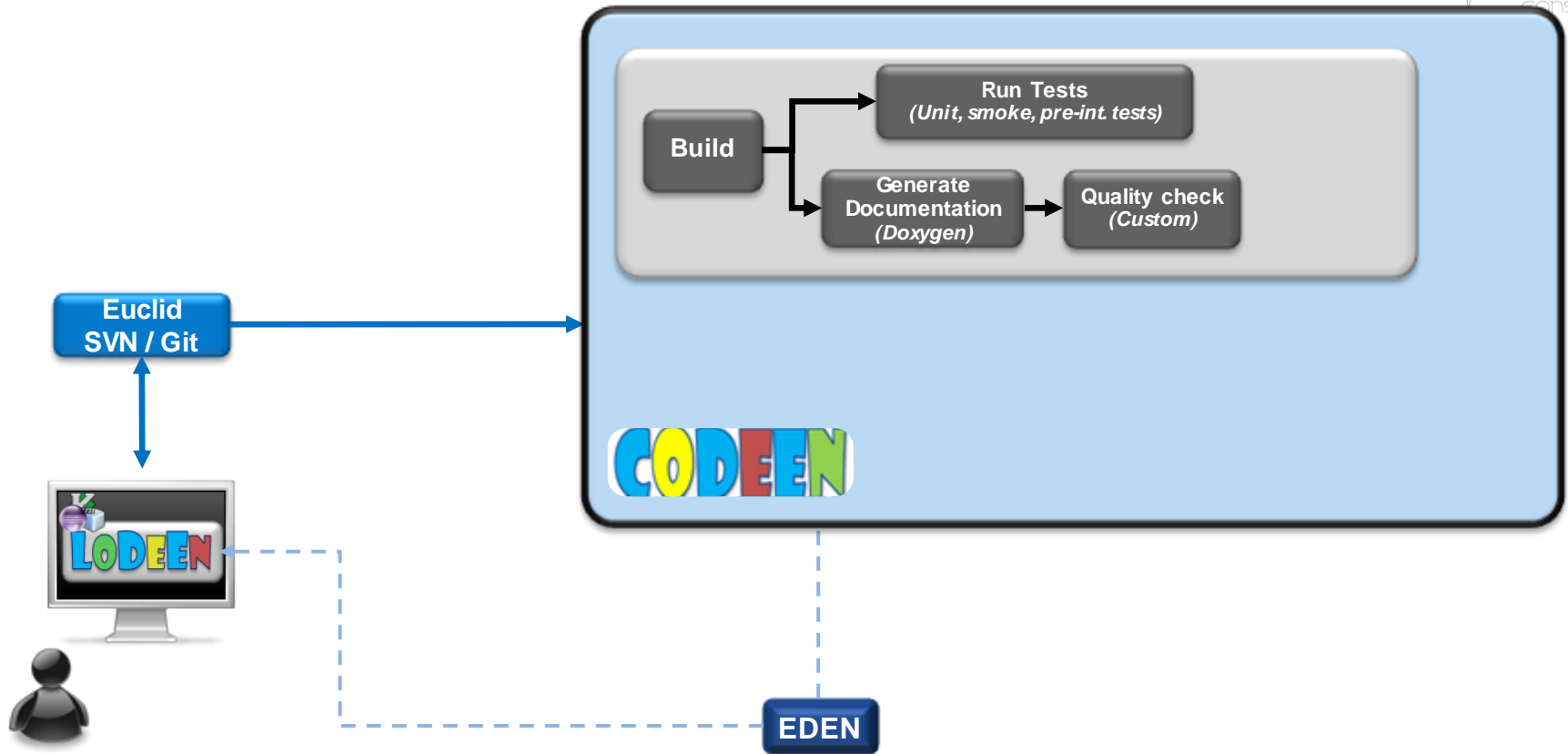
...continuously integrating its code...



...continuously integrating its code...



...continuously integrating its code...



Elements



BOOST
TEST



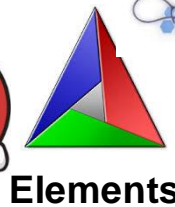
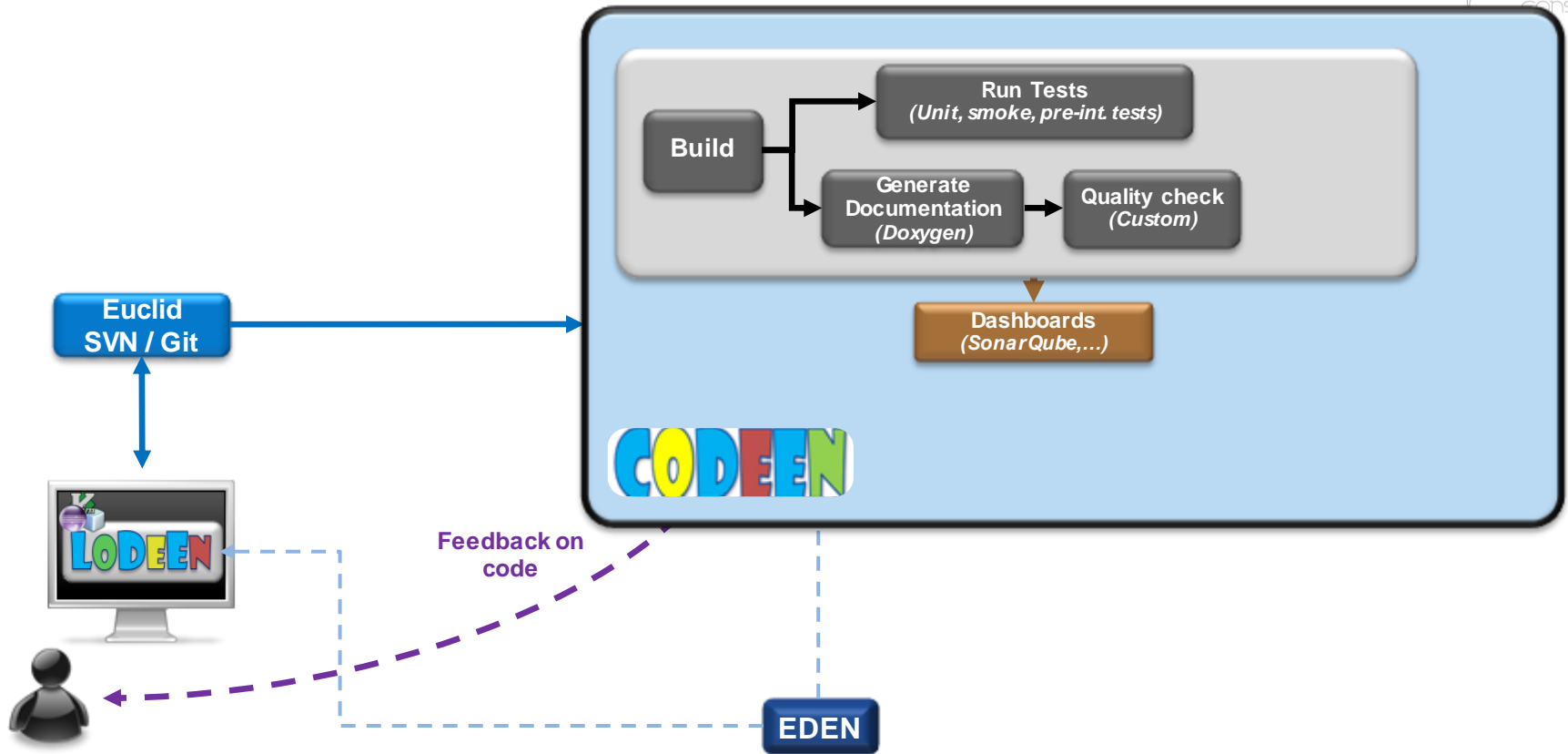
pytest



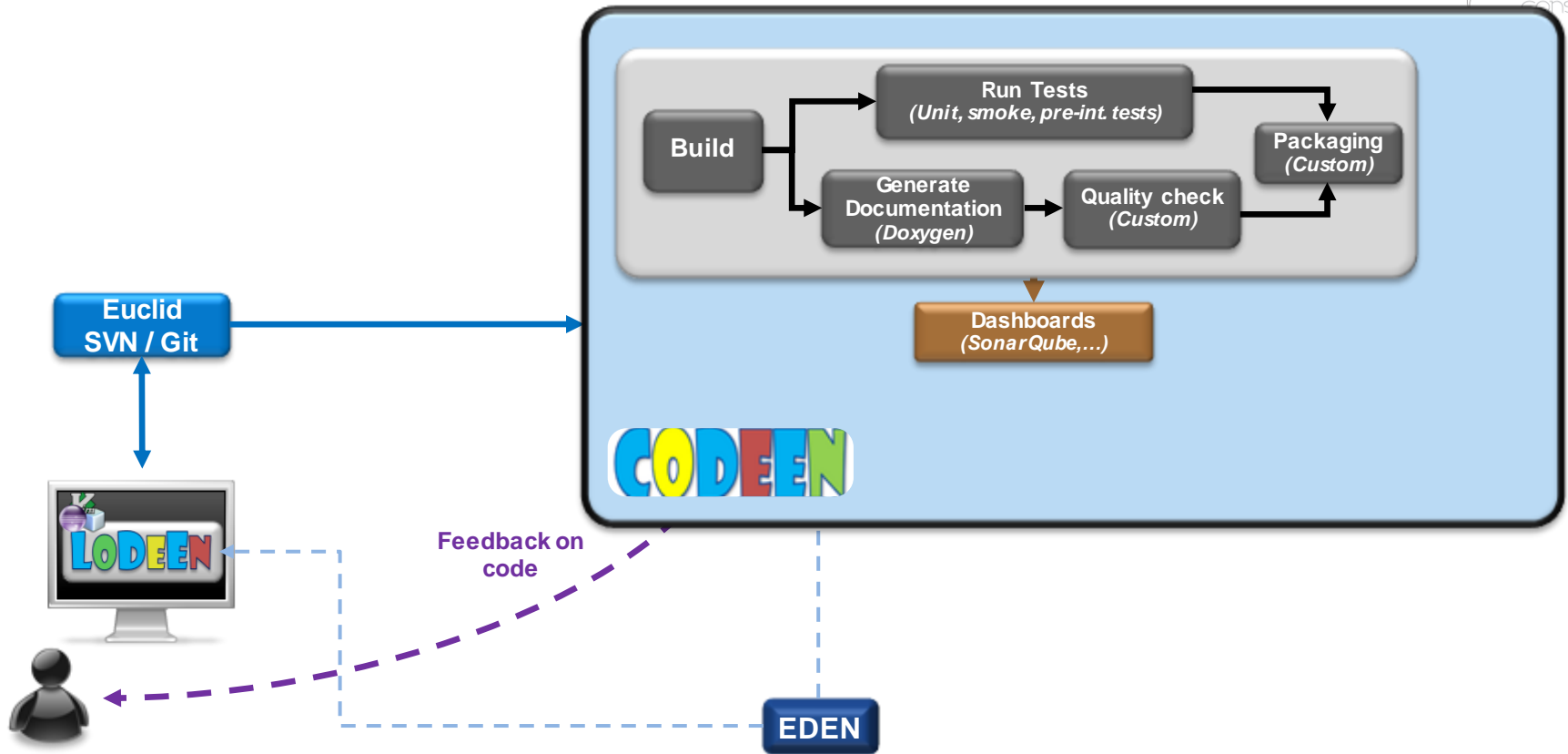
sonarqube



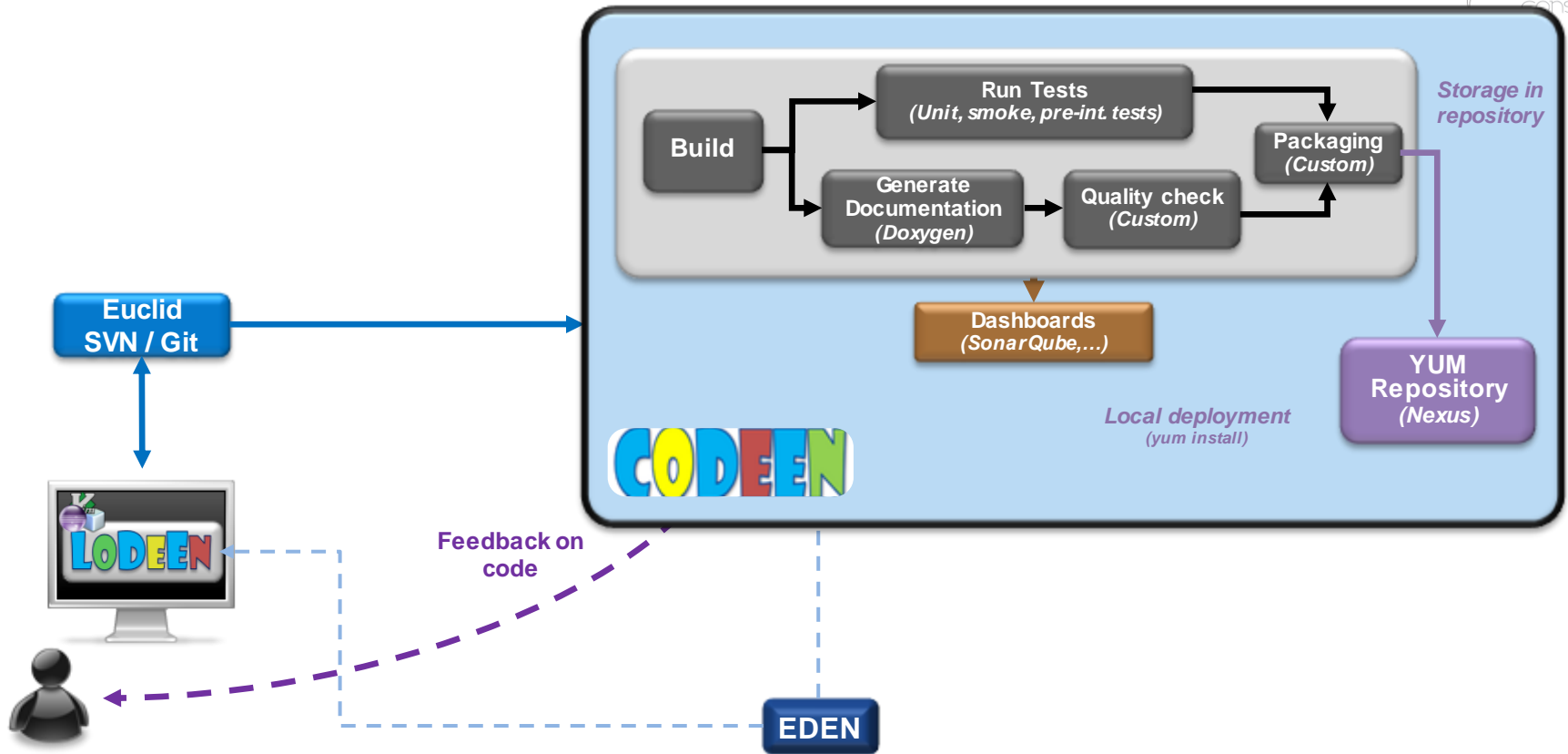
...continuously integrating its code...



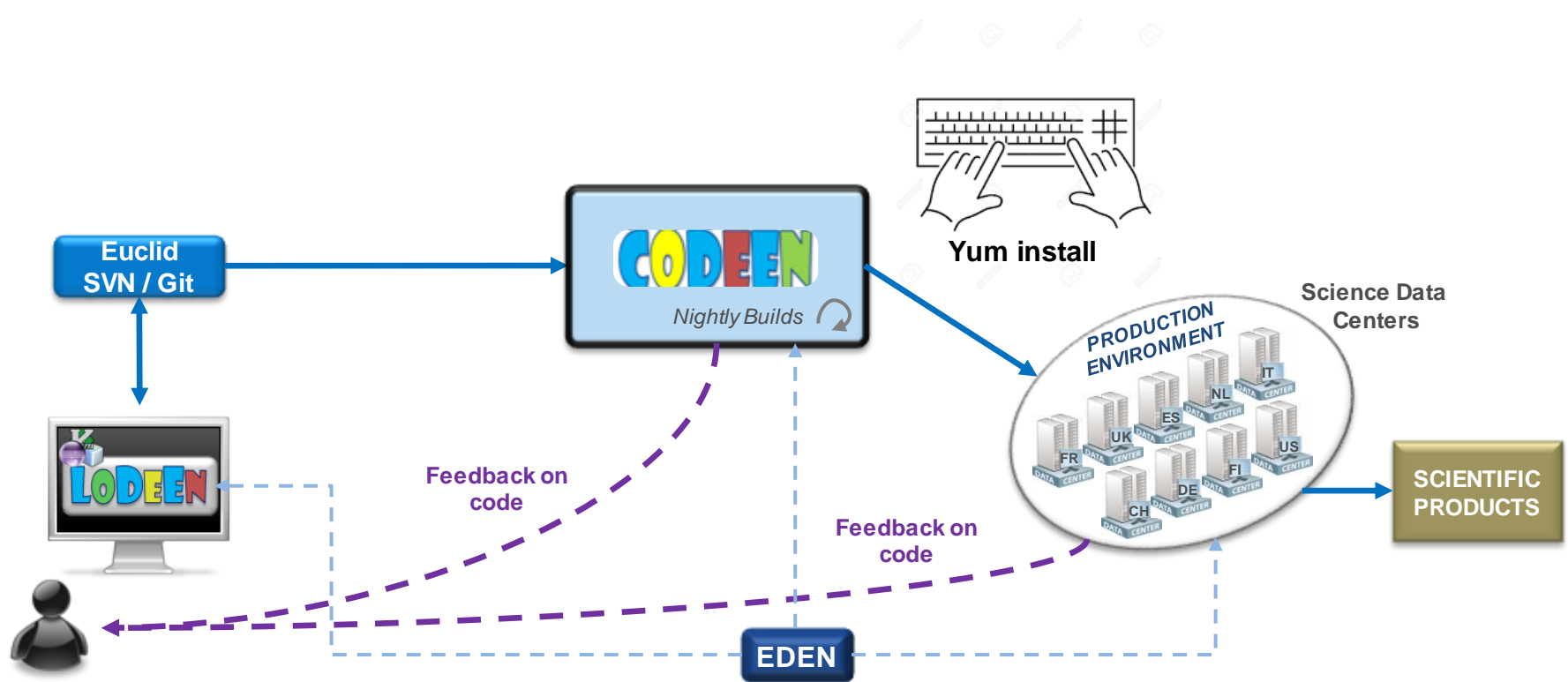
...continuously integrating its code...



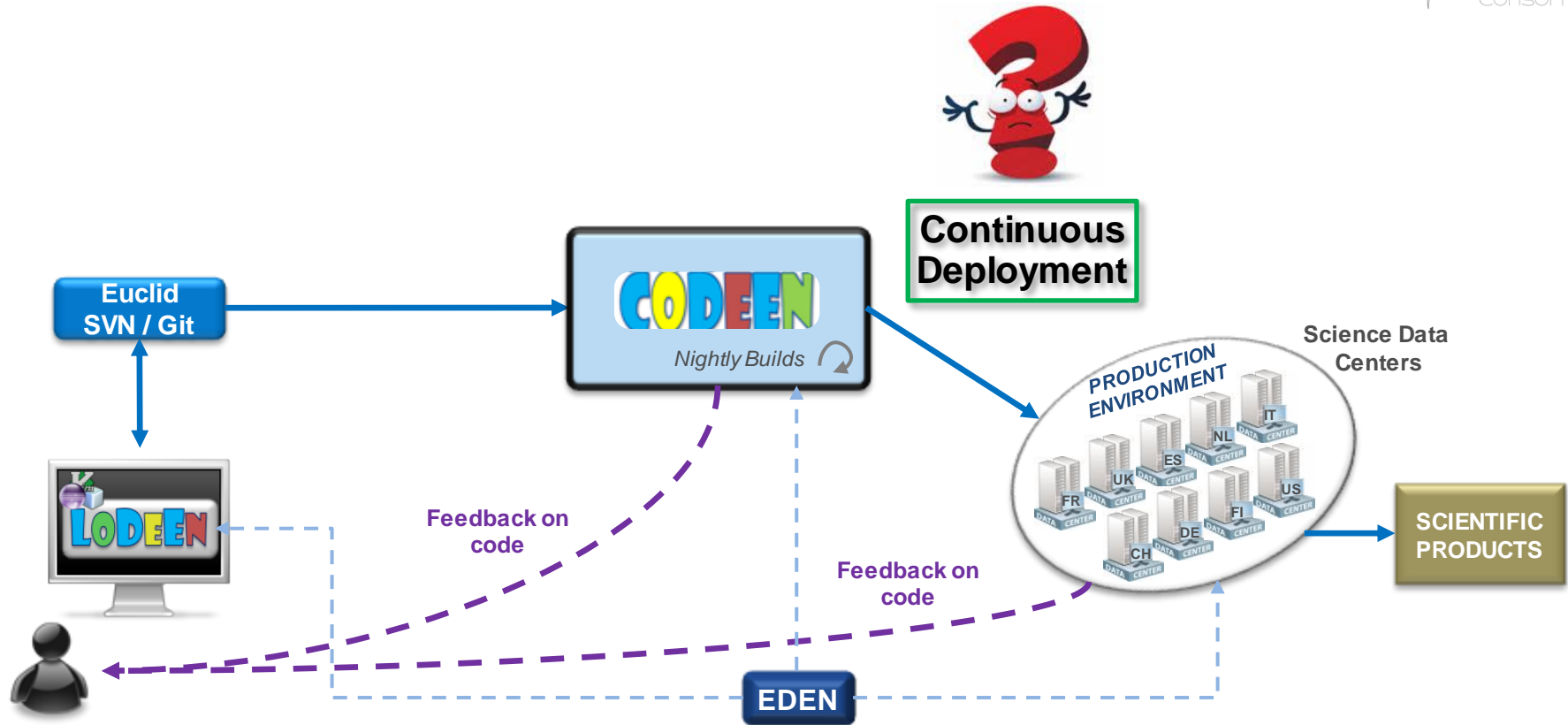
...continuously integrating its code...



...able to quickly deploy it on production...



...able to quickly deploy it on production...



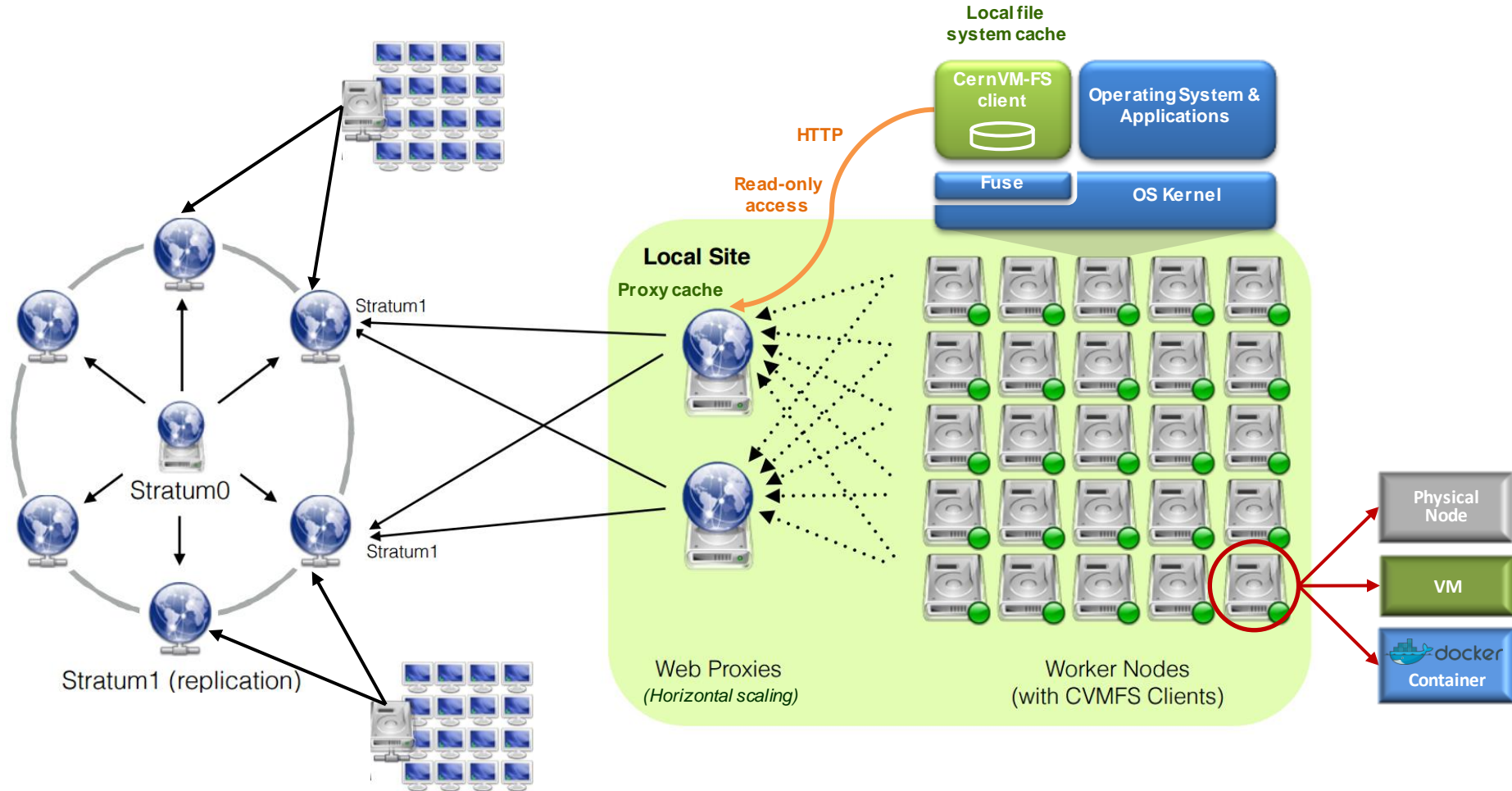
- Euclid Project & SGS
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- **Continuous deployment**
- SGS Building
- Conclusions

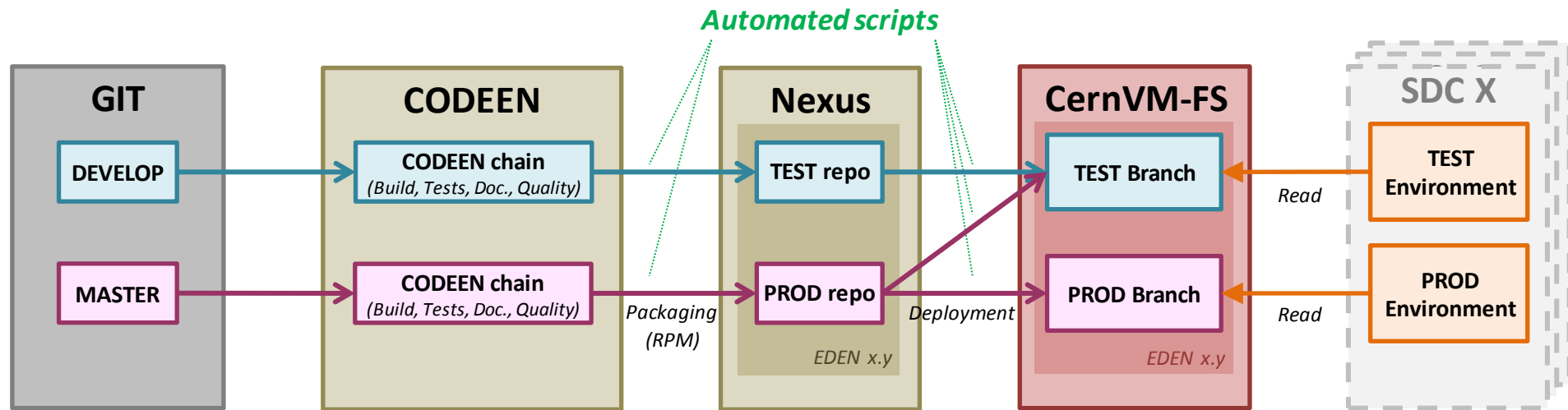
- not (too) intrusive
- Automatic deployment
 - No (less) admin intervention required
- Security friendly
 - No exotic protocol (easy to filter)
 - Outgoing connexion preferred (no incoming)
- Mutiple versions in //
 - EDEN versions
 - Pipeline versions
- Efficient



- Developed by CERN (European Organization for Nuclear Research)
- For High Energy Physics (HEP) collaborations
- To deploy software on the worldwide-distributed computing infrastructure:
 - HTTP based
 - Pull mode: get locally only on access
 - Cache hierarchy
 - User space FUSE local read-only mounting point
 - /cvmfs

Continuous deployment

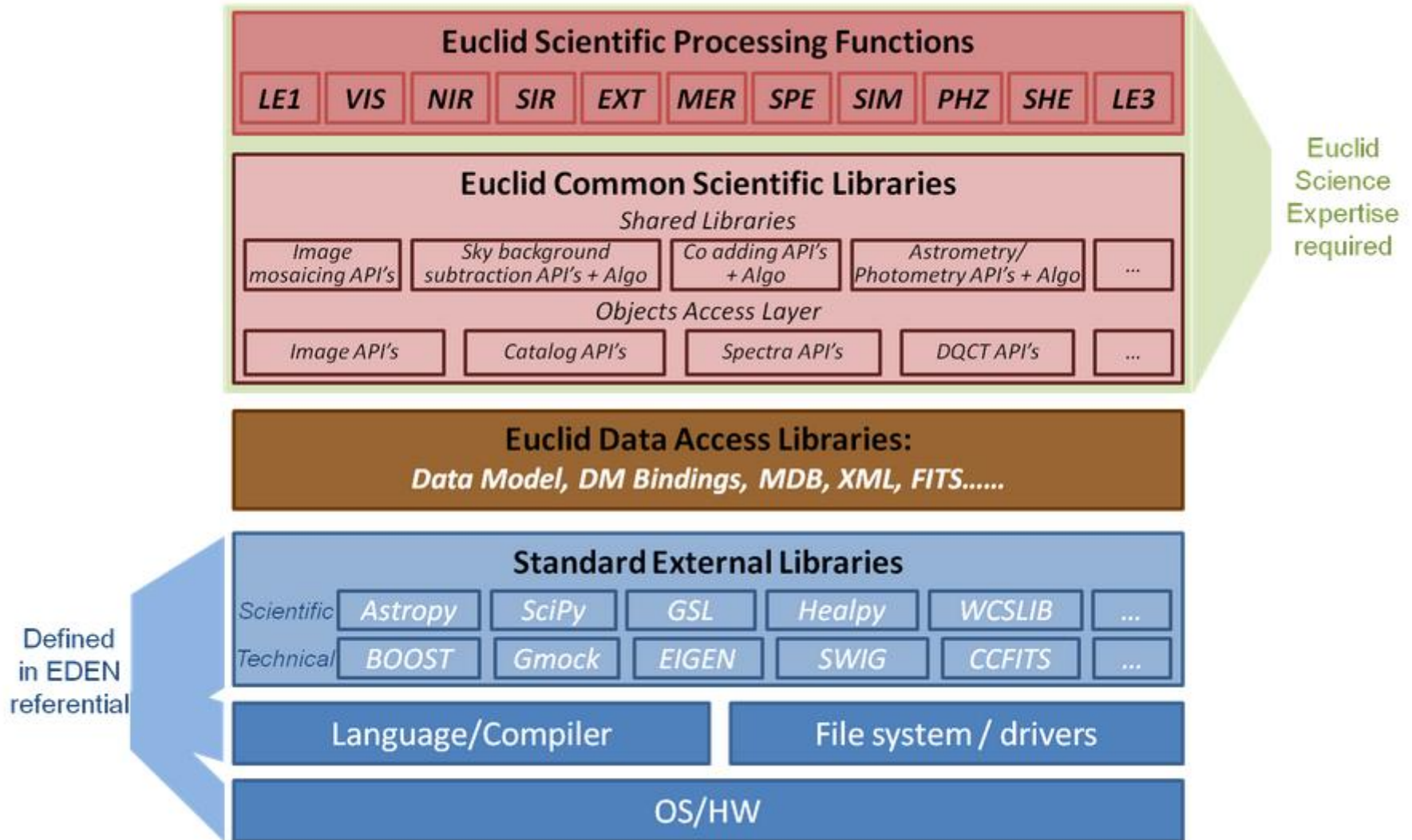




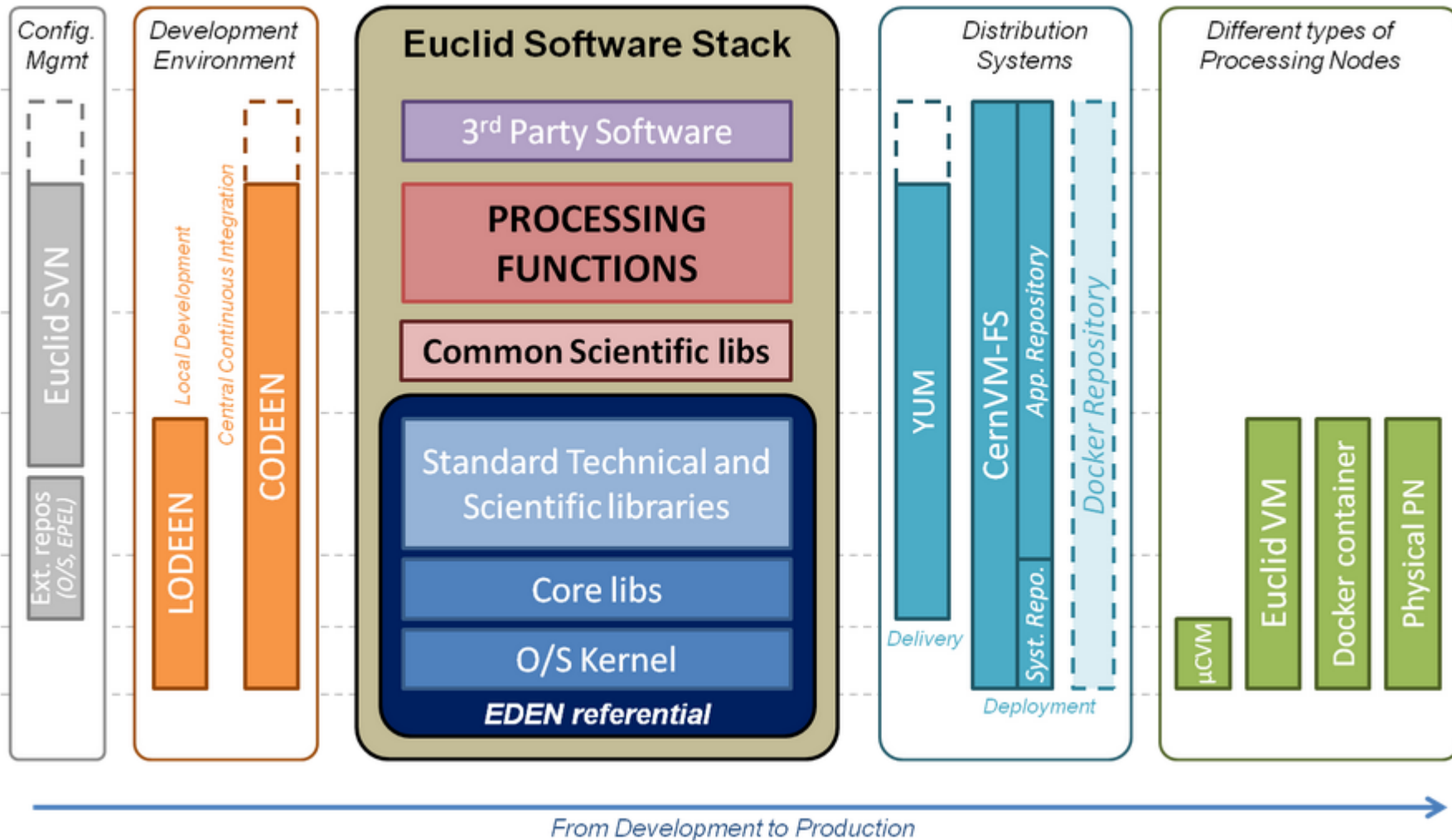
- Both Test and Production branches
- 15~mn latency between
 - Installation on stratum 0
 - Availability on any SDC

- Euclid Project & SGS
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Euclid Software stack



Euclid tools & software stack



Iterative & Incremental process

Source: Jeff Patton

Incremental

Adding pieces



Iterative

Refining, Reworking



Iterative & Incremental

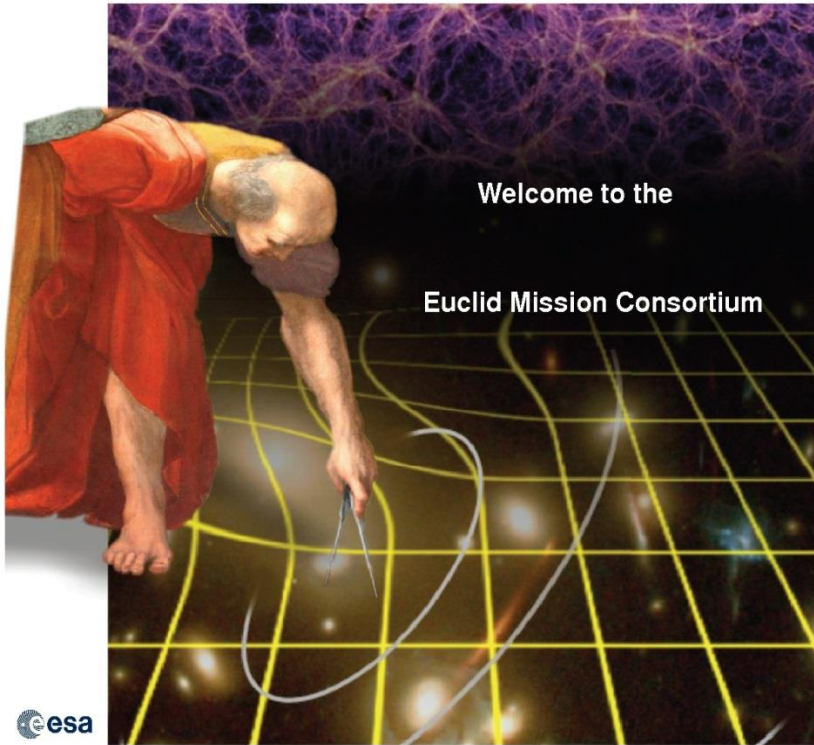
Mixing for delivery



- Euclid SGS is build in an iterative and incremental way through SGS « challenges »
 - Interleaves Technical and Scientific objectives
 - Progressivly integrates and improve
 - SGS services components (IAL, EAS, M&C...)
 - Euclid Processing functions
 - Tests are handled accordingly
- PFs themselves are developed through Cycles and Maturity Levels (passing Maturity Gates)

- Euclid Project & SGS
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- SGS Building
- **Conclusions**

- Big challenges to address in many fields
- Validation of the architecture and development models
- Integration of the first levels of the pipeline
- Next steps
 - At scale integration and validation tests
 - Integrate a first functional prototype pipeline
 - Assess SGS scalability and overall orchestration



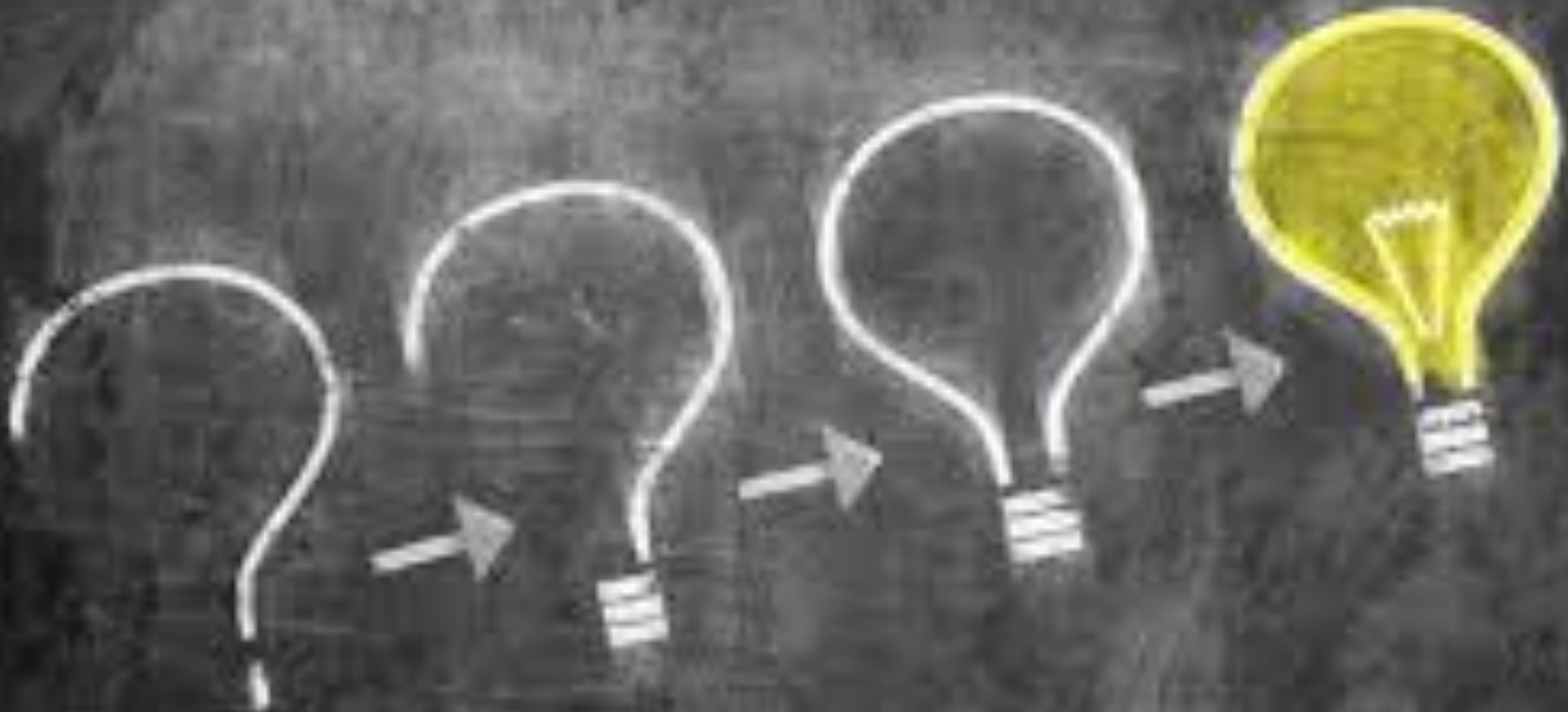
Thank you for your attention

Maurice.Poncet@cnes.fr

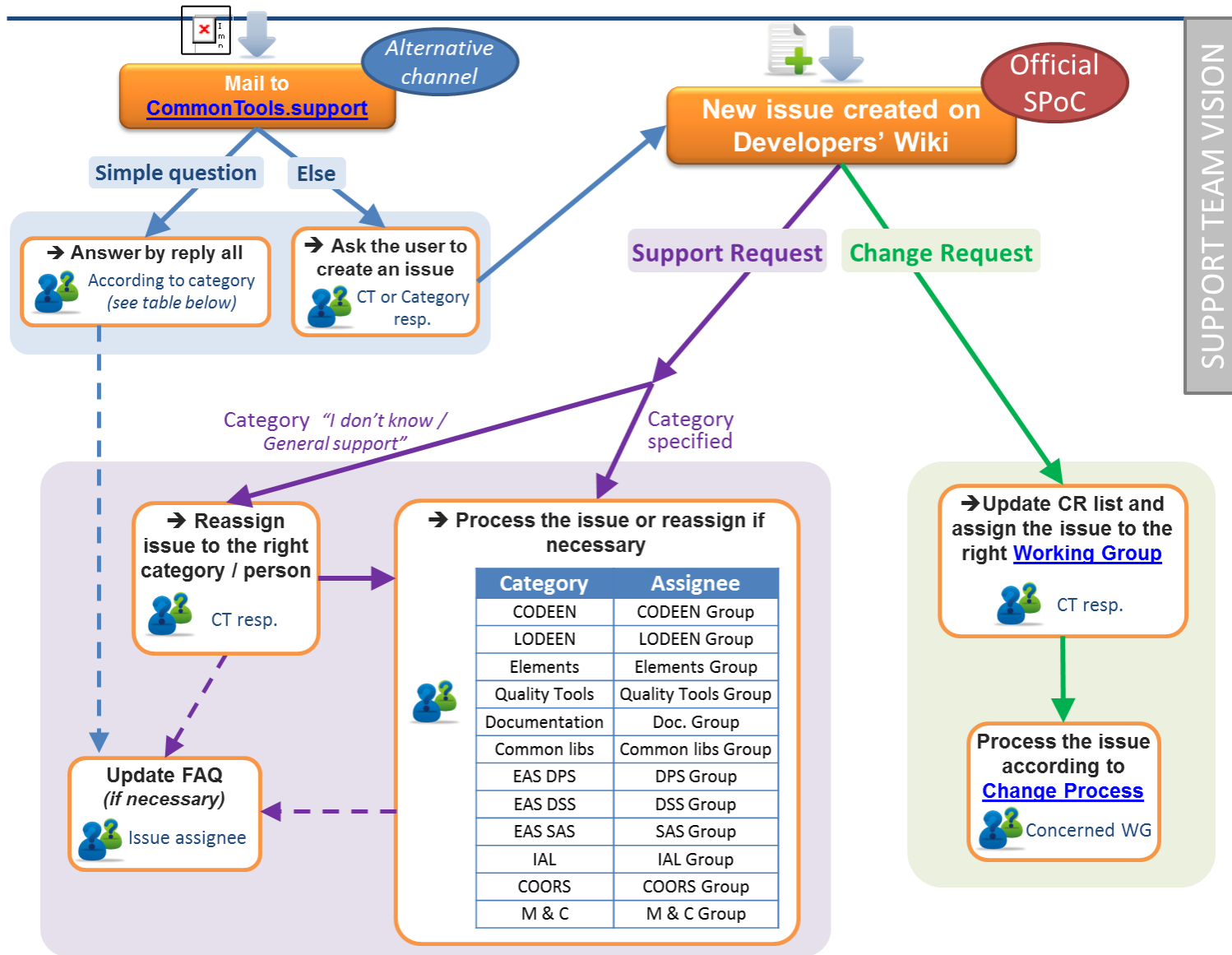
Acknowledgments: authors are indebted to all the individuals participating in the Euclid SGS development inside ESA and EC, too numerous to be listed here



Questions



Support process



Change Process

