



Melodic

optimized multicloud

Managing international research collaborations

MELODIC:

*Optimized Hybrid Cloud Application Management
for AI and Big-Data*

Geir Horn, University of Oslo, Norway



This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No. 731564.



WHAT IS MELODIC?



A single universal platform
for optimized deployment and management
of applications in [the cloud](#).



**Actually Cross-Cloud
and Open Source**



Melodic - why?

- Simple and **easy way to use multicloud** approach.
- Unified way to deploy VMs, containers, serverless and big data to different Cloud Providers.
- **Automatic deployment** to different Cloud Providers.
- Automatic **optimization** of cloud resources.



Google
Cloud Platform





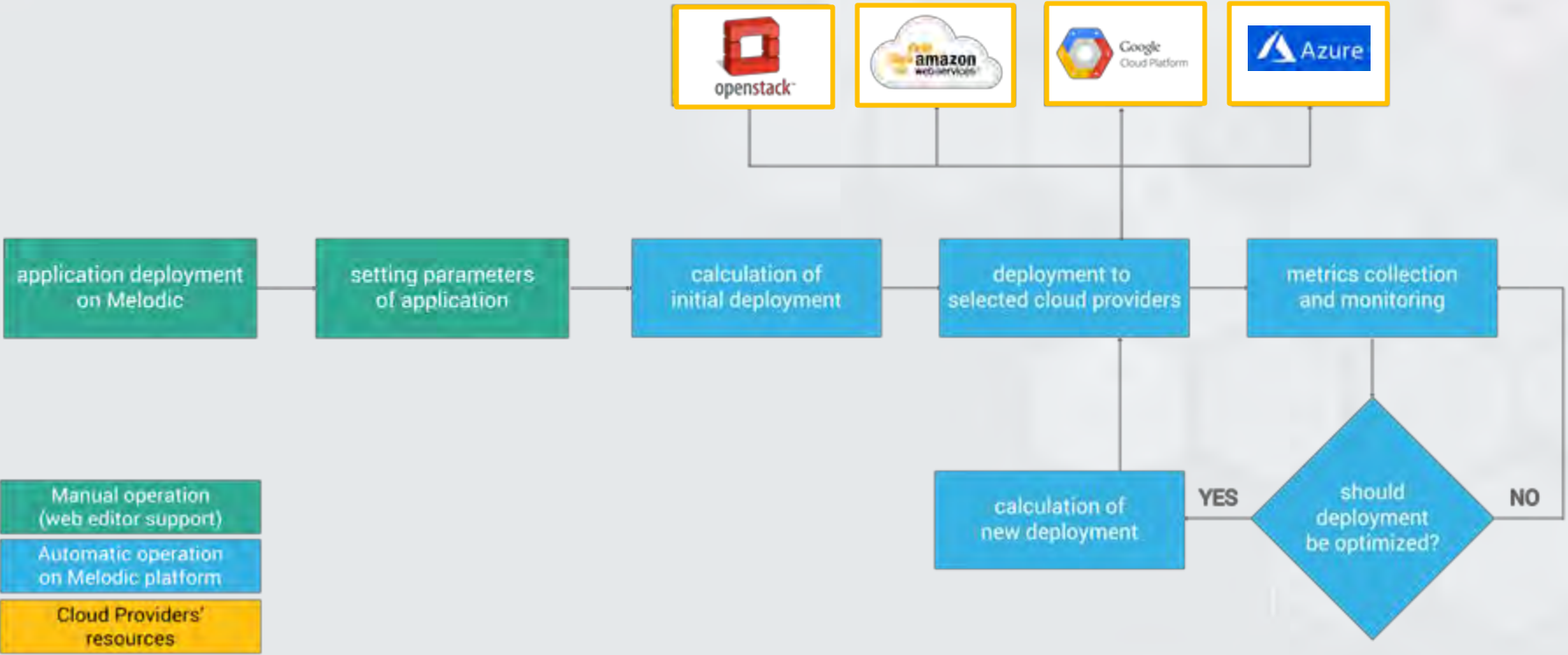
Melodic - key features

- **Automatic** deployment of the application in the cloud
- The ability to select **optimal deployment option** based on application characteristics and defined utility
- Support for **Big Data frameworks** and **data locality** awareness
- **Security** - centralized authentication and authorization of applications
- **Enterprise ready** - Highly Available and Scalable



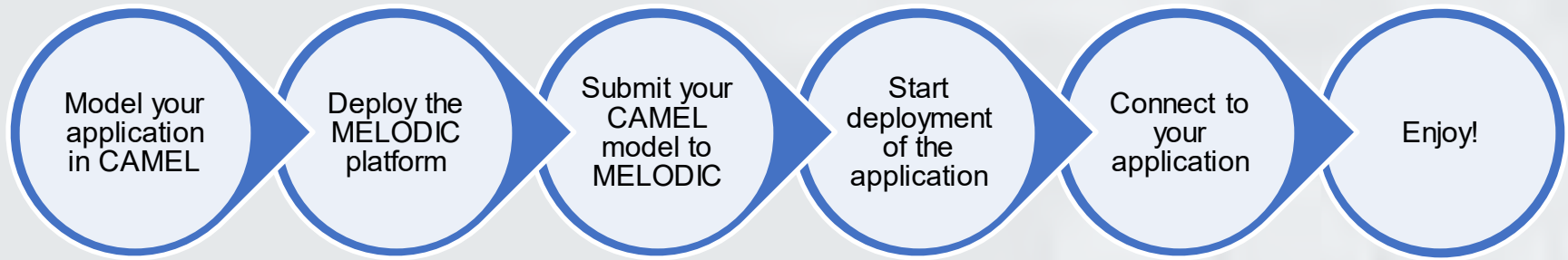


Melodic - optimization and automation





Workflow



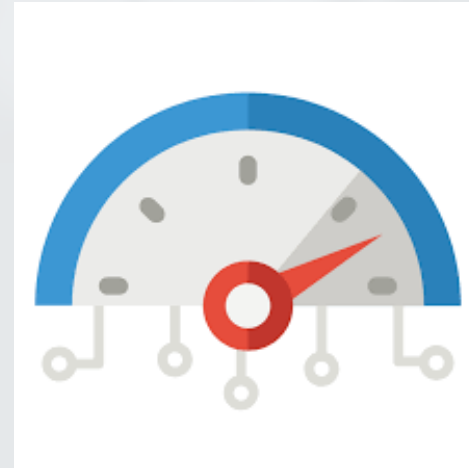
Genome application – Big Data optimization

- Data parallel training of Genome models
- Uses Spark to manage the training
- Least possible cost
- Personalized medicine example application
- Timeliness required



Deployment goal

- Train 50 Genome models
- In about one hour
- Minimal number of resources (cost)
- Two utility dimensions:
 1. Cost
 2. Performance

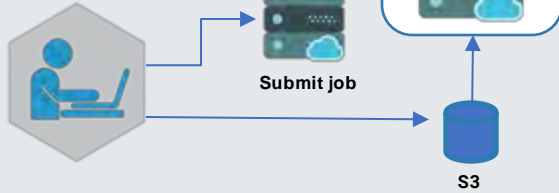




Genome – Spark Application

Time to finish
Processing: **5h**

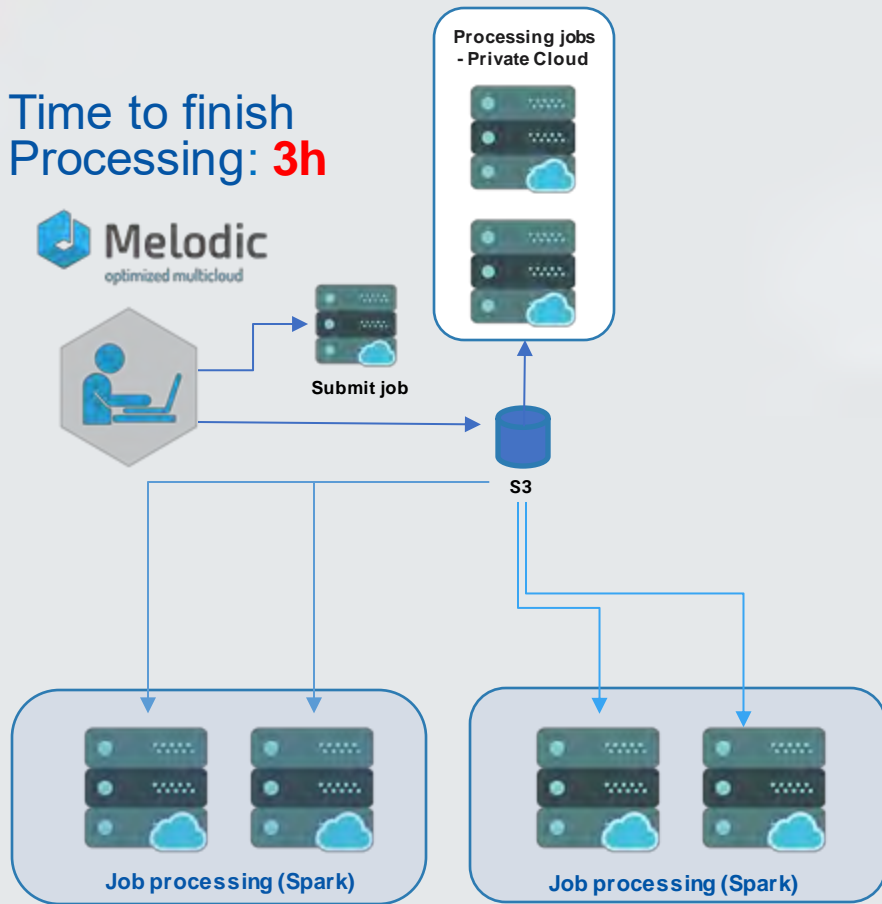
 **Melodic**
optimized multicloud





Genome – Spark Application

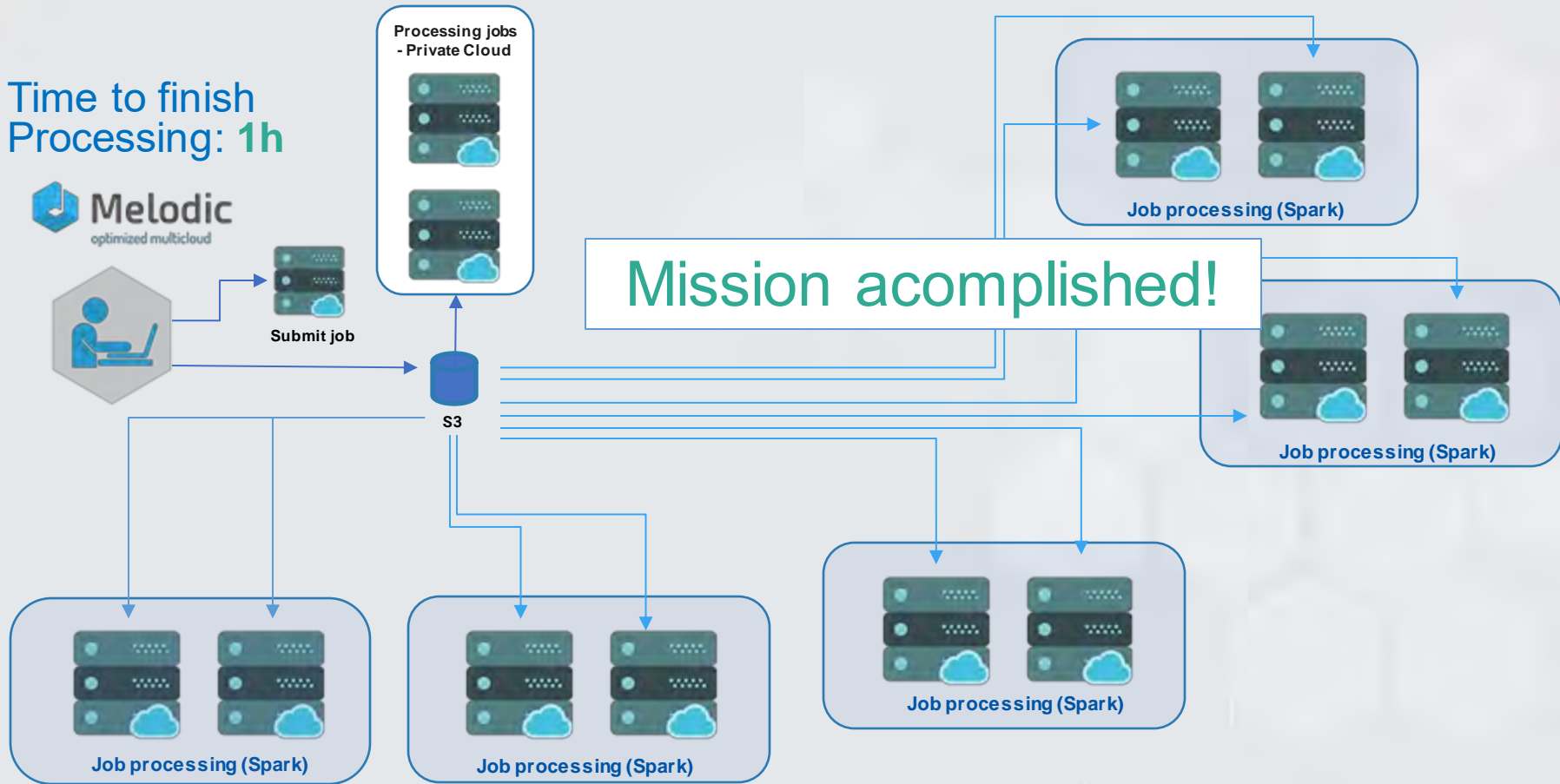
Time to finish
Processing: **3h**





Genome – Spark Application

Time to finish
Processing: **1h**





MASTERING COMPLEXITY



What is a research project?



Nansen – Johansen
Fram
14 March 1895

Melodic consortium

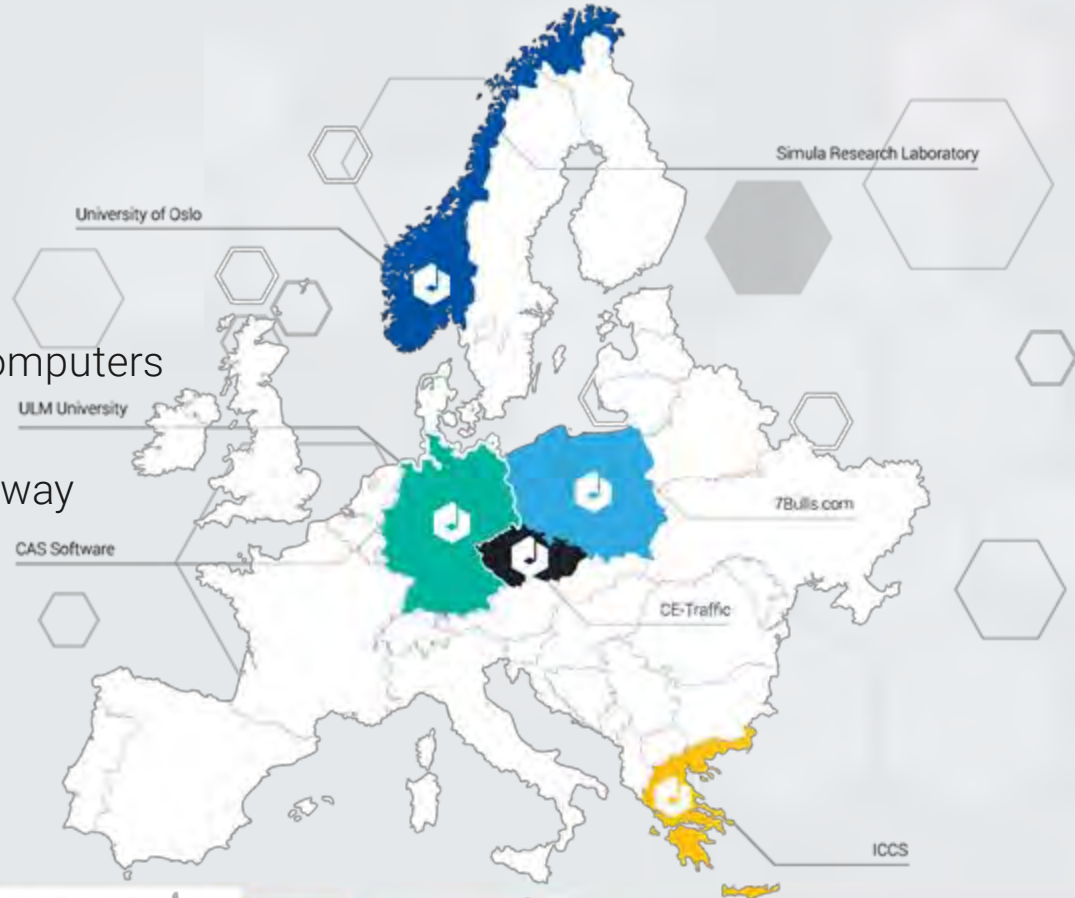
- University of Oslo – Norway
leader of the consortium

Academic partners:

- University of Ulm – Germany
- Institute of Communication and Computers Systems – Greece
- Simula Research Laboratory – Norway

Business partners:

- CAS Software – Germany
- CE-Traffic – Czech Republic
- 7bulls.com – Poland





Key figures

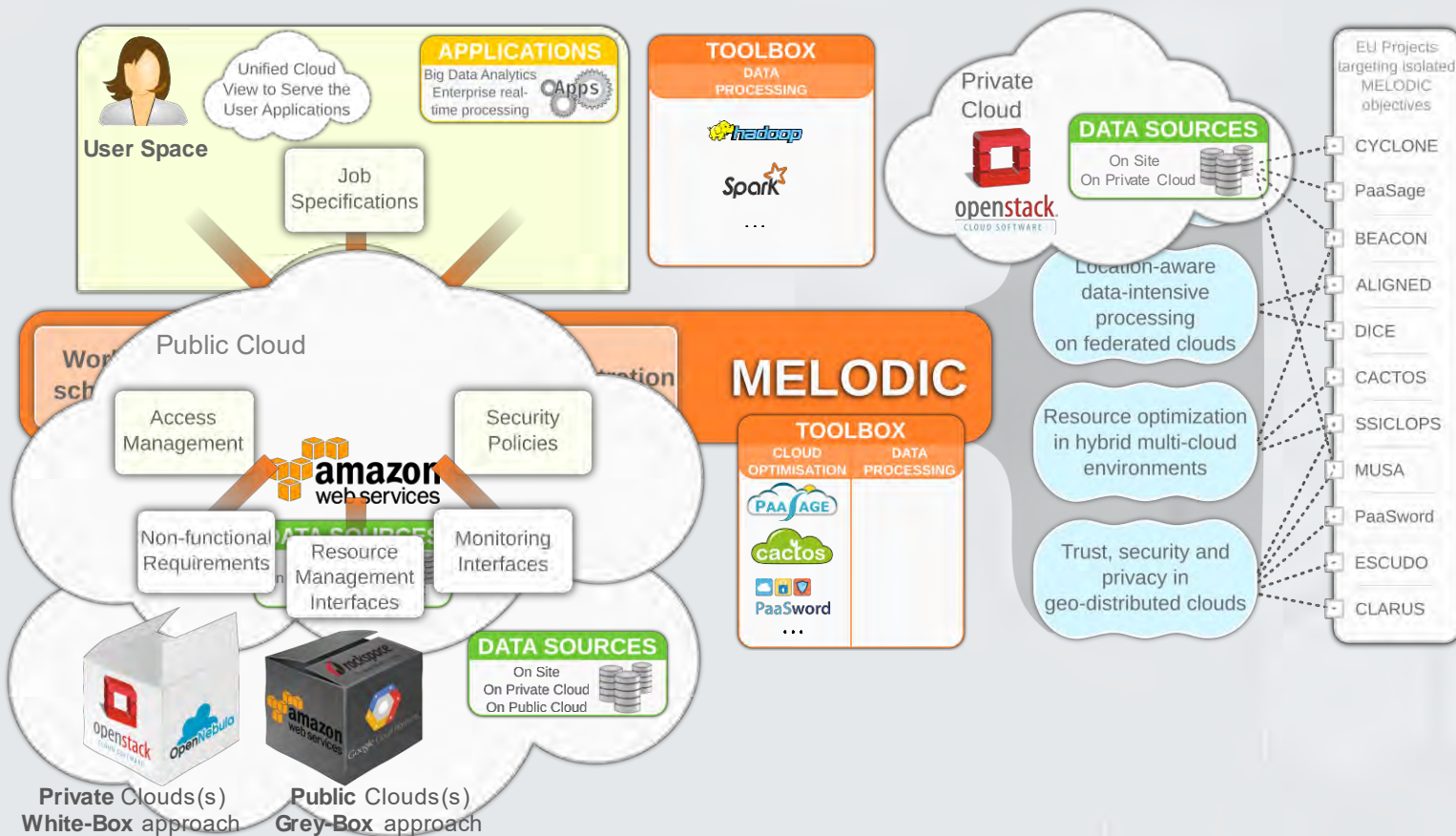


Melodic
Big data cloud

- 7 partners
- 5 countries
- 4.89 m€ funding
- 38 months' duration
- 715 person months
- 43 contractual deliverables

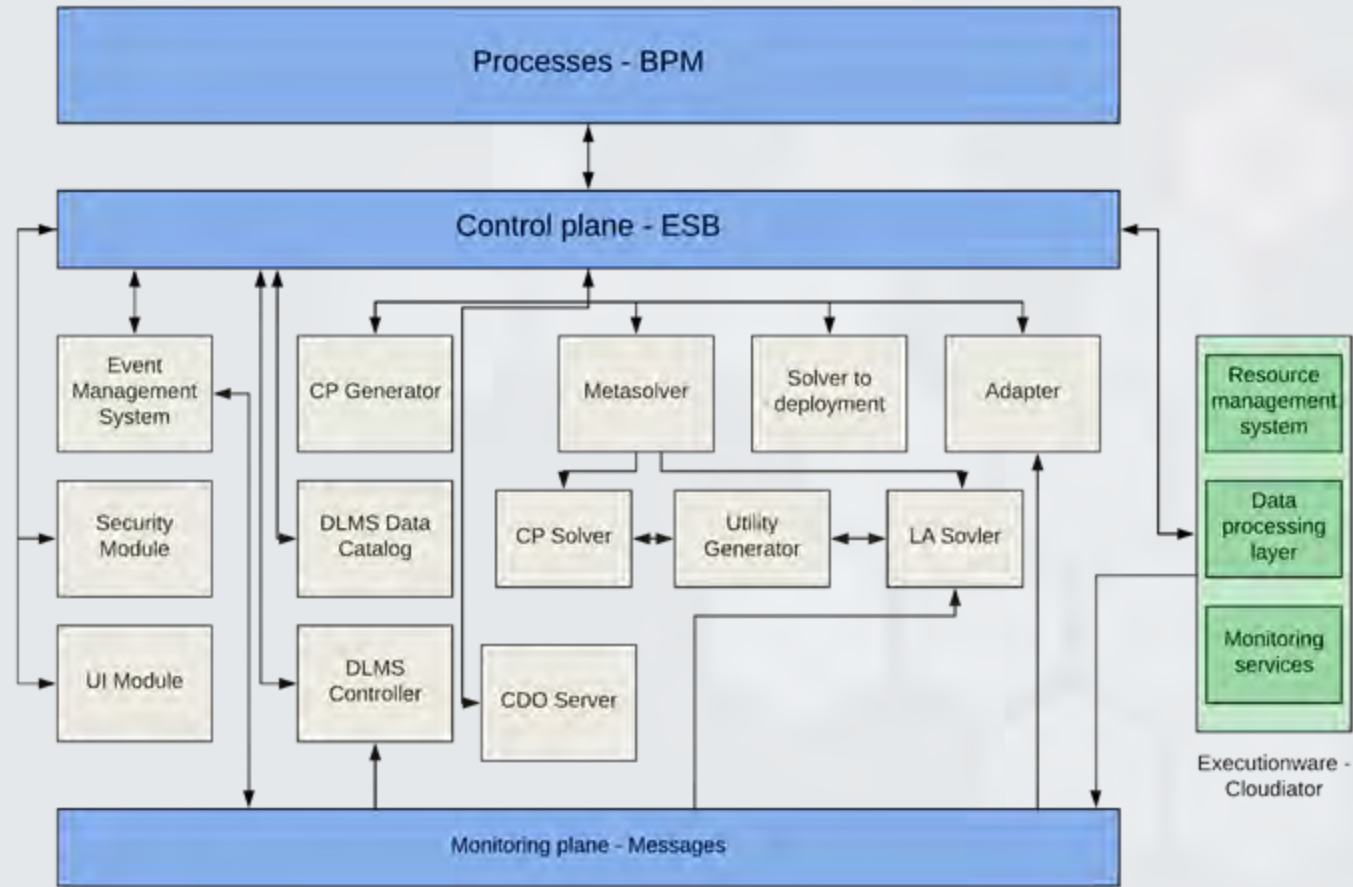


Architecture



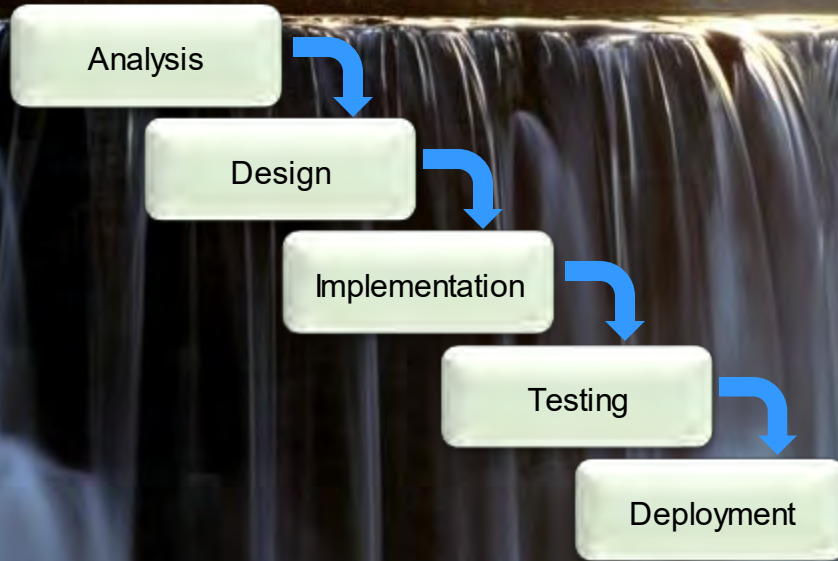


Melodic architecture

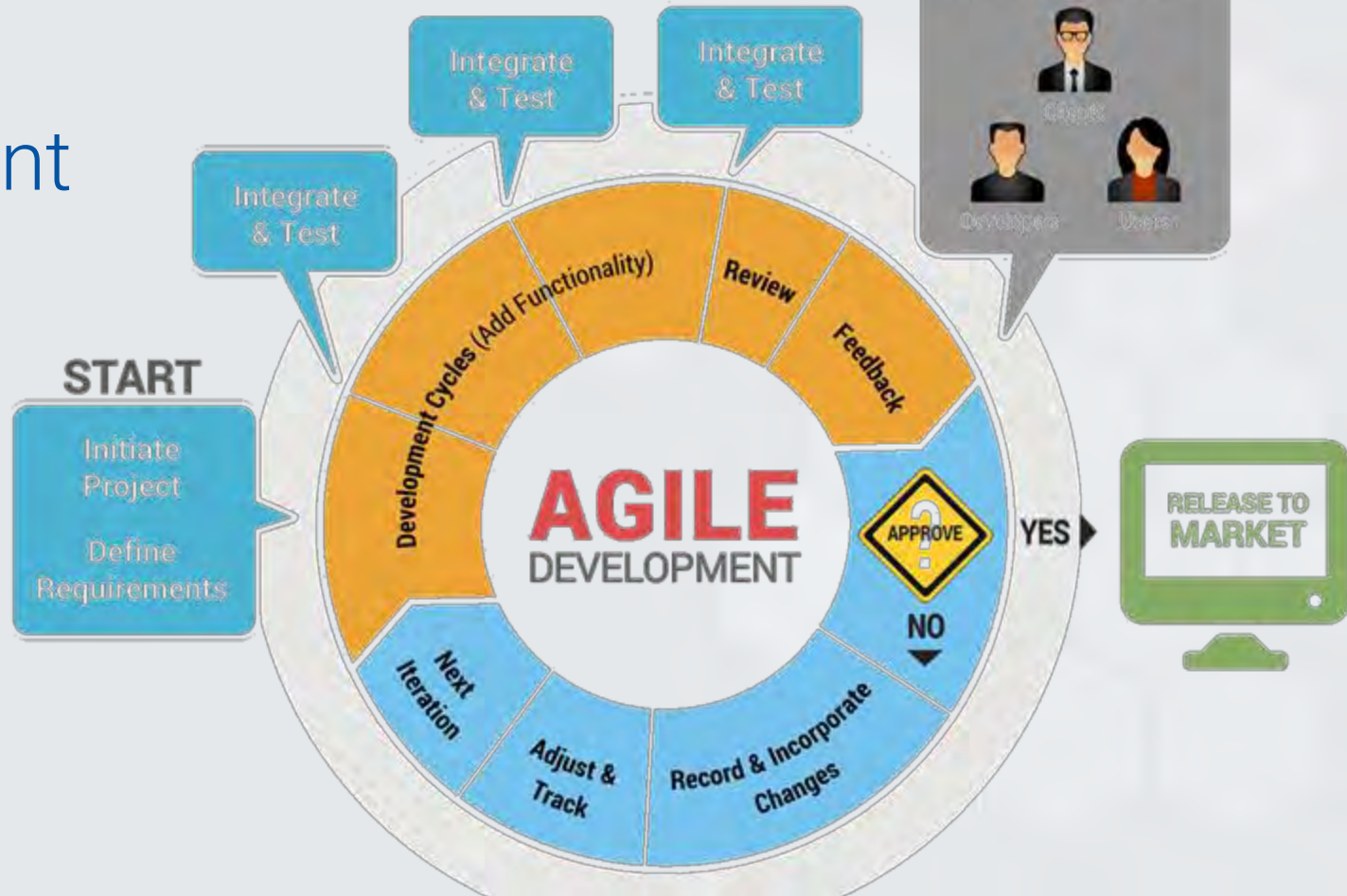


- Input → Output relationships
- Dependencies
- Critical line
- Progress monitoring

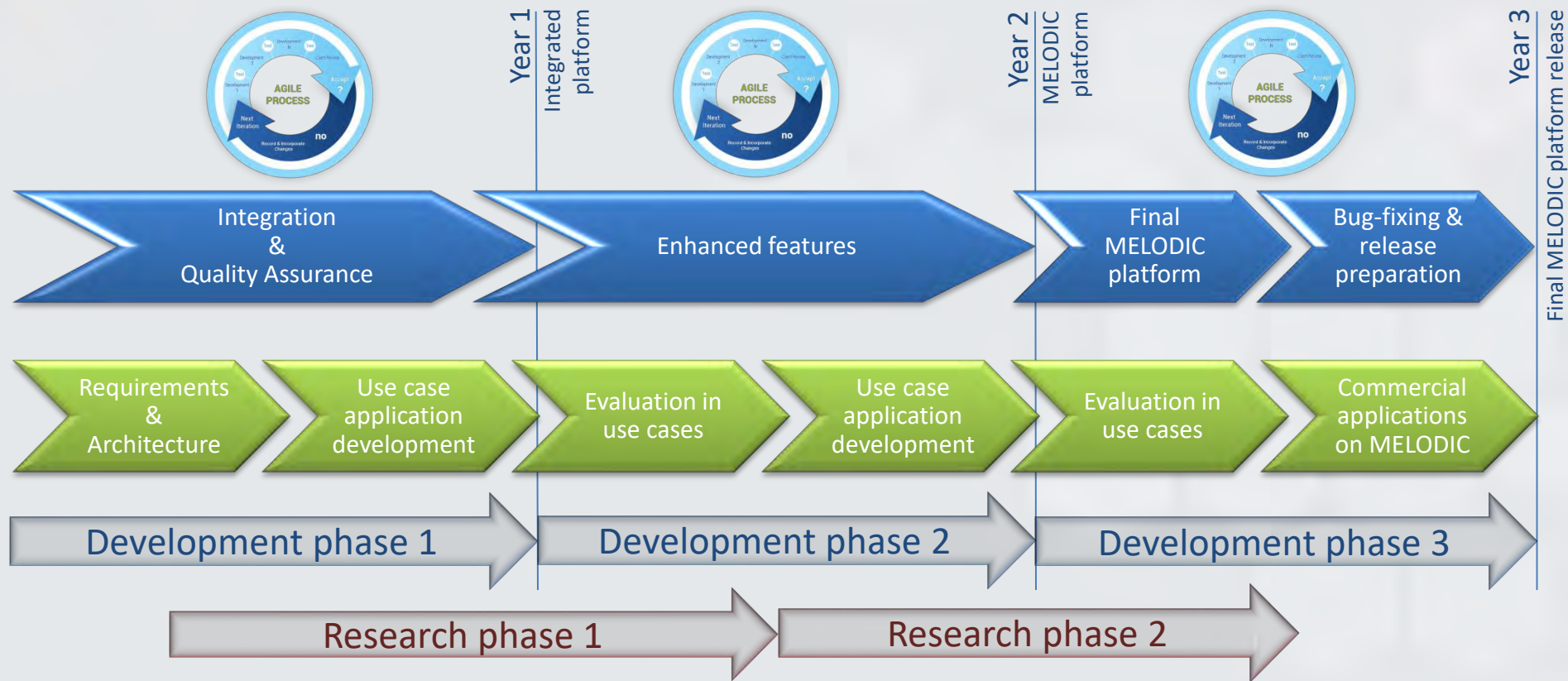
Waterfall thinking



Software Development



Development





Iron Triangle



Management



Principles

Liberté
Égalité
Fraternité





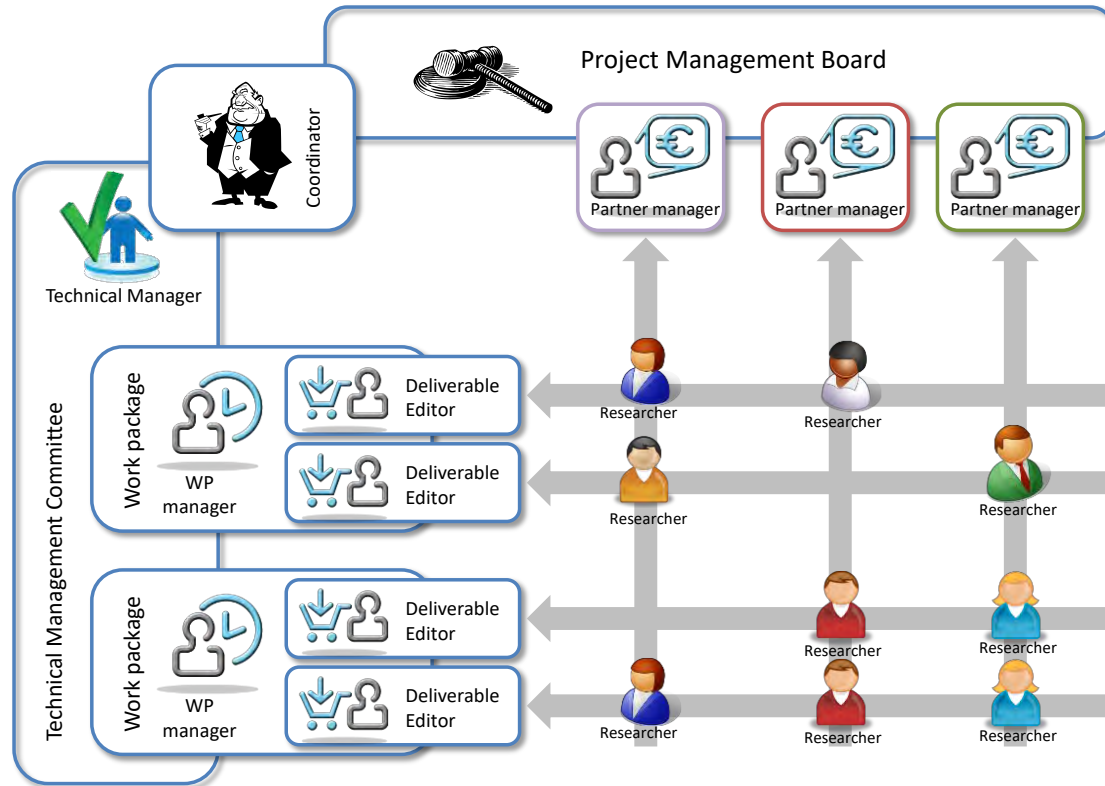
SUCCESS

FAILURE

Decision
making

Project management board
Technical Management
Committee
Exploitation board

Organisation: Roles and responsibilities





Organisation: The Project Office



- Managers:
 - Coordinator
 - Technical manager
 - Operational Manager
- Quality management
- Financial management

Conflict resolution



- Procedures

- Rules

- Players

- Decisions

Conclusions

- All objectives achieved
- Exploitation better than expected
- Excellent collaboration
- Concept proven and future proof

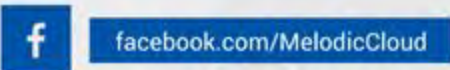
Now this is not the end.
It is not even the beginning of the end.
but it is, perhaps,
the end of the beginning.

Winston Churchill
The Lord Mayor's Luncheon, Mansion House
10 November 1942



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Thank you!



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