Melodic
optimized multicloud

7bulls.com Melodic MORPHEMIC

BLUEPRINT LDN

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10-11 MARCH 2021
VIRTUAL EVENT

Autonomous Multi-Cloud serverless deployment and optimized management

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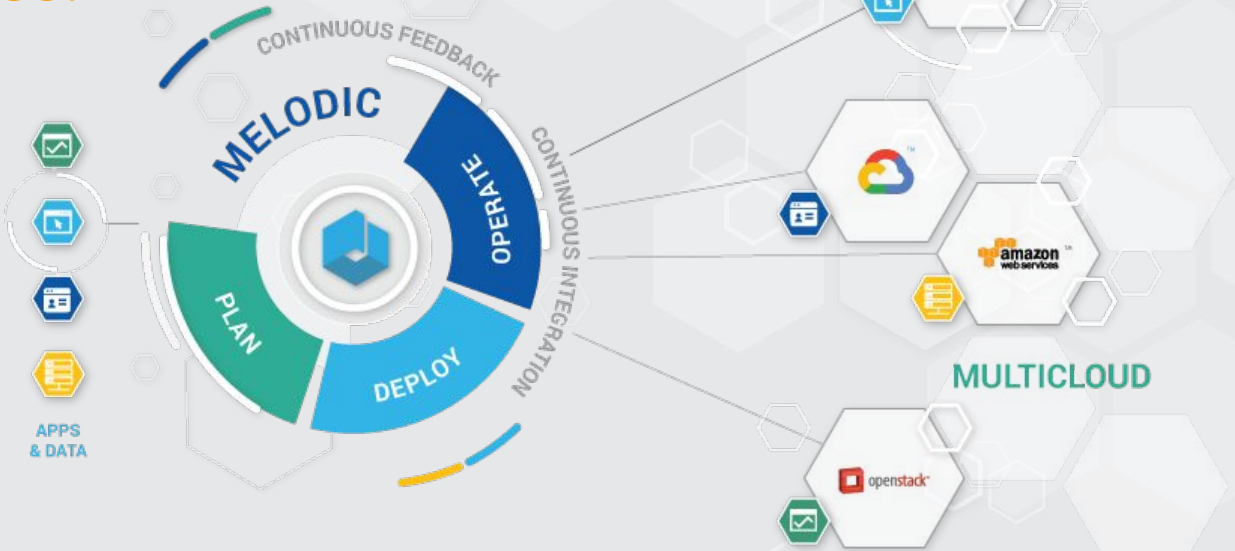
MORPHEMIC

A single universal platform for optimized deployment and management of applications in the cloud.

Including serverless.



Actually Cross-Cloud
and Open Source

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No. 731664.

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.

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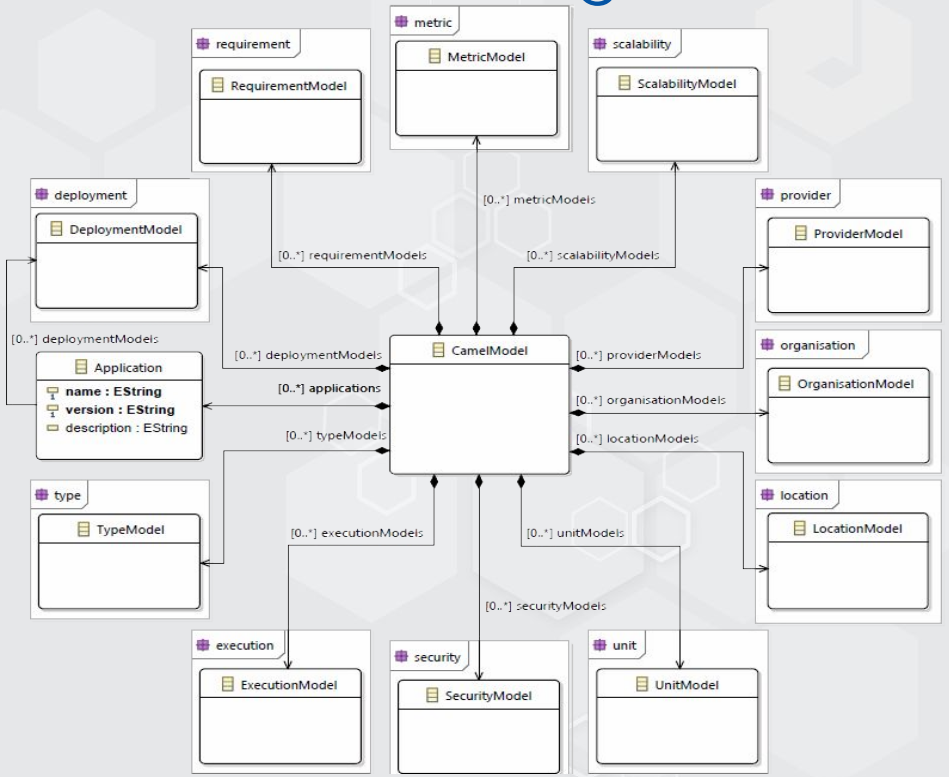
CAMEL– Cloud Application Modelling and Execution Language

- Cloud agnostic **language**, similar to TOSCA
- Application modelling: components, connections, security, etc.
- Infrastructure requirement modelling
- User requirements, constraints, and utility



Unified way of describing application and infrastructure in the Cloud

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Melodic - what is the best deployment?

Melodic offers to:

- Metric collection of the running application
- Flexible way to calculate utility for particular application
- Focus on business value of the application
- Optimize the trade-off of cost, performance, availability etc.

Melodic is your smart, autonomic DevOps

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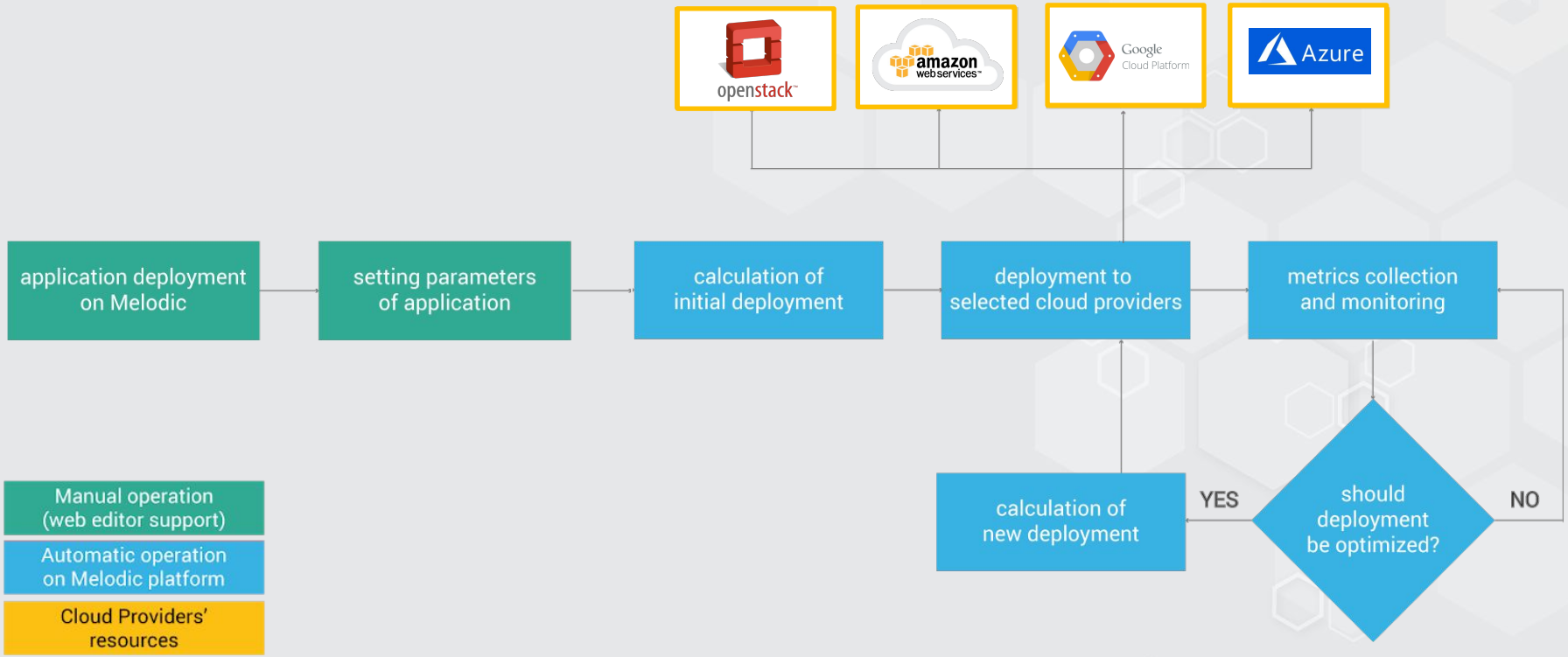
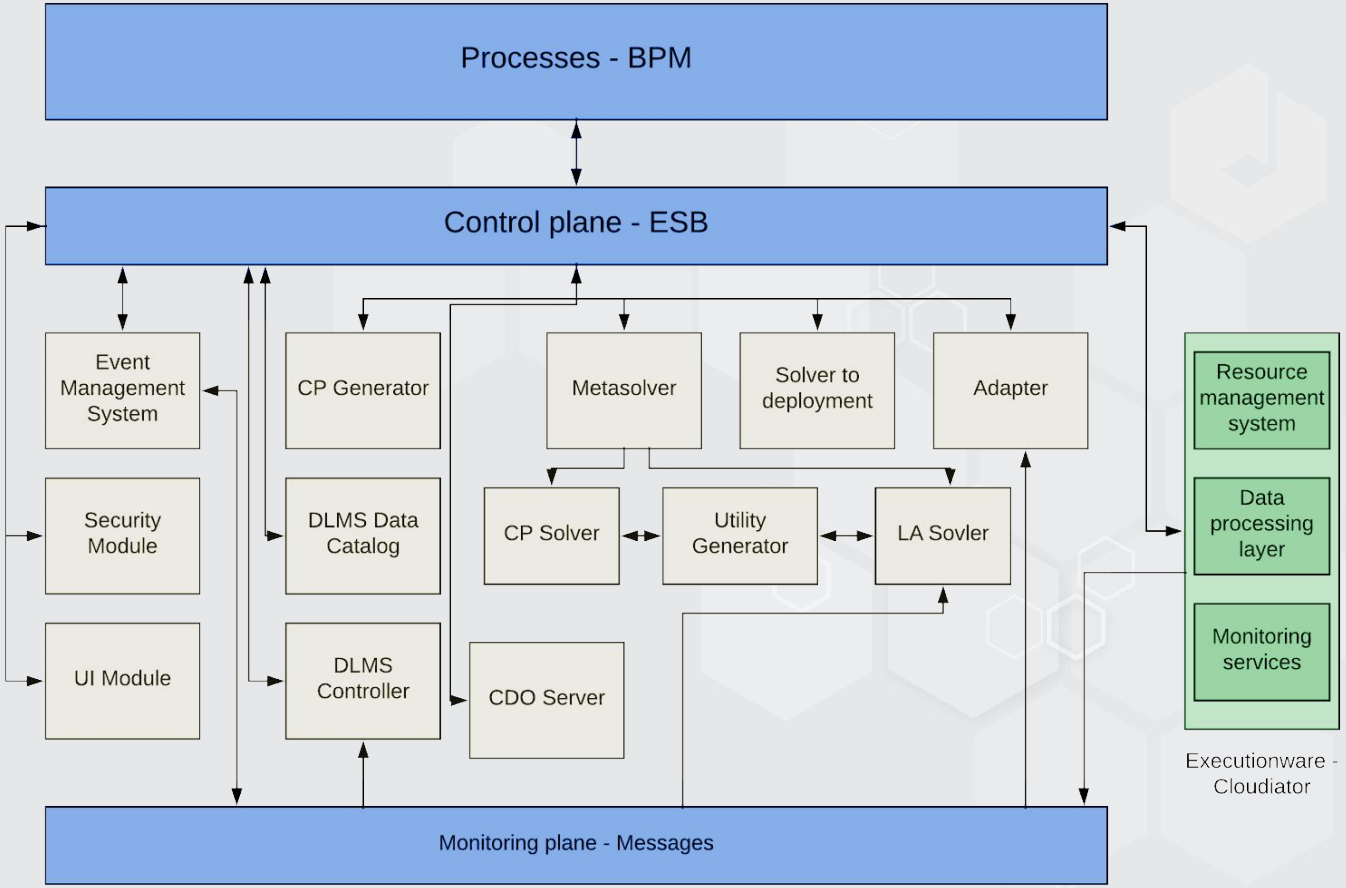
Melodic - optimization and automation



MELODIC architecture



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Core Concept #1: Polymorph Architecture

- Objective: Maximize the utility of the application by adapting the technical forms of its components

- Considered technical forms
  - Virtual machines
  - Containers
  - Serverless components
  - Big data jobs

- Application utility
  - Constructed with requirements in CAMEL specification
  - Evaluated with operation metric and technical form properties

Core Concept #2: Proactive Adaptation

- Objective: Forecast execution context to anticipate deployment

- Execution context prediction
  - Predict resources needs
  - Identify deployment configurations

- Deployment anticipation
  - Conduct effective adaption of the application
  - Provide seamless experience for end-user

Proactive Adaptation - how it works

1. Initial deployment of the application.
2. Metrics collection from running application.
3. Forecasting of future metric values.
4. Optimization of the resources based on forecasting values of the metrics.
5. Finding the optimal deployment plan.
6. Reconfiguration of the application.

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AI Investments - training predictions models

Business GOAL:

Train 50 predictions models in 1 hour using minimal number of resources

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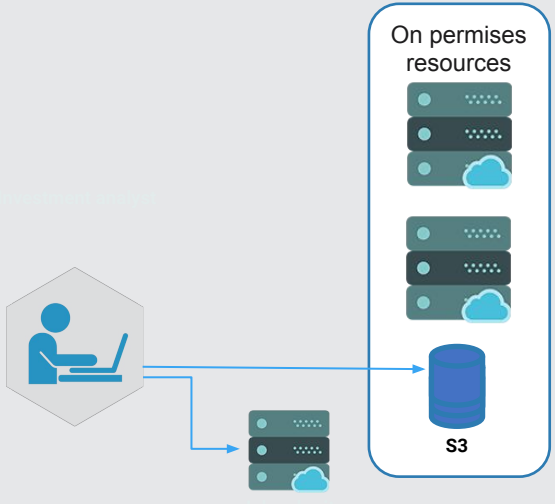
AI Investments - training predictions models



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AI Investments - training predictions models

Time to finish Processing: **3h**

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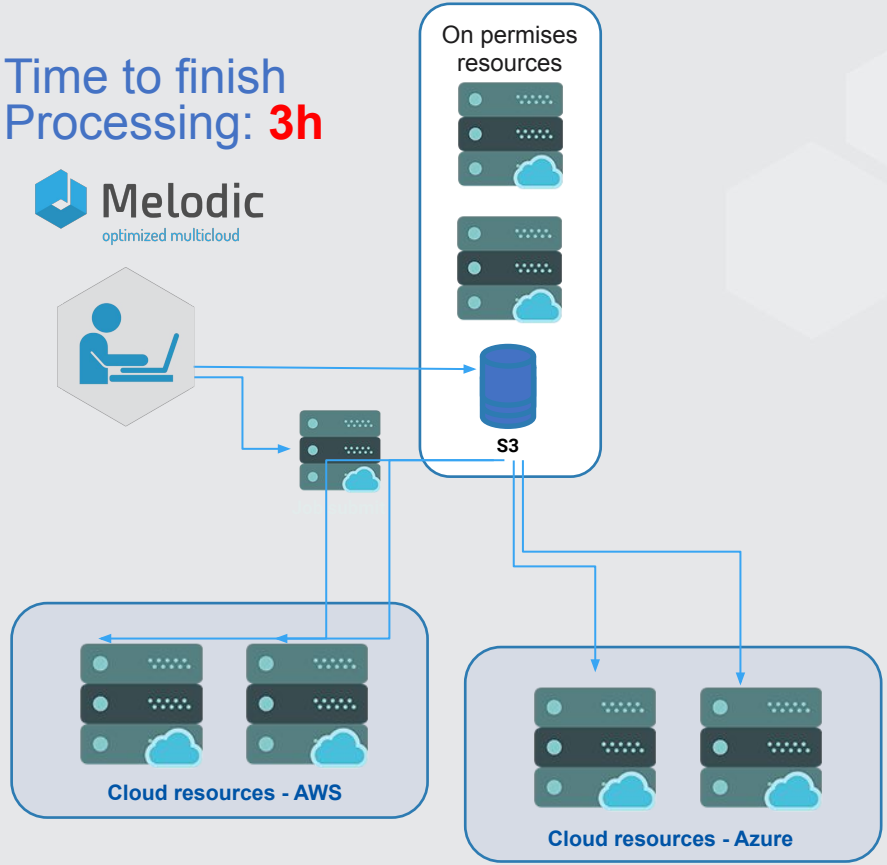

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AI Investments - training predictions models

Time to finish Processing: 1h

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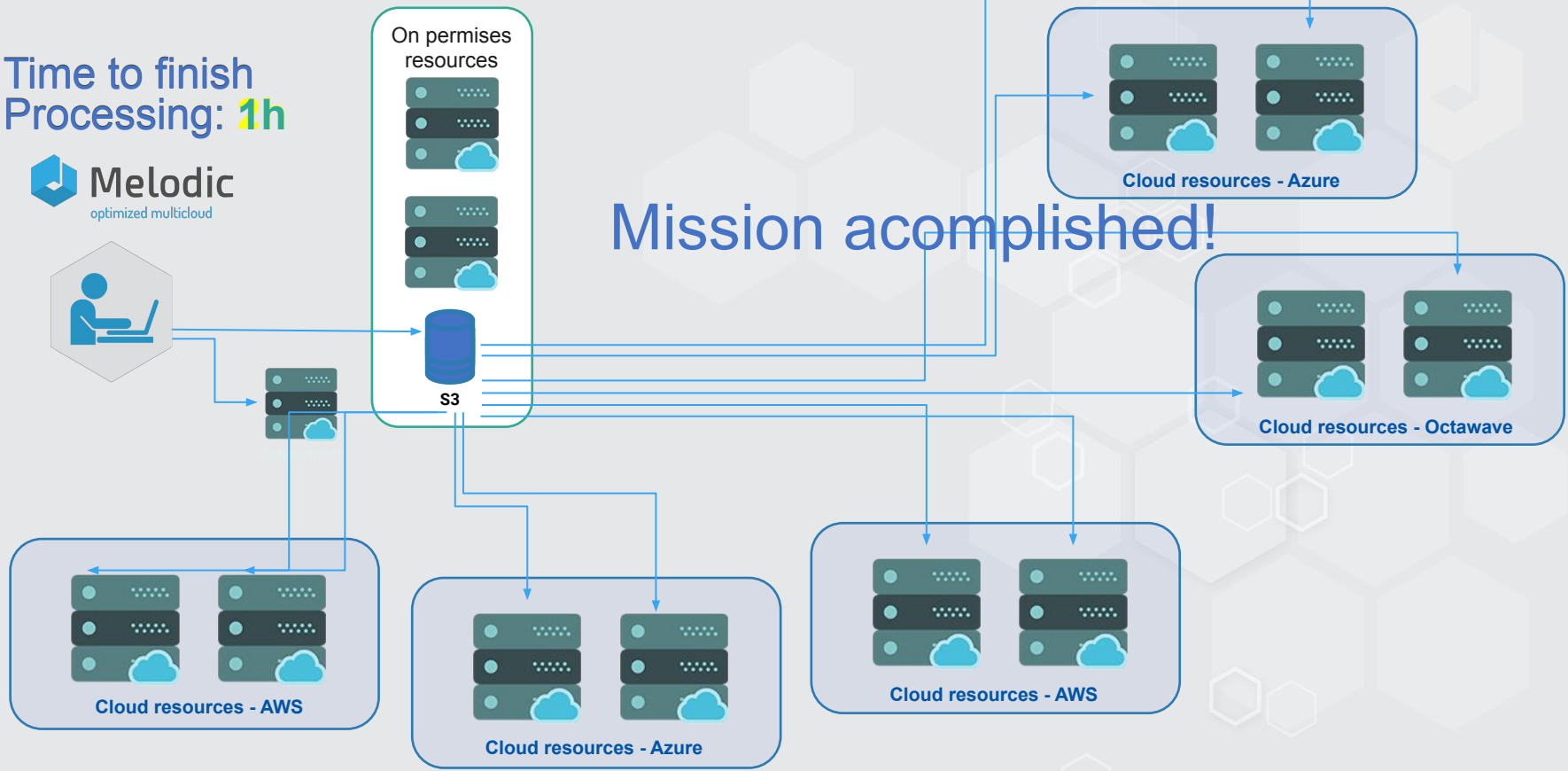

Mission acomplished!

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Benefits

- Effective optimization of resource consumption
- Well-chosen scaling of machine learning training
- Optimizing the work efficiency of the application relative to the budget planned
- Increased reliability of the application (HA)

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AI Investments - Cost savings due to multicloud approach

Over 60% of cost savings thanks to multicloud optimization!

On-premises*				Cloud base**			Cloud burst***			Total cost M	Total cost 3Y
Servers	GPUs	GPU time	cost	GPUs	GPU time	cost	GPUs	GPU time	cost		
1	2	1 440	$181	8	5 760	$5 599	40	1 133	$1 101	$6 880	$247 695
2	4	2 880	$361	6	4 320	$4 199	40	1 133	$1 101	$5 661	$203 807
3	6	4 320	$542	4	2 880	$2 799	40	1 133	$1 101	$4 442	$159 918
4	8	5 760	$722	2	1 440	$1 400	40	1 133	$1 101	$3 223	$116 030
5	**10**	**7 200**	**$903**	**0**	**0**	**$0**	**40**	**1 133**	**$1 101**	**$2 004**	**$72 141**
6	12	8 640	$1 083	0	0	$0	38	1 076	$1 046	$2 129	$76 659
7	14	10 080	$1 264	0	0	$0	36	1 020	$991	$2 255	$81 177
8	16	11 520	$1 444	0	0	$0	34	963	$936	$2 380	$85 695
9	18	12 960	$1 625	0	0	$0	32	906	$881	$2 506	$90 213
10	20	14 400	$1 806	0	0	$0	30	850	$826	$2 631	$94 731
25	50	36 000	$4 514	0	0	$0	0	0	$0	$4 514	$162 500

- Cost of optimal deployment: **72 141** USD
- Difference between the optimal and the most costly deployment: **175 554** USD

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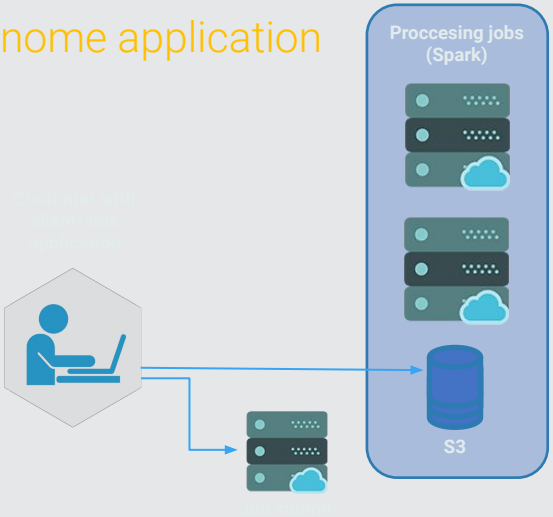
Genome application



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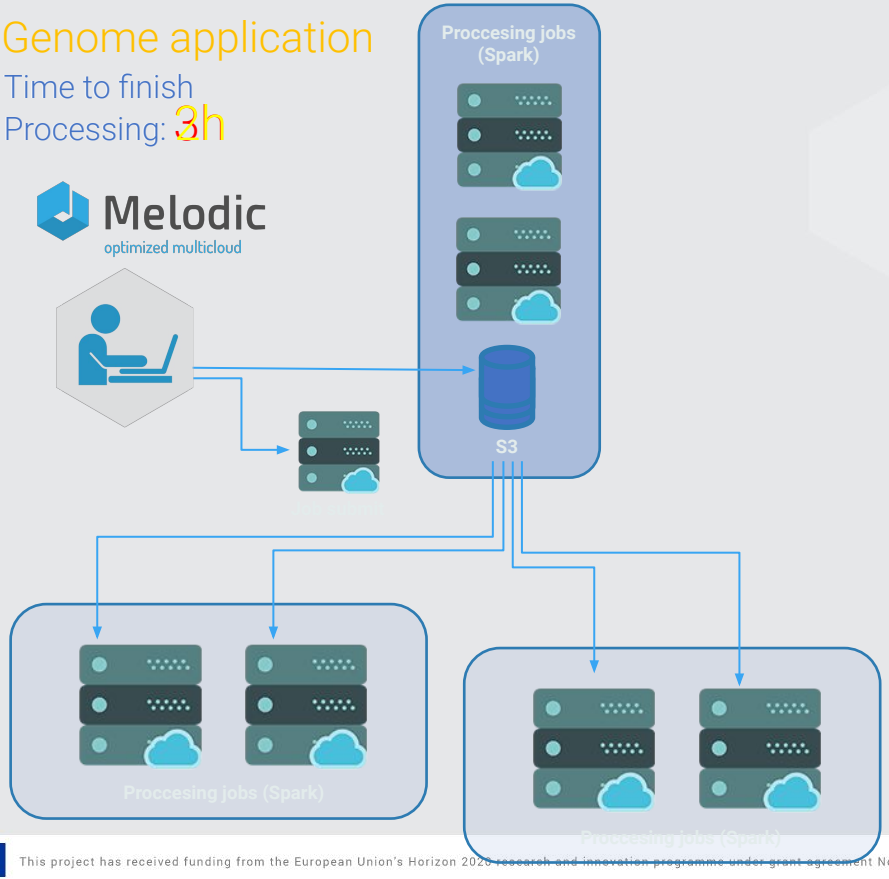
Genome application

Time to finish
Processing: 3h



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Genome application

Time to finish Processing: 55min

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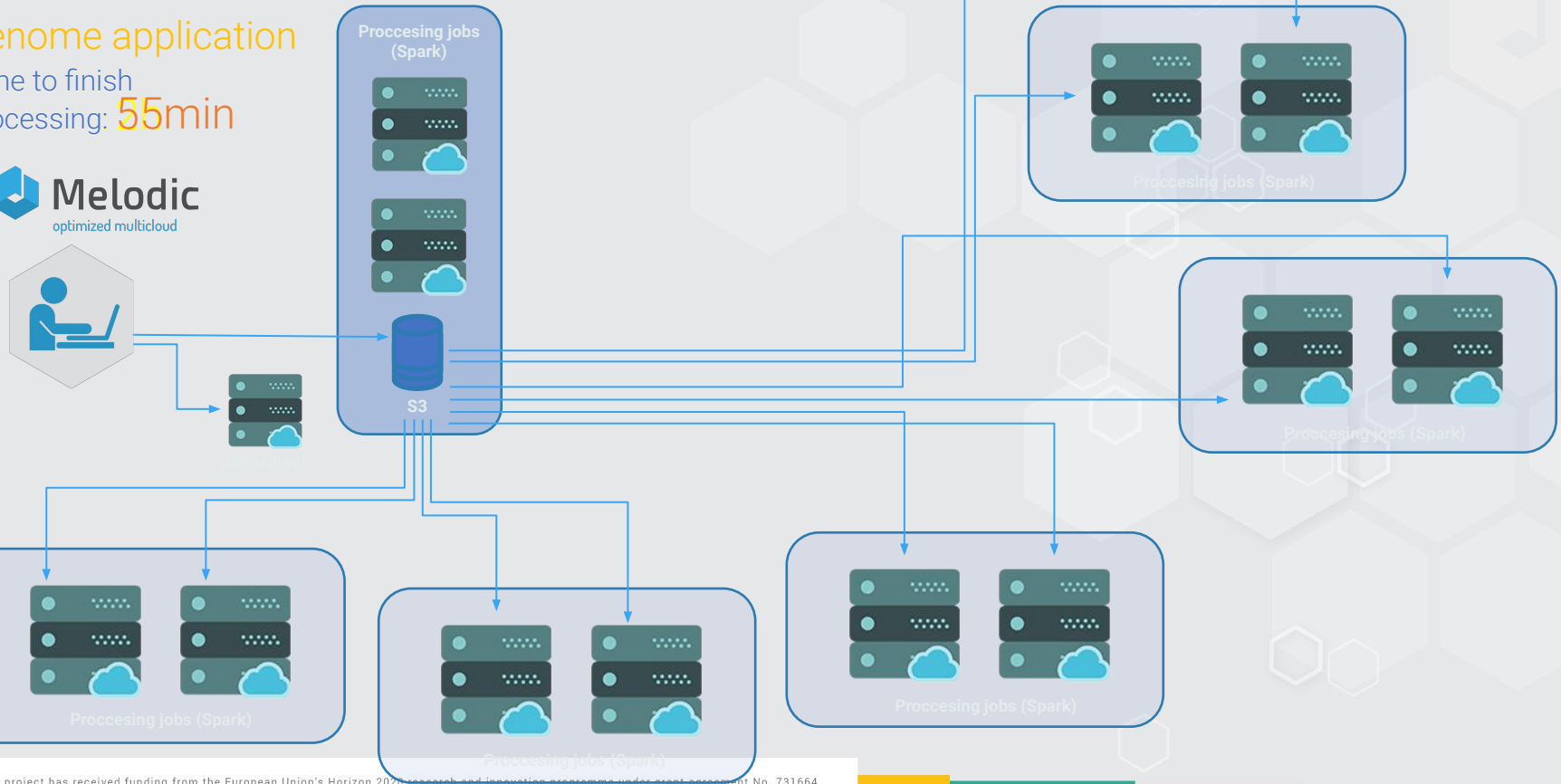

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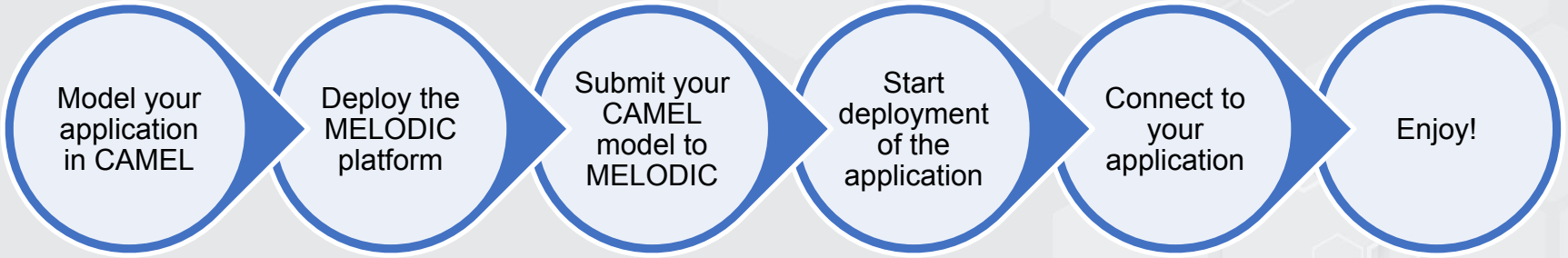
Workflow



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LIVE PRESENTATION

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Download Melodic at

http://www.melodic.cloud/download/
released under MPL 2.0

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Thank you!

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