



Melodic
optimized multicloud



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Autonomous Multi-Cloud serverless deployment and optimized management

AZURE MEETUP OSLO



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

Including serverless.



**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.



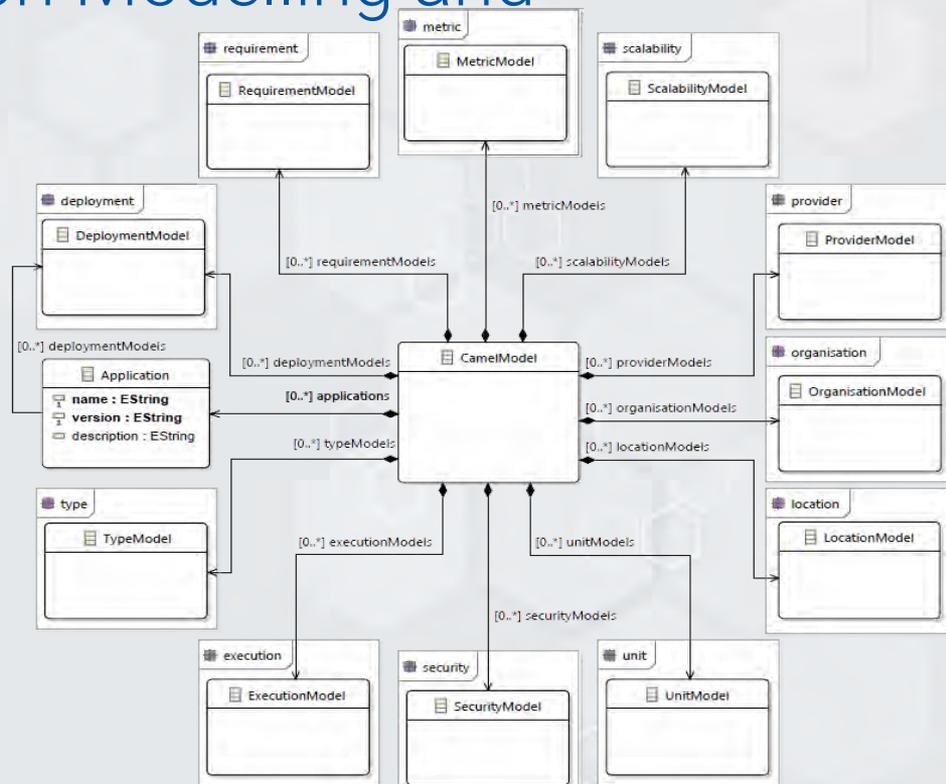
Google
Cloud Platform





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



Melodic - what is the best deployment?

Melodic offers to:

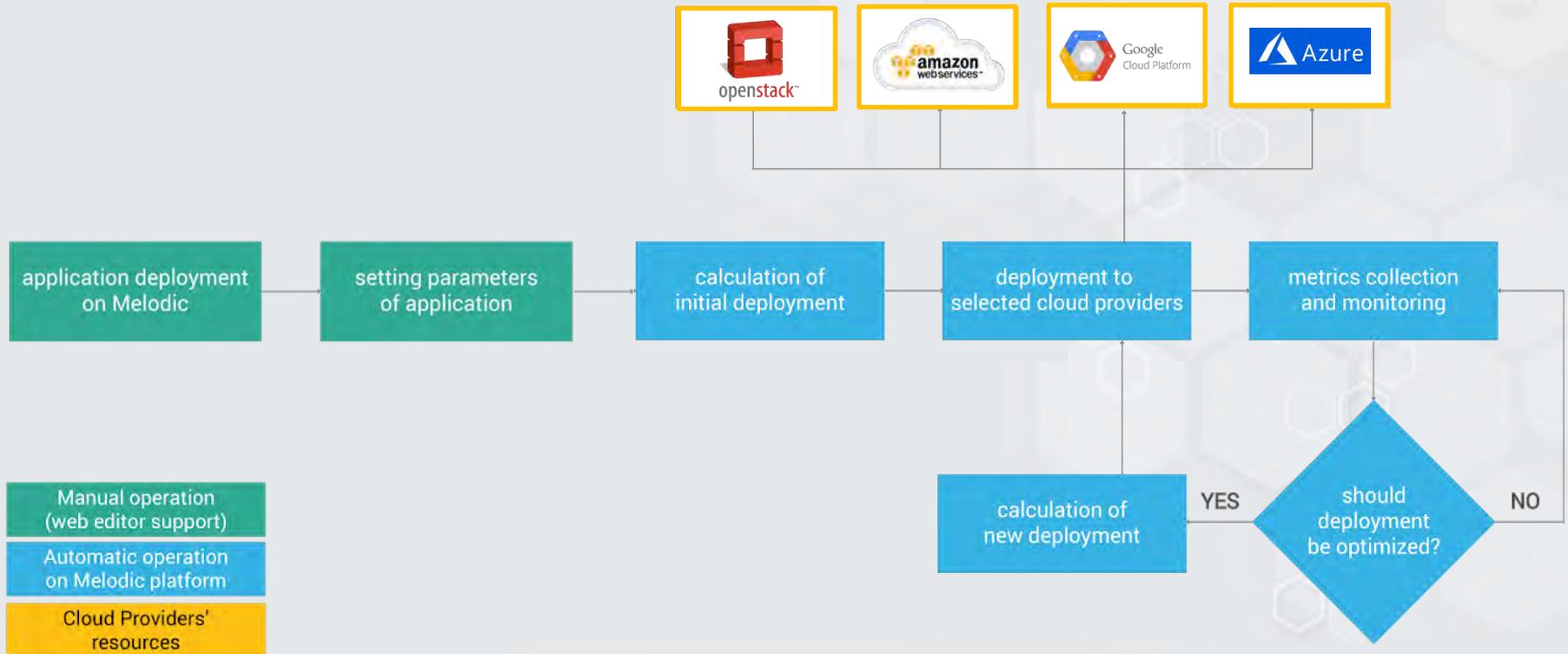
- **Metric collection** of the running application
- Flexible way to calculate **utility** for particular application
- Focus on **business value** of the application
- **Optimize the trade-off** of cost, performance, availability etc.

Melodic is your smart, autonomic DevOps

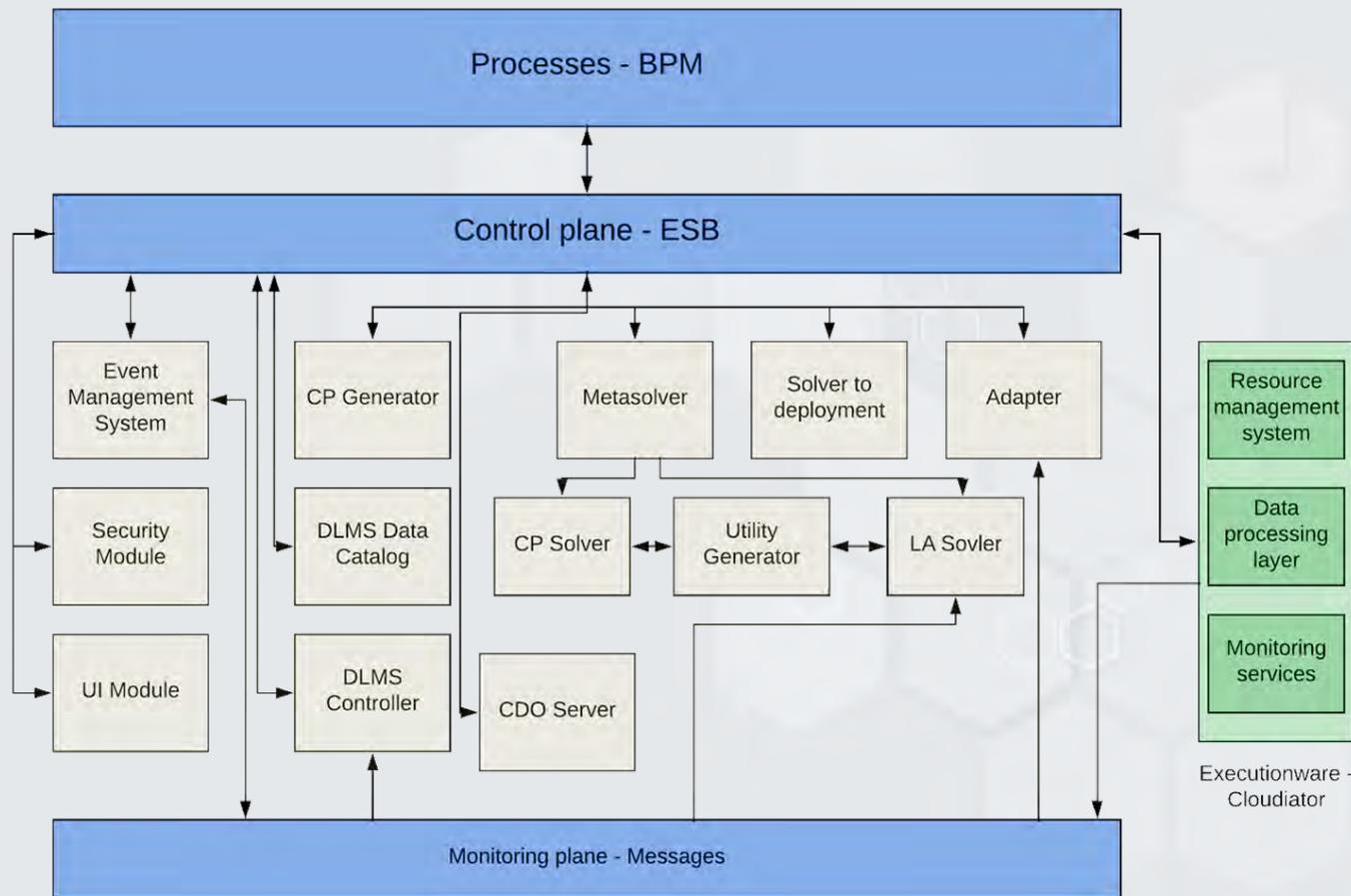




Melodic - optimization and automation



MELODIC architecture





MORPHEMIC

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



MORPHEIC

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



MORPHEMIC

Proactive Adaptation - how it works

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

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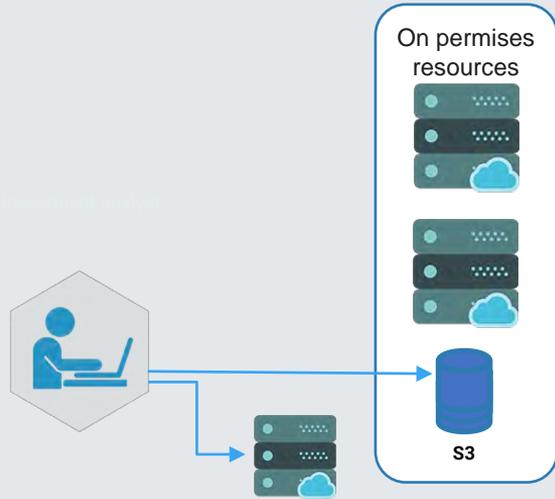
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AI Investments - training predictions models

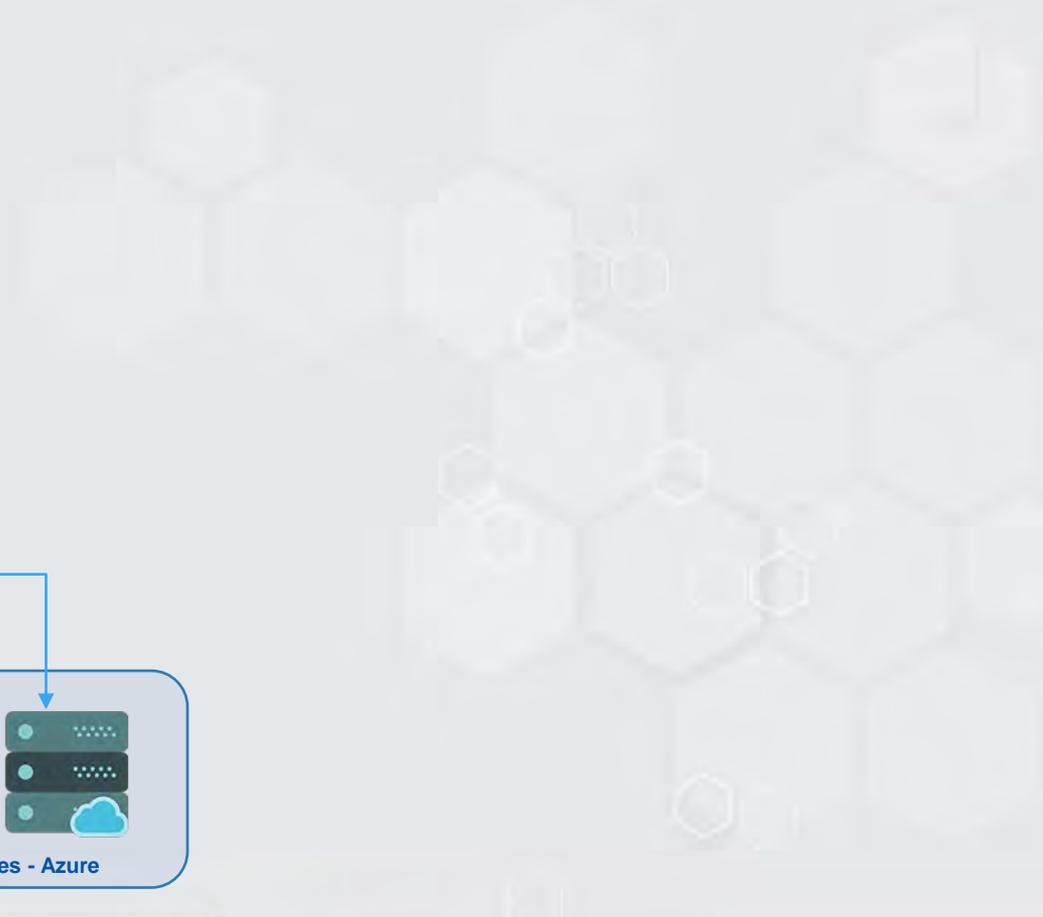
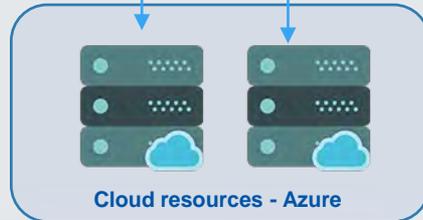
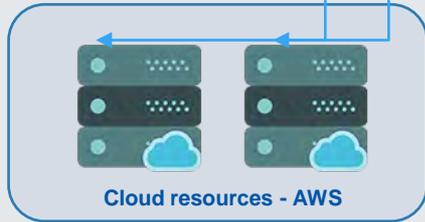
Business GOAL:

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





Time to finish
Processing: **3h**

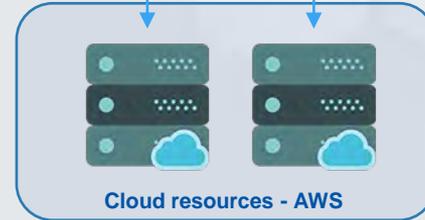
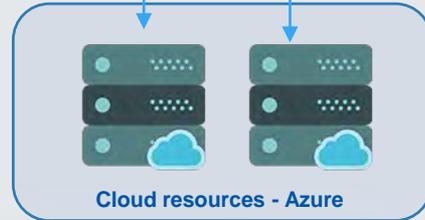
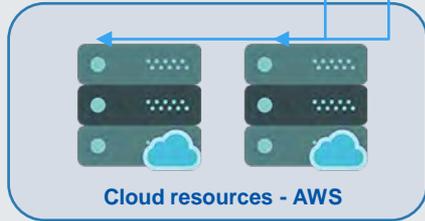
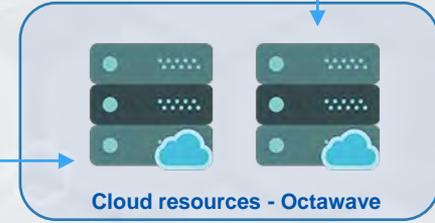
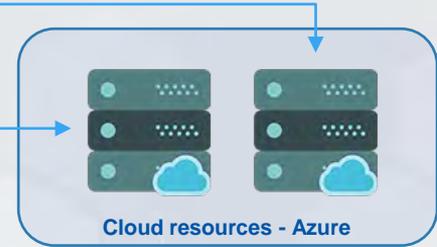




Time to finish
Processing: **1h**



Mission accomplished!





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)**



AI Investments - Cost savings due to multicloud approach

Over 60% of cost savings thanks to multicloud optimization!

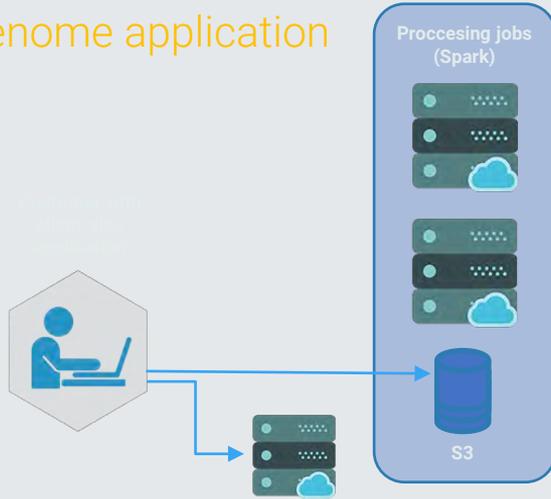
| On-premises* | | | | Cloud base** | | | Cloud burst*** | | | Total cost M | Total cost 3Y |
|--------------|-----------|--------------|--------------|--------------|----------|------------|----------------|--------------|----------------|----------------|-----------------|
| Servers | GPUs | GPU time | 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**



Genome application

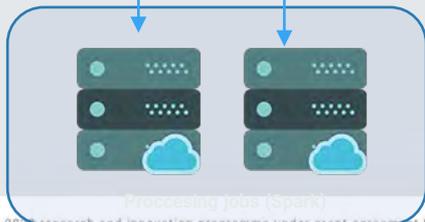
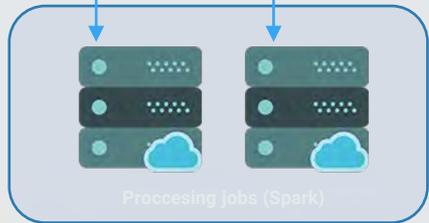
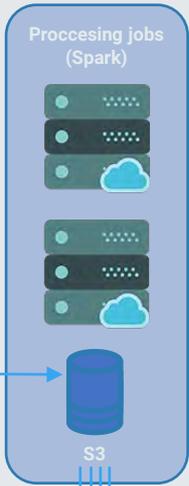




Genome application

Time to finish

Processing: 3h

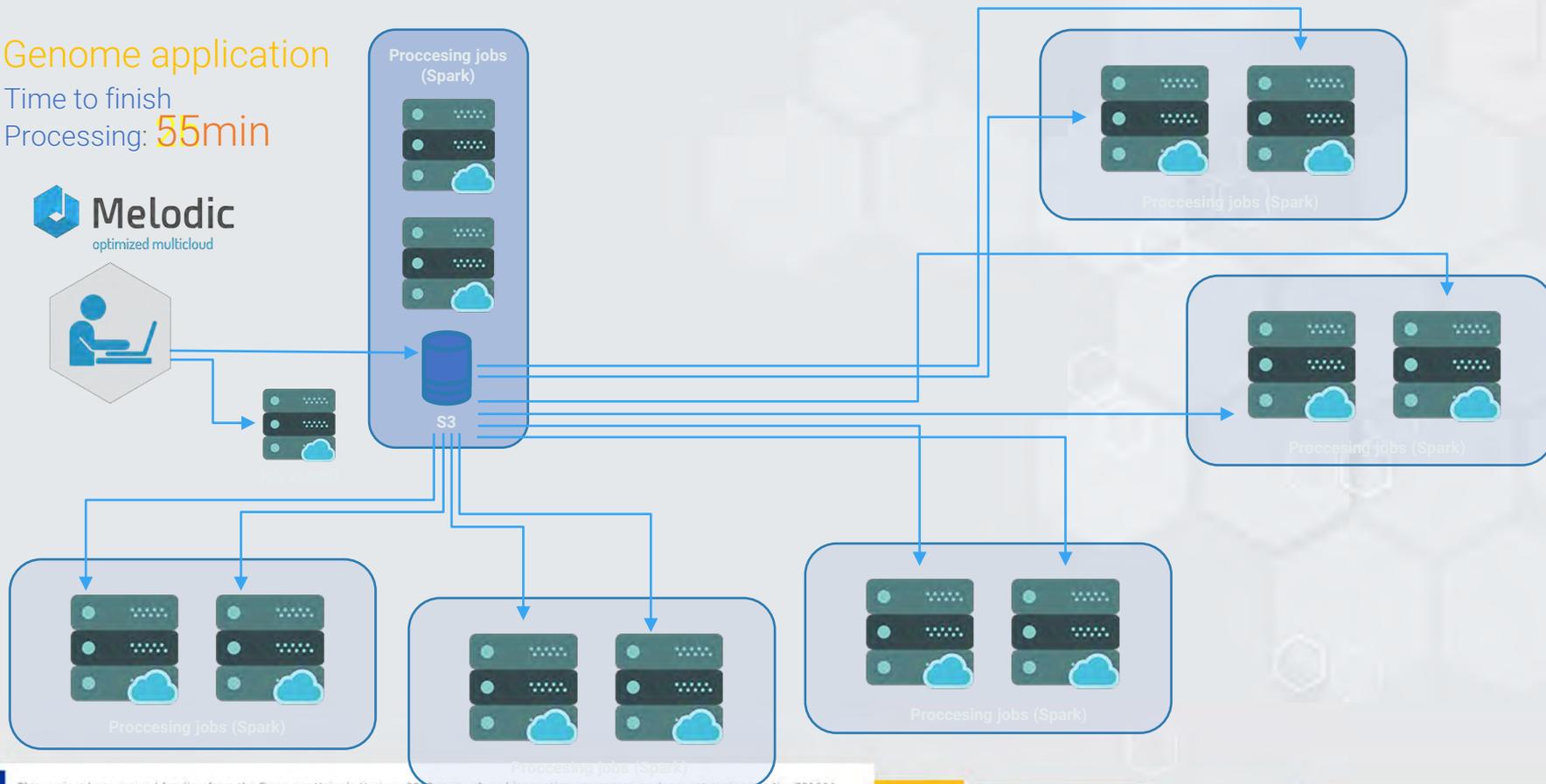




Genome application

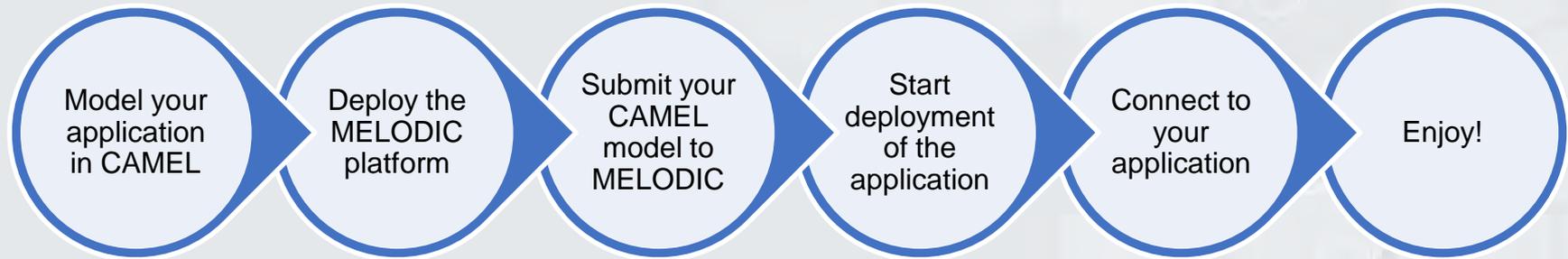
Time to finish

Processing: **55min**





Workflow





LIVE PRESENTATION





Download Melodic at

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



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Thank you!



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