



Forum **TERATEC** 24

Unlock the future

The Hybrid challenge

Migrating HPC workloads to Cloud environments

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UCIT

UCit at a glance

A team of 15 Founded in March 2015
Headquartered in Montpellier (France)

Proud member of the European HPC Ecosystem

We look at workloads and advise where they fit

AWS Consulting Partner & NICE experts
Cofounder of the Do IT Now alliance

GET HYBRID SMART



WorkCloud



WorkCarb

UCit



OKA Suite

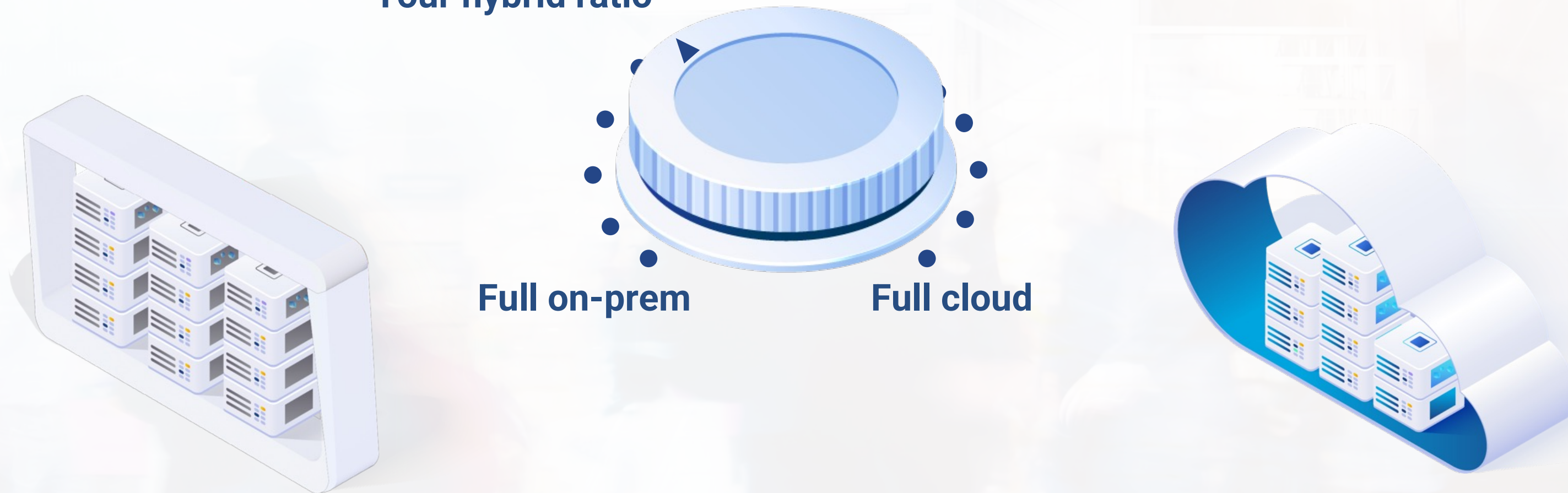


CCME

BE EFFICIENT

Get ready to be hybrid

Your hybrid ratio



Prepare to incorporate additional/external resources
Turn-on the knob step by step
For each platform its own workload



Fairbrics performs its **climate change mission** by developing circular manufacturing processes that use **renewable resources instead of oil-based products**. Their first product is a technology that **converts CO2 into Polyester yarns** for fashion brands that wants to reduce their carbon footprint.

CFD Simulations (OpenFoam) are used to study flow inside electrolyzers to propose alternative parts able to enhance process performance.

Challenge

- Running on a simple **8 cores workstation**
- **Small simulations** (1.4 Millions meshes): **1 day of computation**
- **Complex simulations** (> 100 Millions meshes): **cannot be run**

Solution

- First step: fully functional HPC Cluster in Stockholm (hpc6a): **25 simple simulations < 1day**
- Second step: rapid duplication in Ireland, use ARM-based instances (hpc7g) for **price/perf optimization to run complex simulation**

Result

The most **complex case scale linearly to more than 1024 Graviton cores** and deliver **results in less than 4 days** shortening the whole process development cycle.

“Using the CCME tool on AWS, we can deploy HPC resources in a few minutes. With AWS Graviton technology and the price/performance they deliver we can shorten our simulation time-to-result from months to a few days while increasing accuracy.”

Gregory Pujals, R&D Fluid Mechanics Engineer, Fairbrics



CAC40 industry

Challenge

- **Transform multiple local HPC clusters addressing similar needs into state of the art and shared platform**
 - Share methods and tools
 - Speedup innovation
- **Compliant with all sensitivity levels**
- **Improve agility**
- **Reducing global costs at Group level (growing demand)**

Solution

- **Mutualized hybrid and flexible HPC platform** distributed on 3 locations, based on the **sensitivity of simulations/codes/data**
 - *On-premises* for highly sensitive workloads
 - *Shared clusters with research partners* for large workloads and collaboration
 - *Cloud* for agility – AWS
 - **Fully automated deployment of HPC platforms** in 4 AWS accounts (DEV/INT/PPD/PRD)
 - DevOps process with infra as code (Terraform, CloudFormation, Gitlab pipelines)
 - Managed HPC cluster to AWS with CCME, along with virtual workstations (Linux & Windows)
 - Highly constrained environment (security/rules/policies/processes)

Result

- **Better capacity availability** for sensitive simulations which require on-premises environments
- **Decreased overall costs** with simplified management
- **Higher flexibility** matching engineering demand



Migrating workloads – focus points

Standard / "easy"

- Workloads identification (incl. users, licenses...)
- Target Cloud Provider
- Data identification (type, volumes, transfers...)
- Price/performance

Driving more complexity

- Identity management
- Security & IS Urbanization
- Data management
- Target platform deployment industrialization requirements (IaC)
- Internal processes

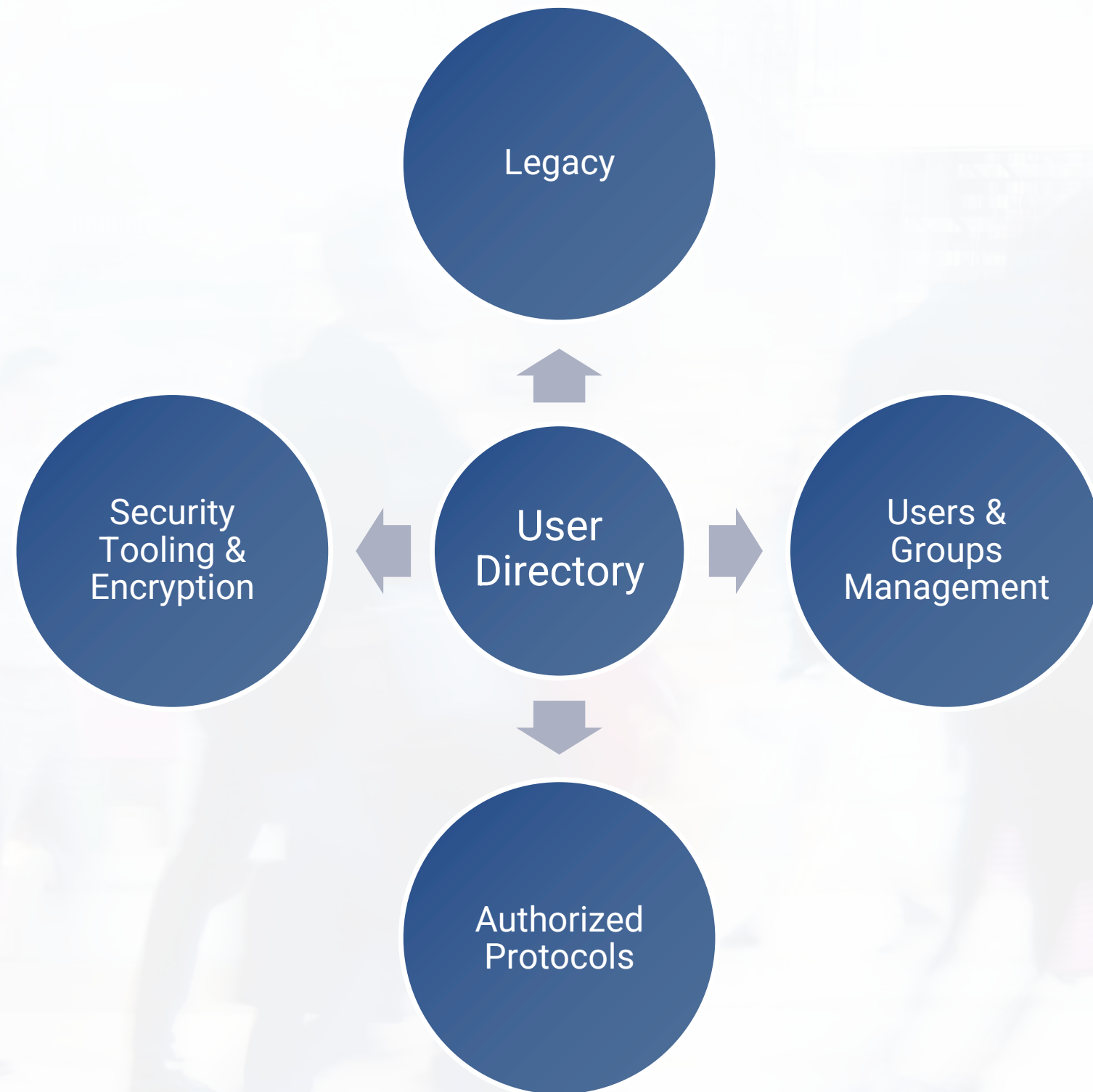


Project team

Unlock the future



Challenge #1 – Authentication



Key Takeaways

- Ensure the selected User directory configuration (legacy or not) fits your needs
- Deal with specific/non-standard authentication components
- Take care about applying to GDPR

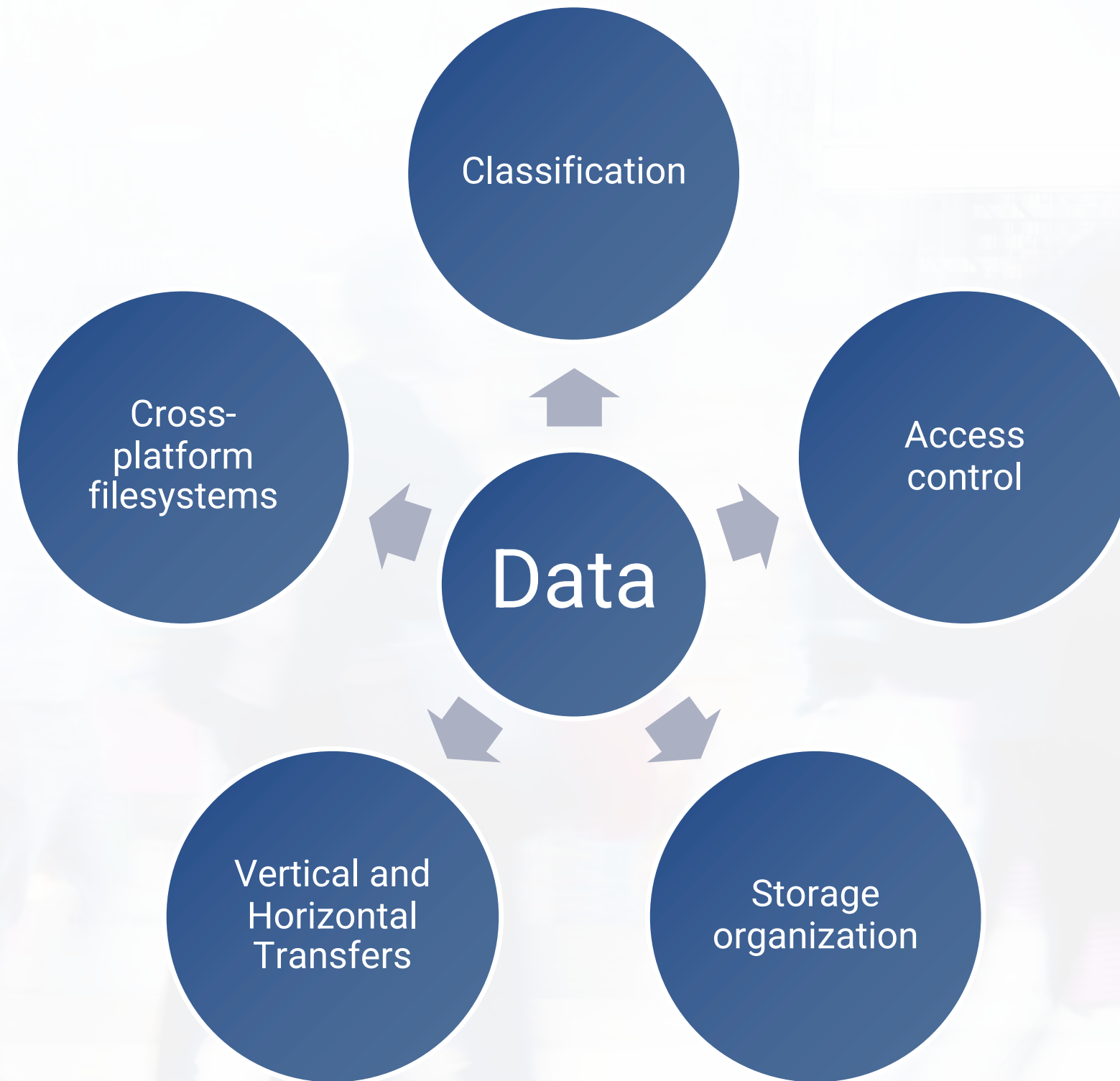
Challenge #2 – Security & IS rules



Key Takeaways

- Take extra care when building up in a moving set of processes
- Understand how to authorize any required network communication (port opening)
- Understand the constraints applying to the creation of custom system images
- Identify any required exception to the Customer's security standards

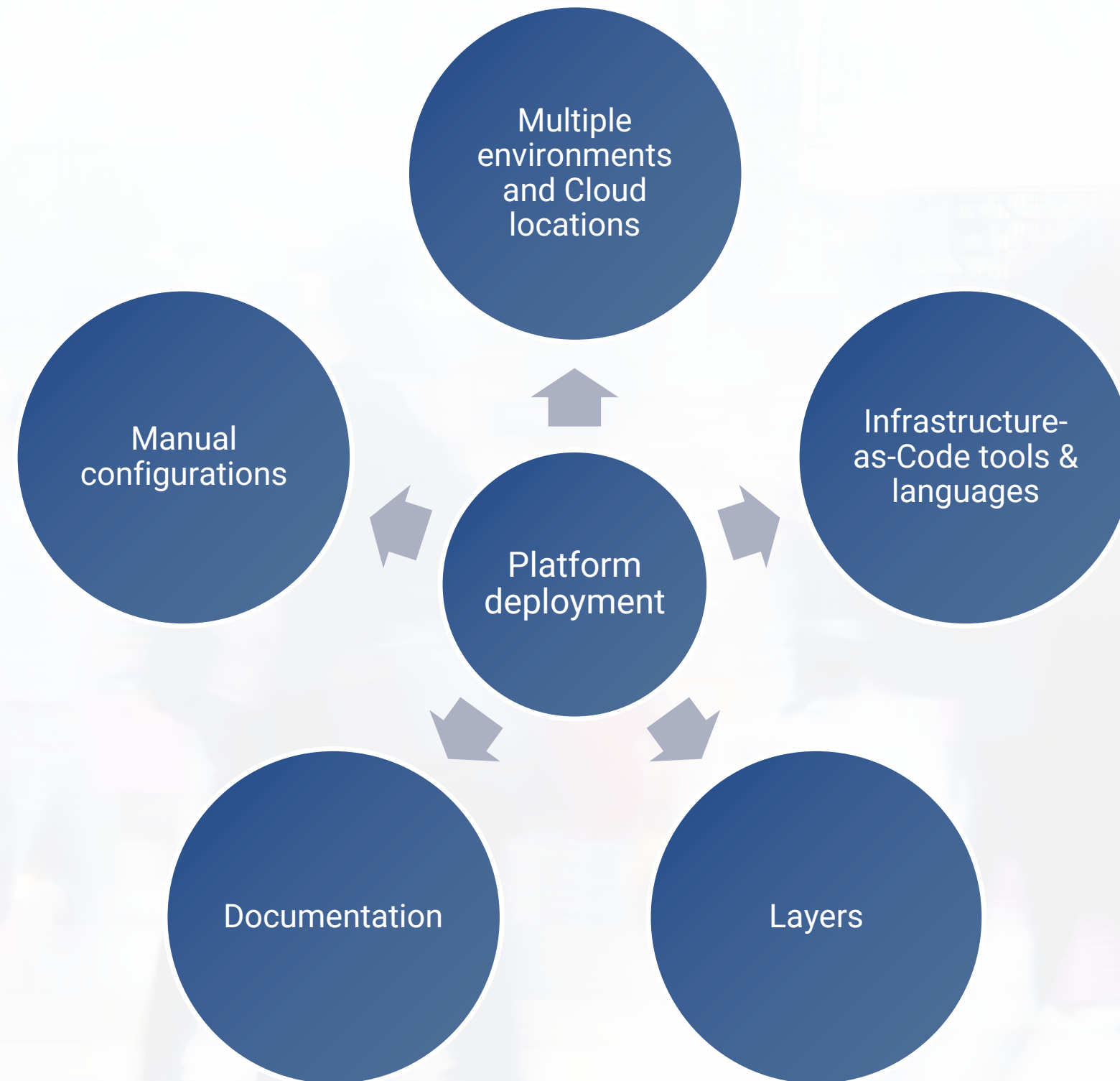
Challenge #3 – Data



Key Takeaways

- Make technical decisions based on data classification constraints
- Identify Users distribution across Company subsidiaries and projects in order to anticipate how to build the appropriate data access control matrix
- Adapt storage technologies to your needs

Challenge #4 – Automation



Key Takeaways

- Define the environments needed to apply to automation development best practices (from DEV to PROD)
- Define the right level of automation
- Document everything you do (automatically?)

Journey to hybrid – Success criteria

- Start small, then grow
 - Project framing
 - Provider/client synergy/trust
 - Teams onboarding (have the appropriate people with the appropriate set of skills/expertise around the table at the right moment)
 - Improve team cloud awareness, to building a CCoE
 - Time & patience...
- Need for methodology & external support
- UCit WorkCloud
 - CSP Migration Programs & tools
 - ISV (point of contact)



Thanks

Come see us on booth #A13

