

enCRUS Grid Middleware Architecture

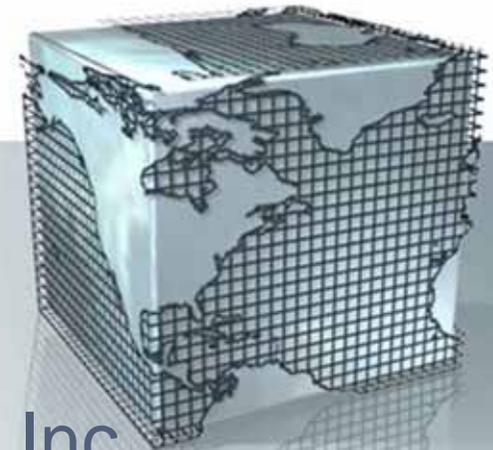


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Agenda

1. Definition of Grid Computing

2. What is enCRUS

3. enCRUS Architecture

4. enCRUS Features

5. Case Study

Definition of Grid Computing

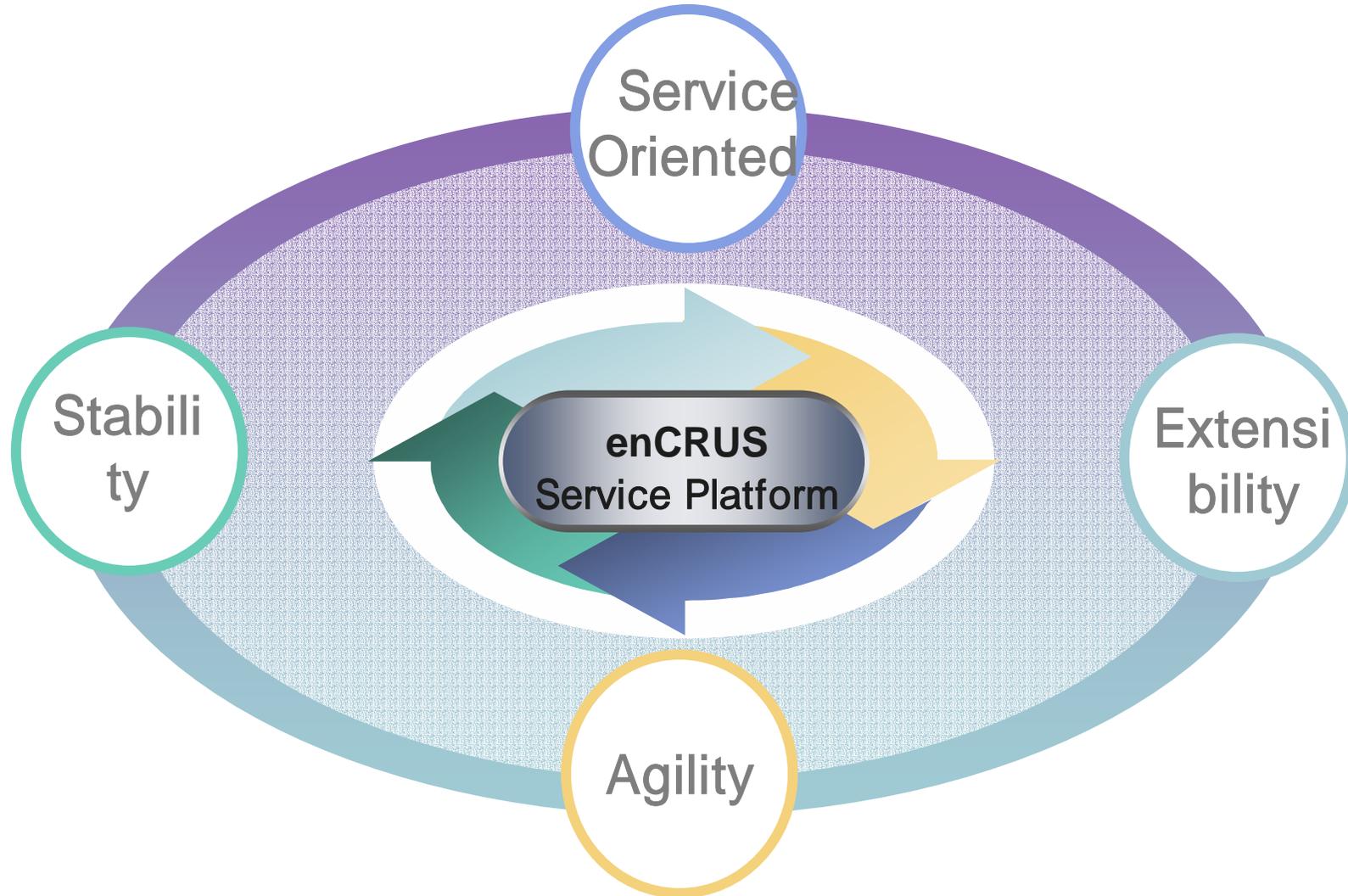
- Infrastructure connecting distributed computers, storage devices, databases and applications
- Dynamic sharing of distributed computing resources
- Managed Virtual Platform

What is enCRUS

- enCRUS 1.0 is rooted on MoreDream KISTI developed
- enCRUS 2.0 is extension to Globus Toolkit 4.0 (GT4)
- Collection of high level grid services on top of GT4
- Support Unix, Linux, Windows
- Targeting computational and transactional grid

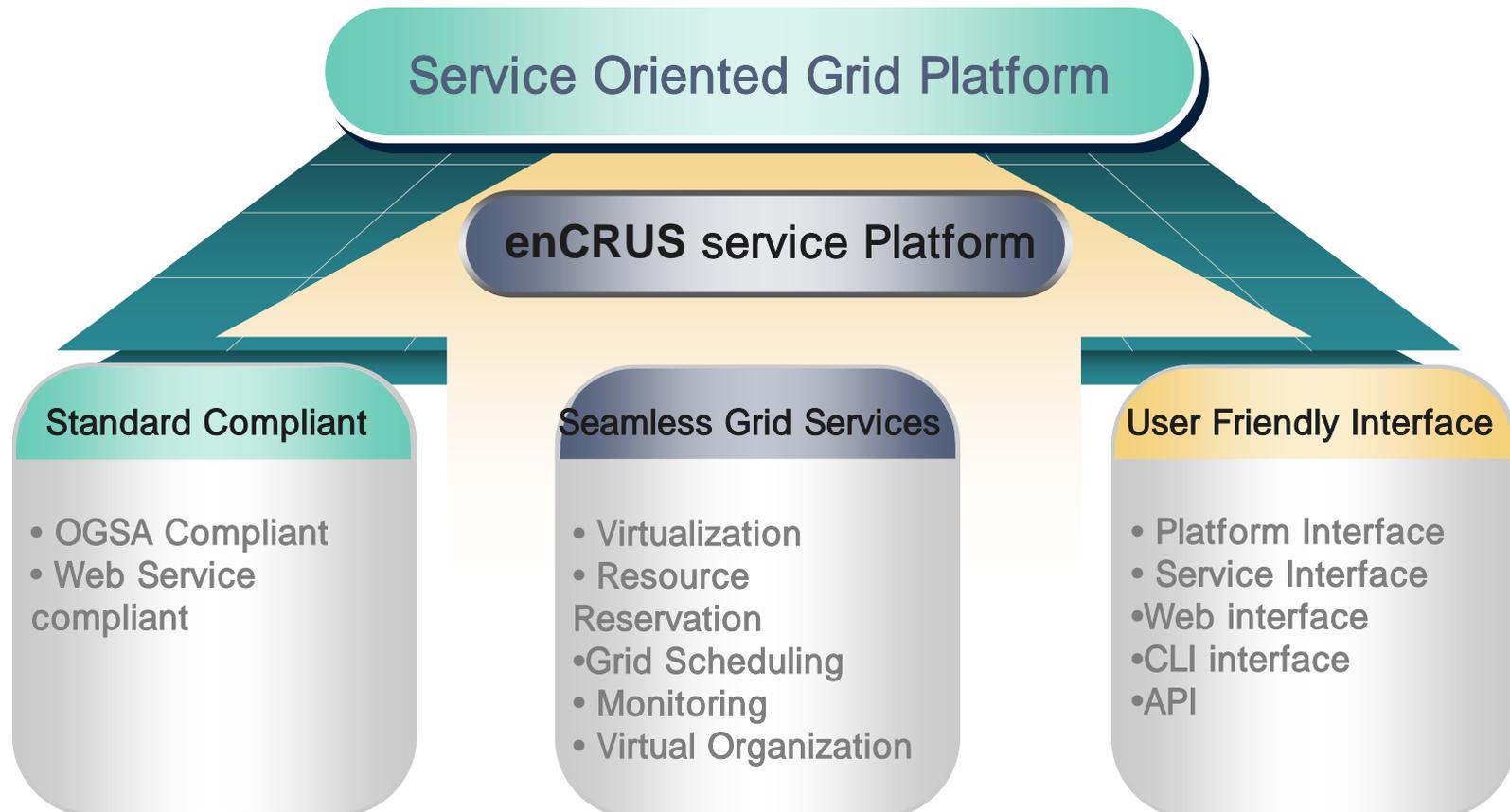
Why enCRUS

□ Service Oriented enCRUS

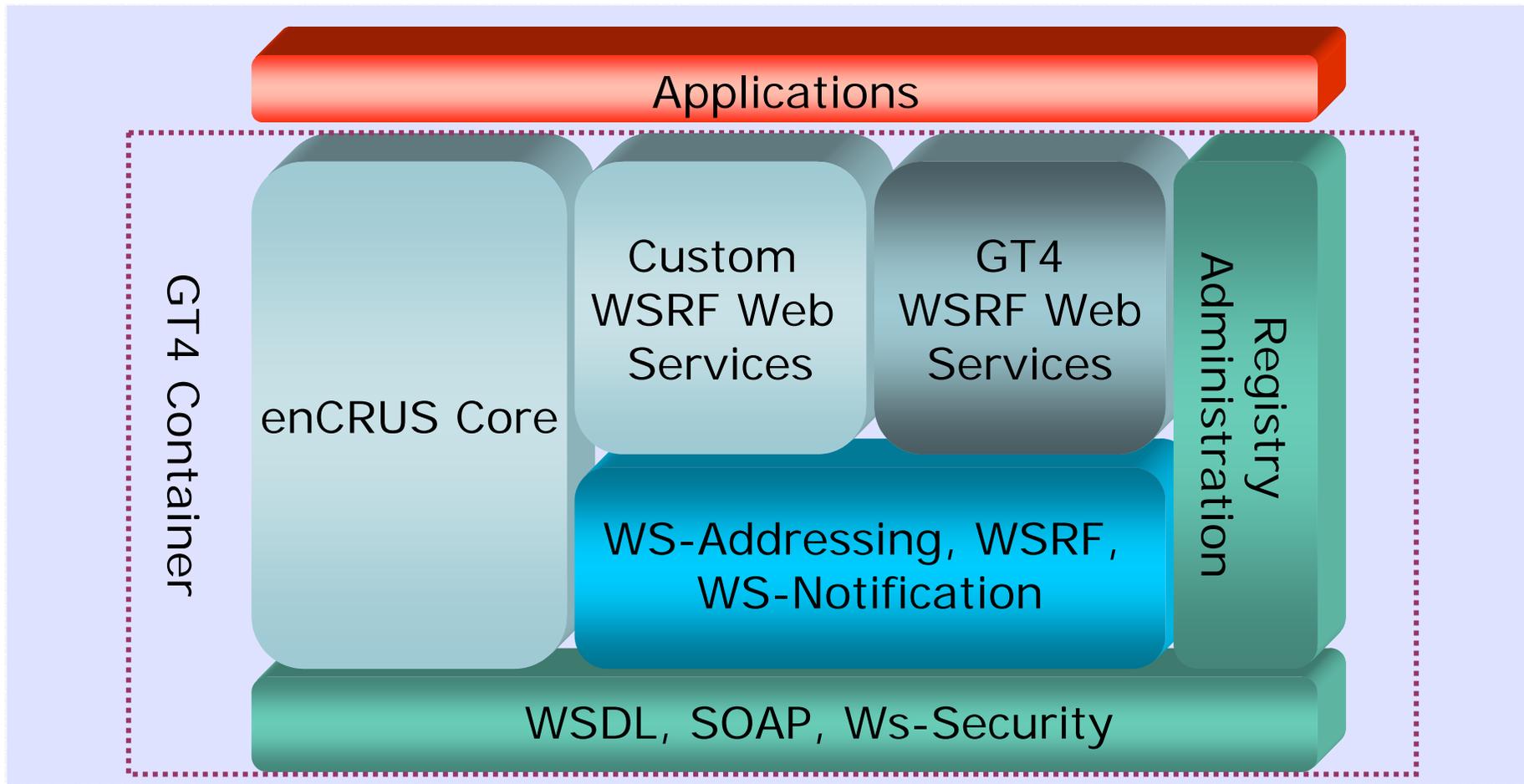


Service Oriented enCRUS

□ Service Platform

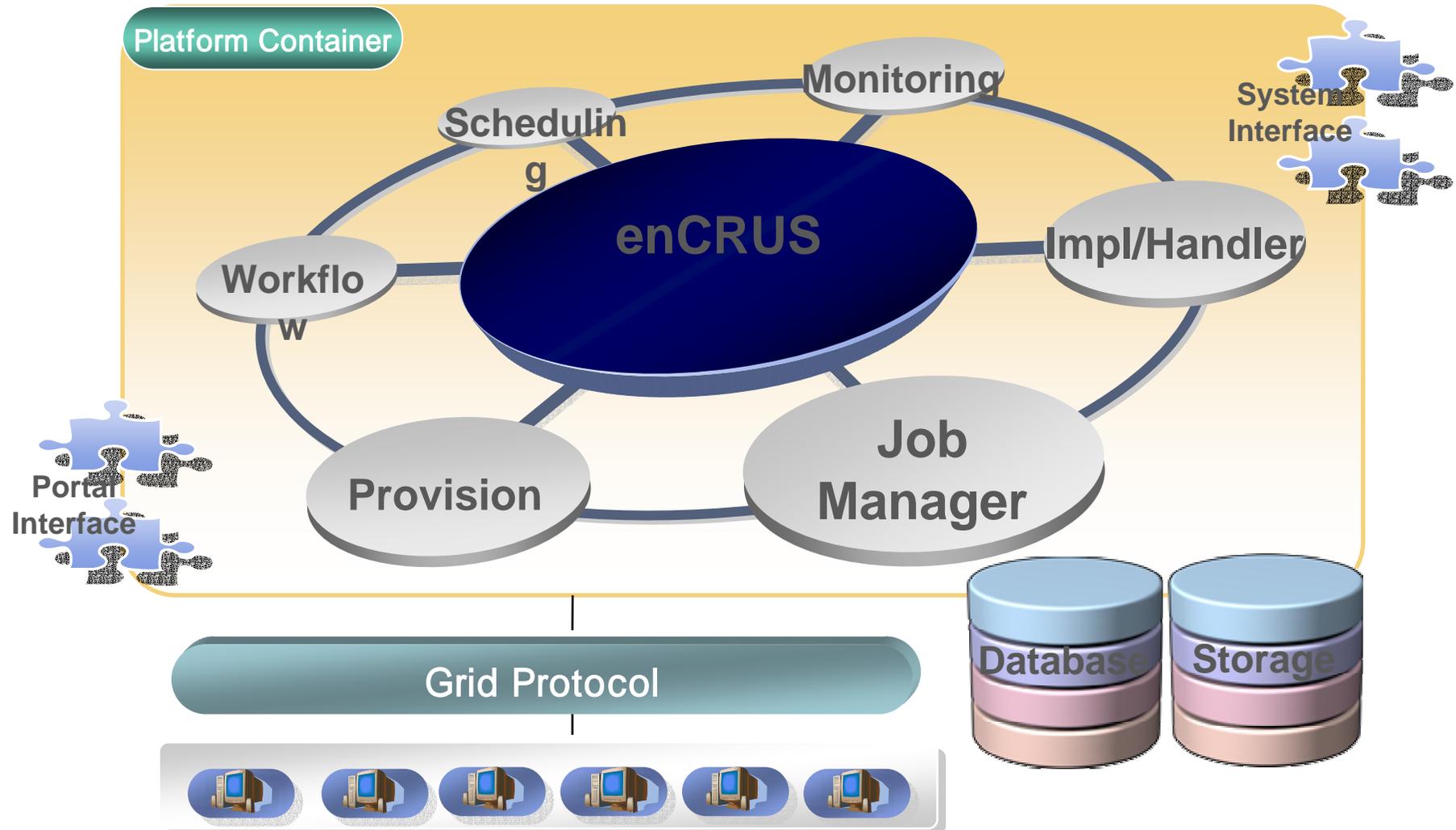


enCRUS & Web Service



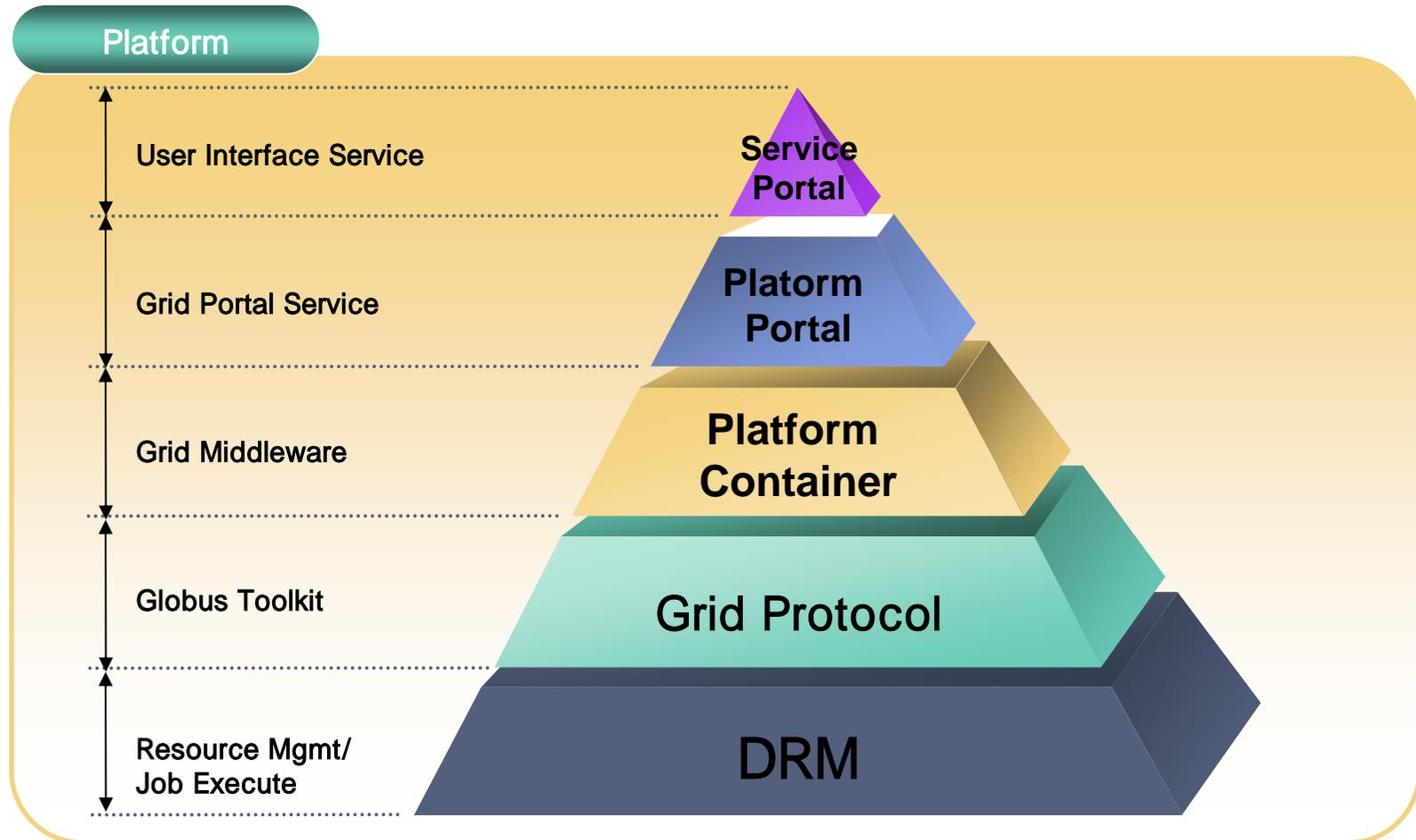
enCRUS Deployment

□ Conceptual enCRUS Deployment



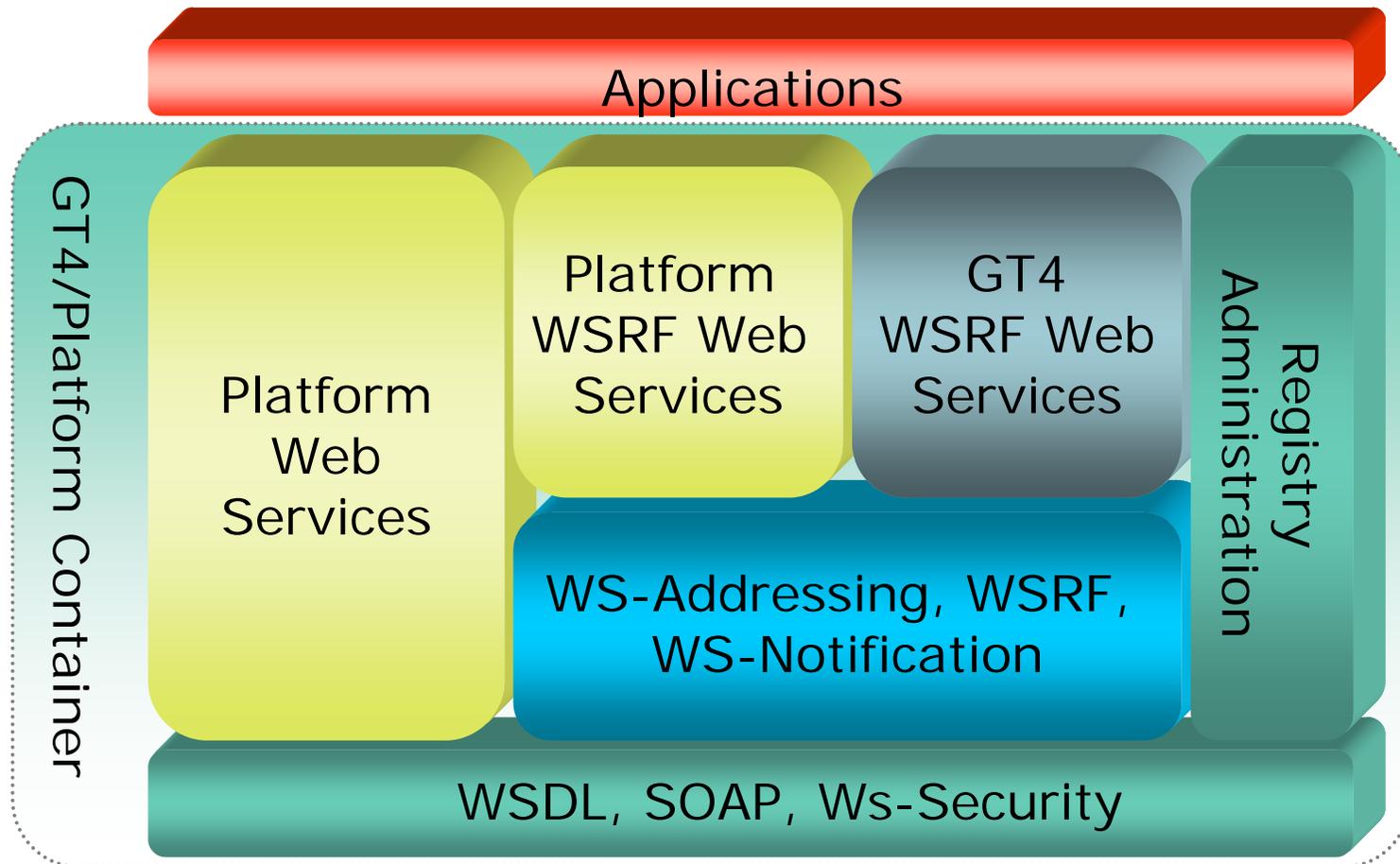
enCRUS Platform Layers

□ Platform Layers



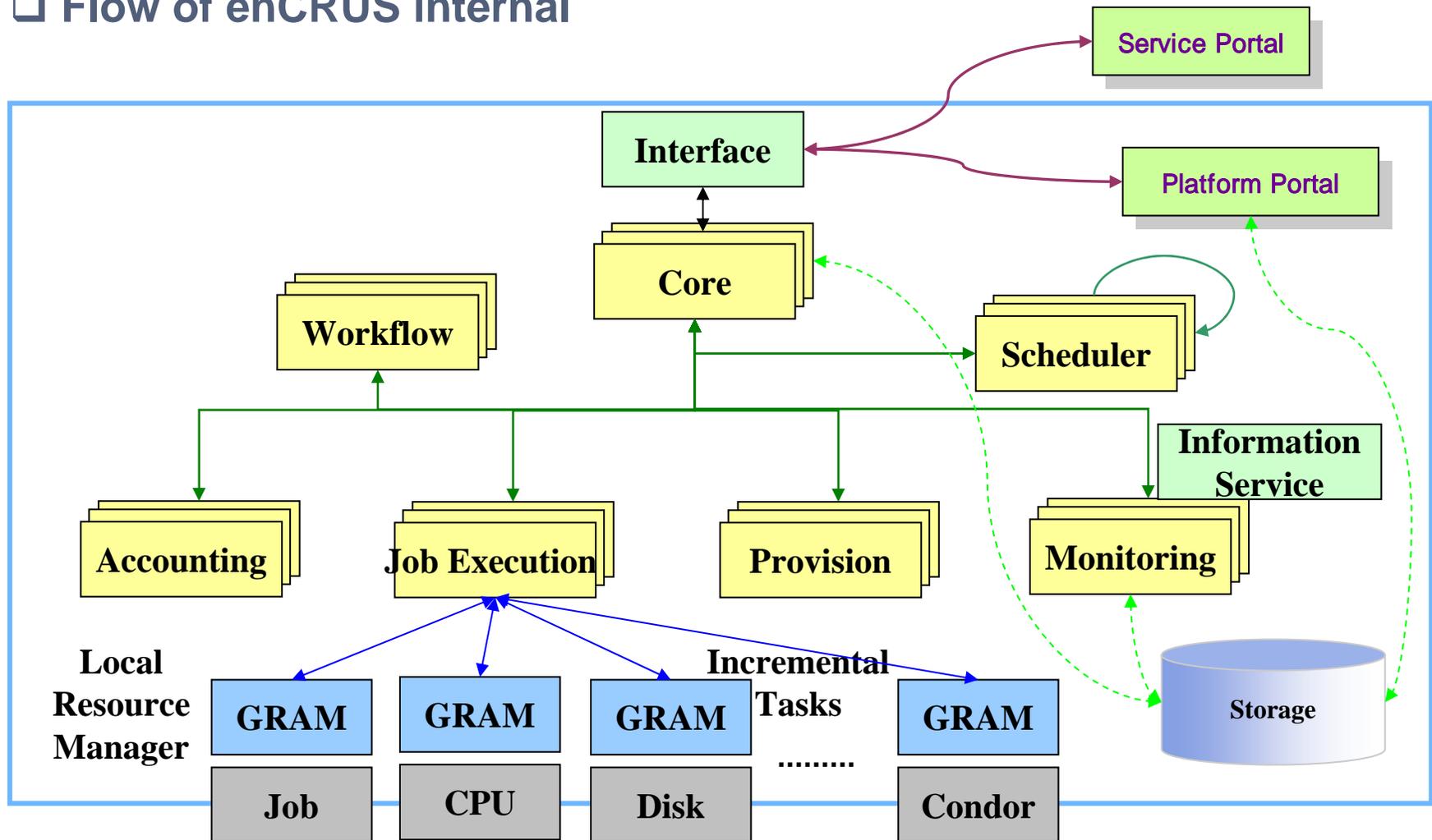
enCRUS Service Map

□ Service Map (GT4 & Platform Container)

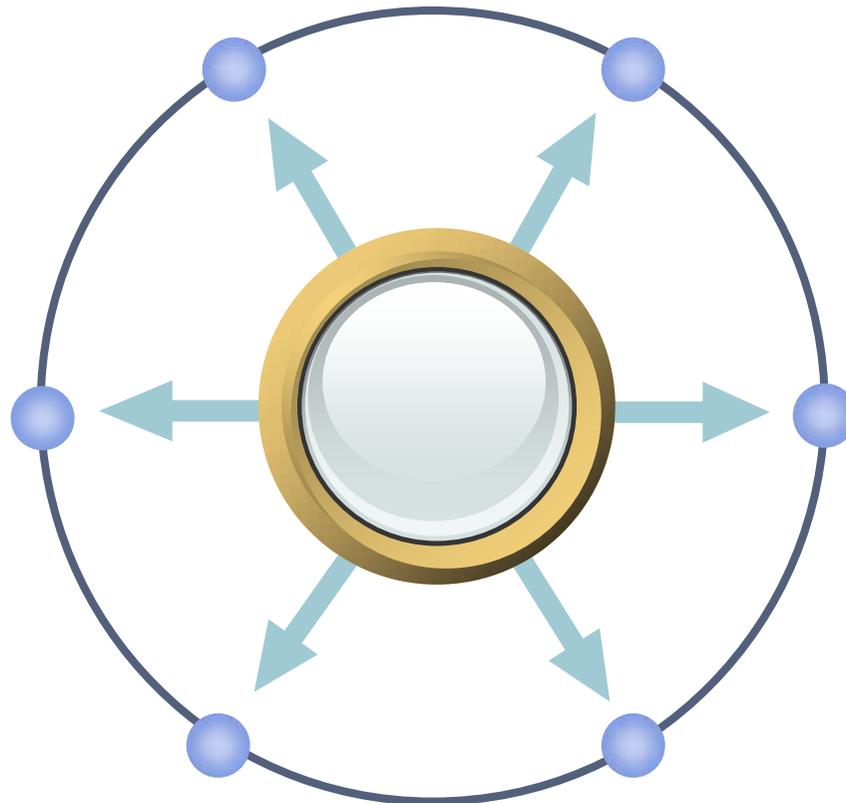


enCRUS Internal Flow

□ Flow of enCRUS internal



enCRUS Architecture



enCRUS Components

□ GT4 & enCRUS Components

		Job Distribution		
	Data Provisioning	Execution Controller		
	Data Replication	Scheduler	Resource Provisioning	
Delegation	Data Access & Integration	Grid Tele-control Protocol	Advanced Monitoring	
Community Authorization	Replica Location	CSF	Web-MDS	Python Runtime
Authentication Authorization	Reliable File Transfer	Workspace Mgmt	Trigger	C Runtime
Credential Mgmt	Grid-FTP	Grid Resource Allocation & Mgmt	Index	Java Runtime
Security	Data Mgmt	Execution Mgmt	Info Services	Common Runtime

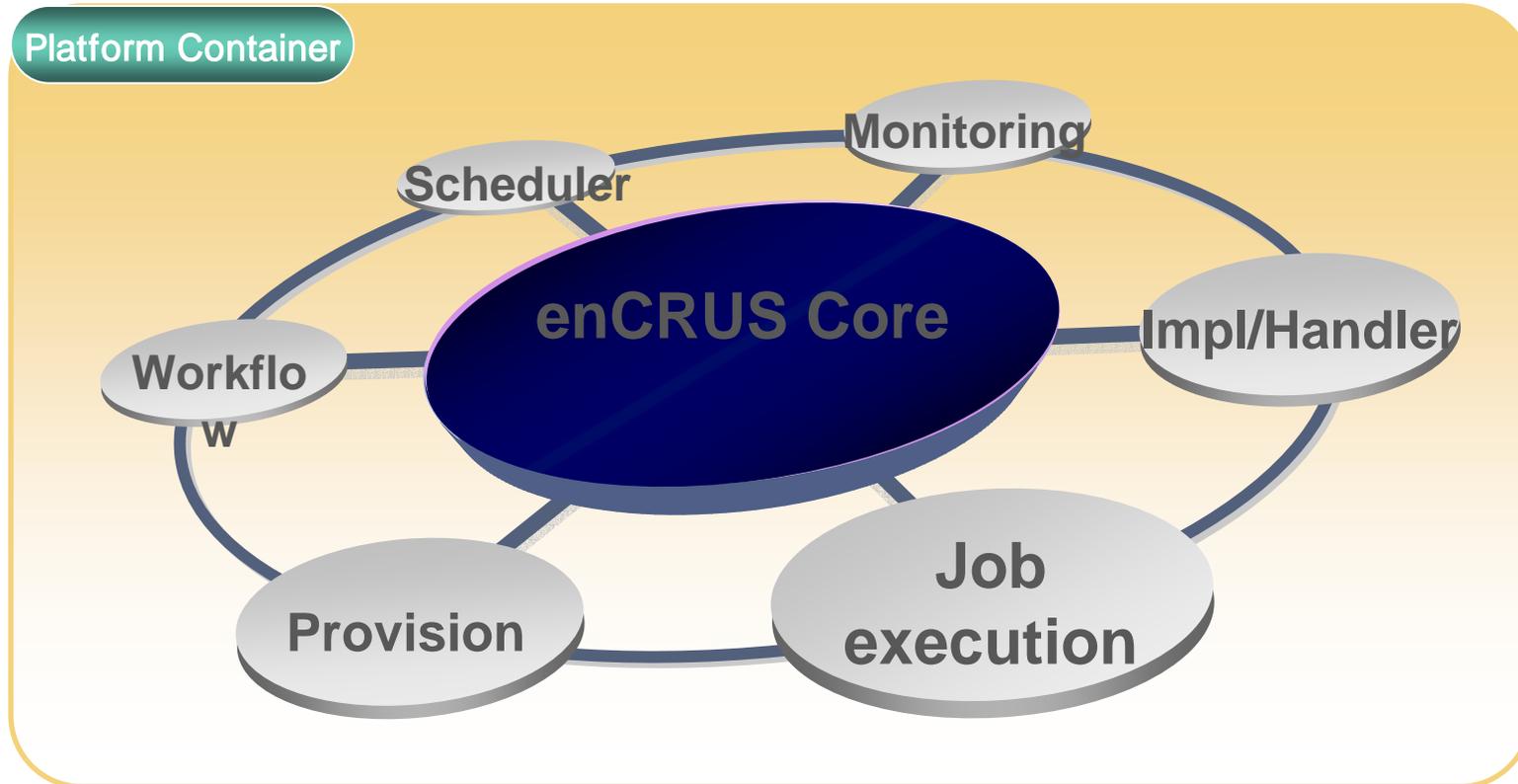
enCRUS Components

□ enCRUS Components

		enCRUS Platform				
Component	Core	Scheduler	Execution	Provision	Workflow	Monitor
Function	Platform Control	Job Schedule	Job Order	Server Provisioning	Workflow Modeling	Resource
	Platform Configuration	Resource Reservation	Job Pause	Server Virtualization	Workflow deployment	Job
	Notification		Job Cancel	SW License Mgmt.		Fault
			Job Exec Control	Switch Provisioning		

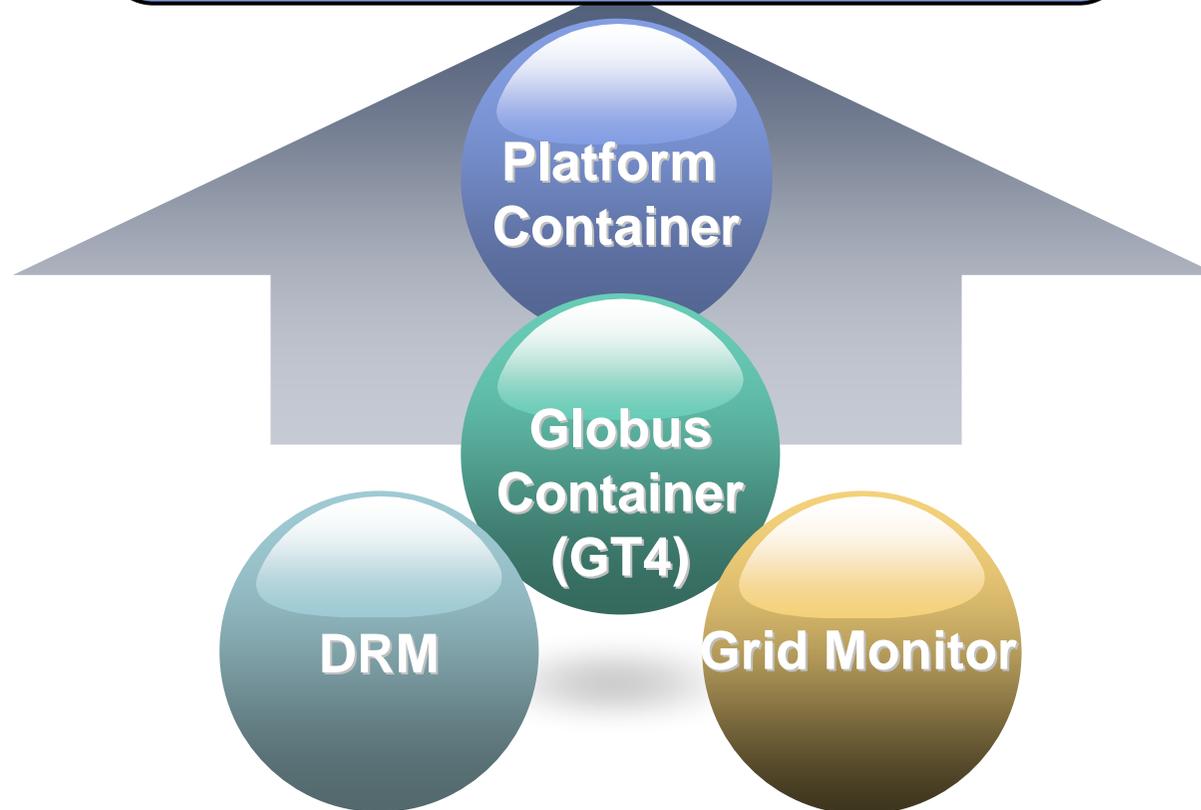
enCRUS Platform Container

□ Components inter-relationship

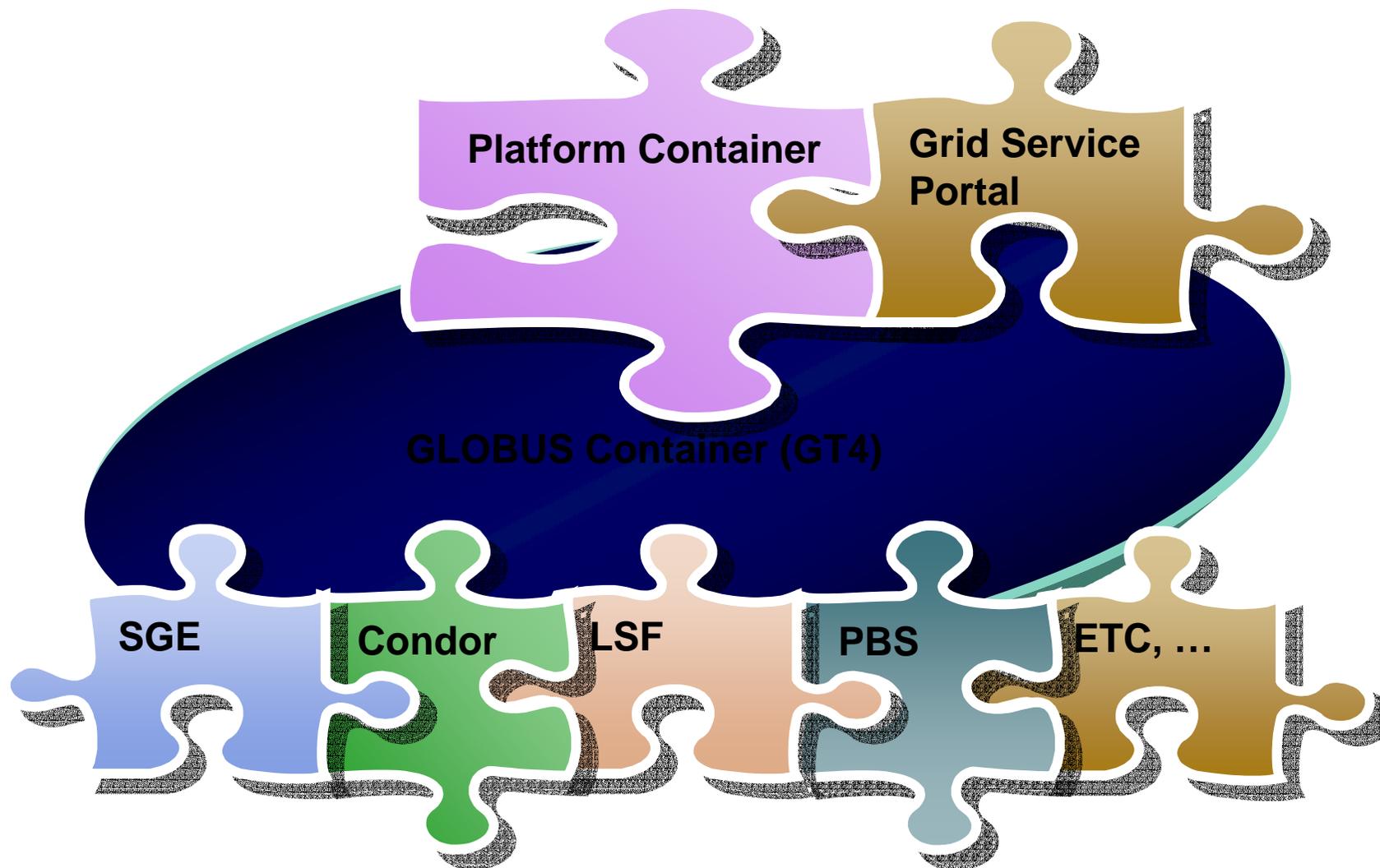


enCRUS Platform

enCRUS Grid Service Platform

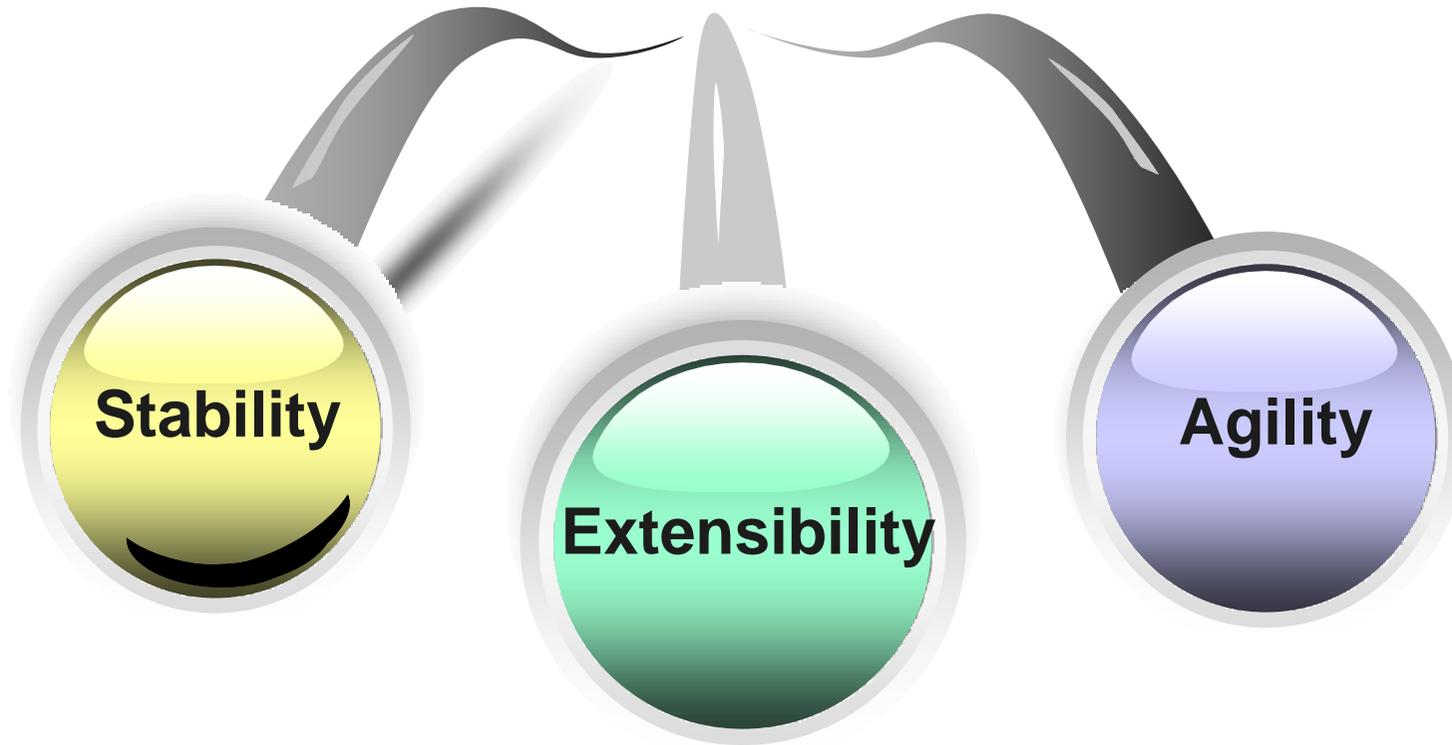


Big Pic of enCRUS



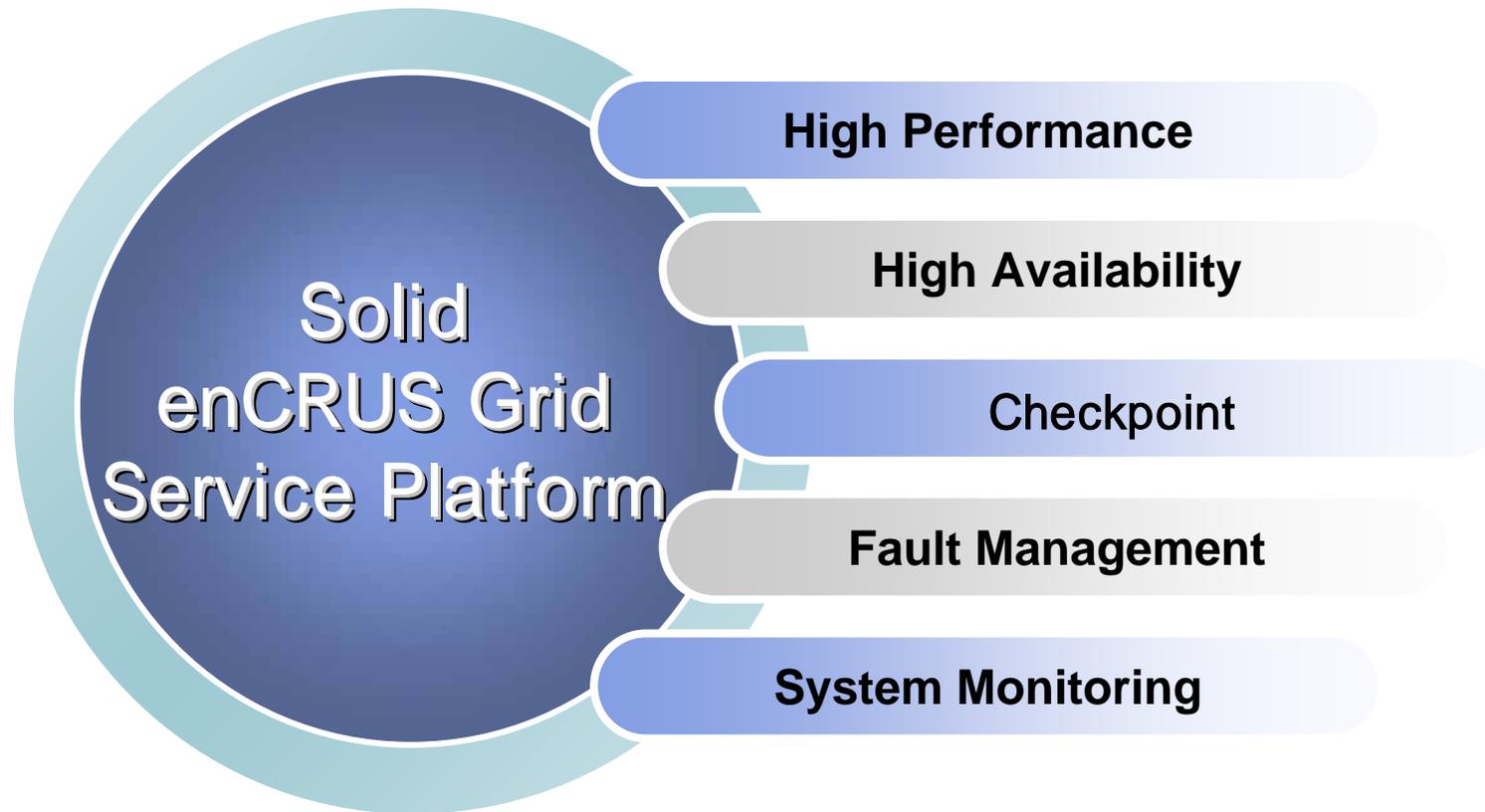
enCRUS Features

enCRUS Grid Platform



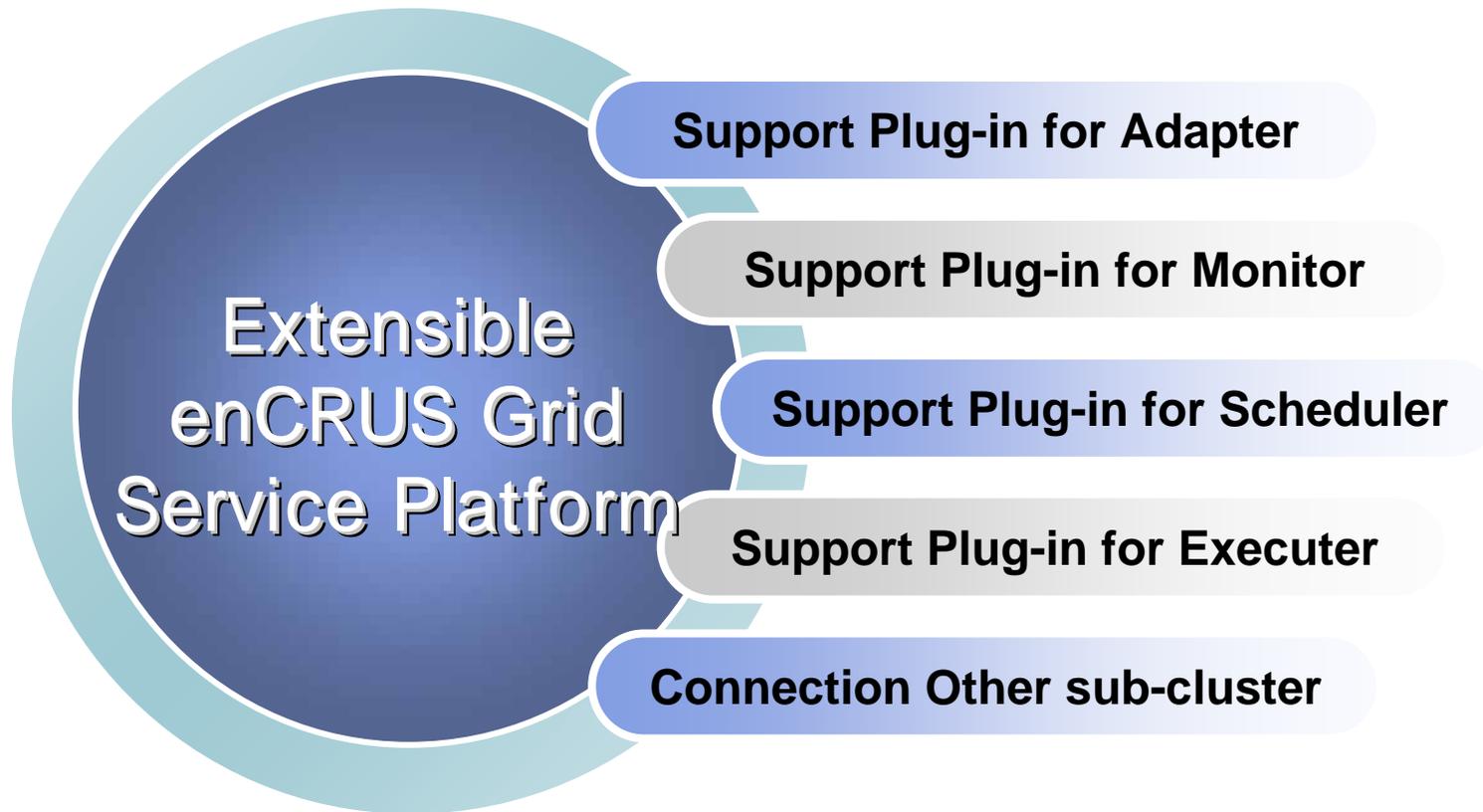
enCRUS Features

□ Stability



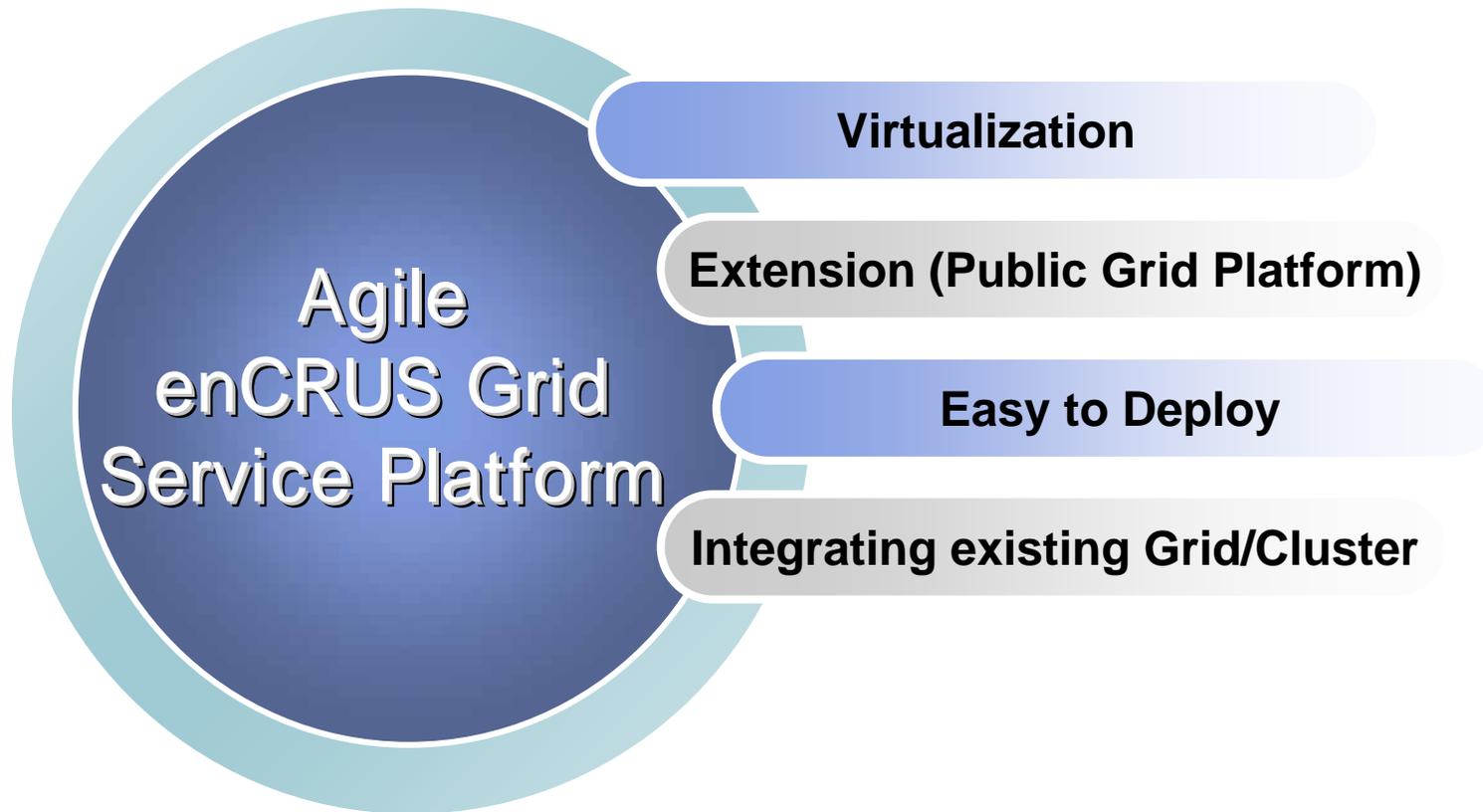
enCURS Features

❑ Extensibility



enCRUS Features

□ Agility



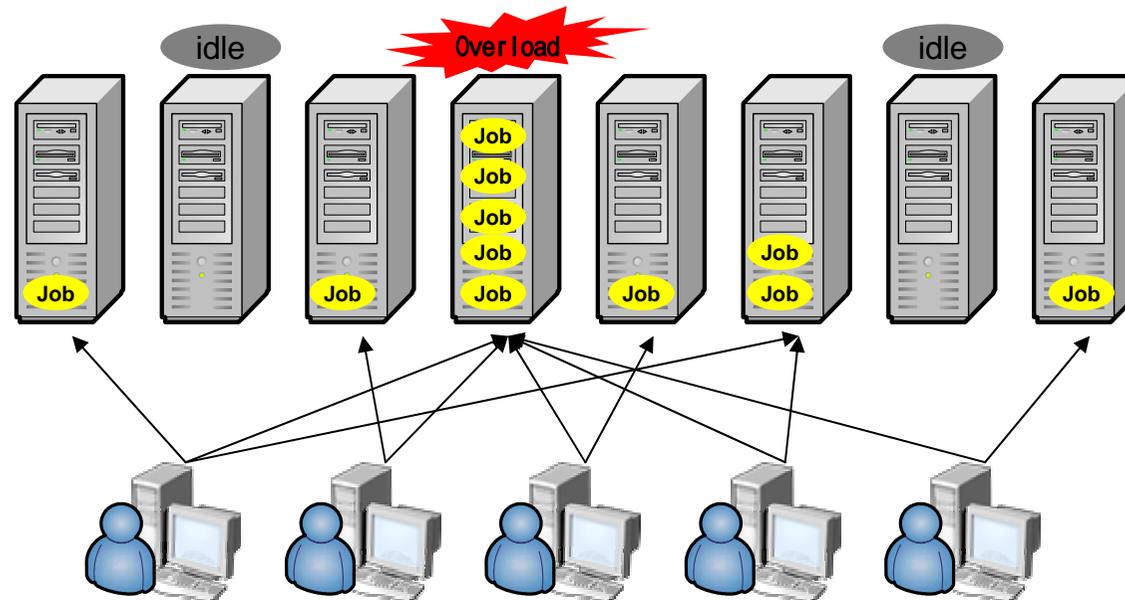
Case Study

- **Company Info**
 - Company: XXX Corporation. Hwasung, Korea
 - Industry: Manufacturing
 - Area of Focus: Analysis of complex tasks with time-consuming simulation
- **Key Business Benefits**
 - Increase efficiency of lab time, target the most productive areas
 - Improved productivity in CFD design cycle
 - Minimize a risk of user environment when applying computational grid

Case Study

- Key Business Challenges

- Need innumerable time and energy for simulating the interaction of fluids and gases
- One simulation failure affects predictability delay and business lines hold up
- Budget restrictions lead R&D slow down

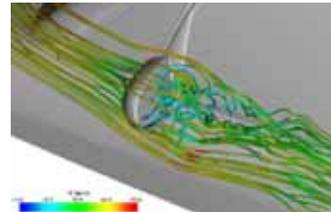


Case Study

- Target Application Field
 - CFD simulation: Commercial CFD code for metal extrusion and similar problems
 - OpenFOAM: a former commercial code that is now under GPL



[CFD Simulation]



[OpenFOAM]

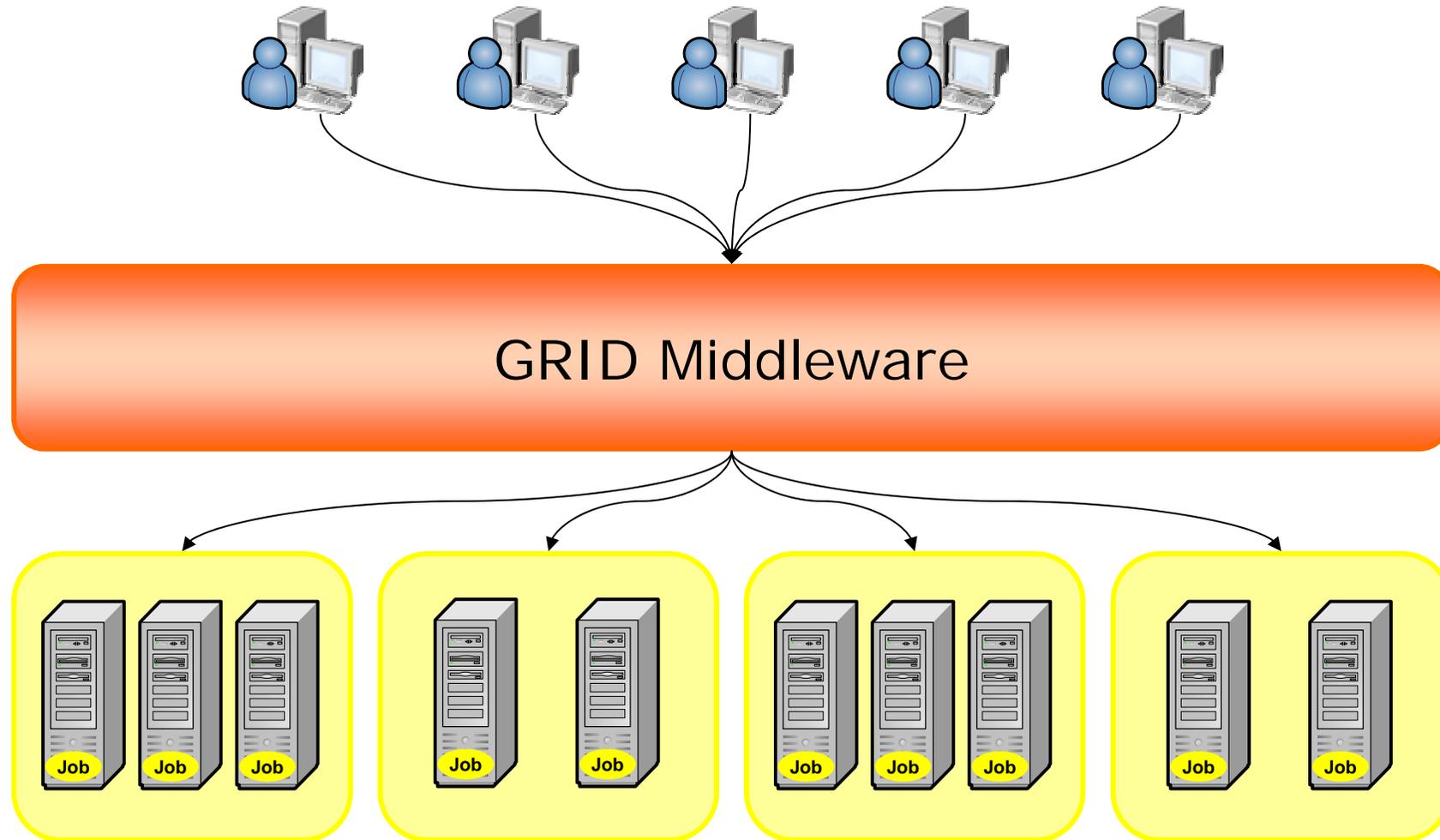
- What is CFD?
 - Computational Fluid Dynamics (CFD) is one of the branches of fluid mechanics that uses numerical methods and algorithms to solve and analyze problems that involve fluid flows. Computers are used to perform the millions of calculations required to simulate the interaction of fluids and gases with the complex surfaces used in engineering.

Case Study

- Key Business Solutions
 - Build computational grid in order to obtain maximum benefit from operating CFD system
 - enCRUS service platform on 2-way x86 server
 - 20 x86 Job execution nodes
 - Linux Operating System
 - KVM Switch
 - Rack
 - Backup Drive

Case Study

- Computational Grid



Case Study

- Key Business Results
 - Maximize engineering productivity
 - Manage distributed resources with enCRUS
 - Maximize service efficiency through scheduling efficiently of rapid increasing data
 - Guarantee business stability without any failure
 - Gain flexible scalability simply adding a node when upgrade is needed

