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**CENTRE NATIONAL D'ÉTUDES SPATIALES**

# THE WIDE AREA GRID
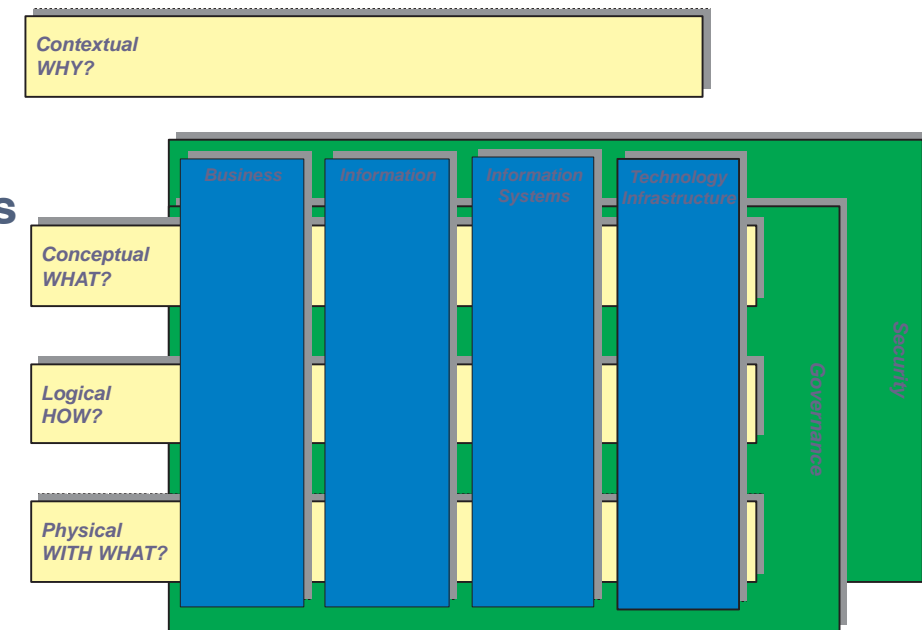
## Progress Report

# Context

■ **The Wide Area Grid concept was discussed during several WGISS meetings**

■ **The idea was to imagine and experiment an infrastructure that could be used by agencies to easily make available some of their applications**

■ **The Wide Area Grid is a R&D activity at CNES**

◆ **CAP Gemini is the contractor selected by CNES for the design and implementation of a Wide Area Grid prototype**

■ **The WIDE Area Grid was also studied in the frame of an "INTAS" joined project between**

◆ **Institute of Informatics, Slovak Academy of Science (Slovakia)**

◆ **Space Research Institute of the NASU–NSAU (Ukraine)**

◆ **Institute of Space Research of the RAS, IKI RAN (Russia)**

◆ **Centre National d'Etudes Spatiales (France)**

■ **CAS/CEODE (China), NSAU (Ukraine), ESA/ESRIN have expressed interest for participation**

■ **Other CEOS agencies invited to join the project**

◆ **"It must be <u>easy</u> to jump in."**

# Methodology followed for the architecture

*Integrated Architecture Framewok (IAF)*

- **overall approach that covers all areas of an architecture**
    - **provides a model for architecure development and usage**
    - **describes the format and content of the constituent elements of the architecture**
    - **specifies the way in which these elements relate to each other**
- **consists of 6 aspect areas – each one adds knowledge**

*Contextual WHY?*

*Conceptual WHAT?*

*Logical HOW?*

*Physical WITH WHAT?*

*Business* *Information* *Information Systems* *Technology Infrastructure*

*Governance* *Security*

   - **business aspect area – objectives, activities, organization**
   - **information aspect area – information used by the business**
   - **information system aspect area – types of information systems supporting information processing**
   - **technology infrastructure aspect area – infrastructure components that support information systems**
   - **governance aspect area – manageability and quality of the architecture information**
   - **security aspect area – known risks to the architecture implementation**

**Emphasis put on IS and TI aspects in this study**

- **consists of one contextual level (Why?) and three abstraction levels**
    - **conceptual (What?)**
    - **logical (How?)**
    - **physical (With what?)**

## Objectives of the architecture study

- **identify the technical elements necessary to complete the WAG**

- **identify a mechanism for service publication**

- **identify a portal for accessing the WAG**

- **identify a generic business process management**

- **identify a mechanism of transfer and visualization of service results**

- **write an architecture document**
  - ◆ **V 1.0 already released and sent to interested agencies (see CNES presentation at WGISS23)**
  - ◆ **draft V 2.0 available for comments**

## Grid Technology

**The WAG is not a grid *per se*. But the WAG concept has grown up from the emerging grid technology (already studied in the past by the GRID TT).**

# WAG business mission

■ merge existing resources (partners) from as many places as needed into a designated federation, each resource provider retaining within the federation the ownership of the provided resource

■ low cost of WAG deployement and management

■ technological interest

# WAG constraints

■ take into account the technological choices of the partners

■ the WAG is based on WAN, not on LAN

■ security is not necessarily the same for all partners

■ access to the WAG by users and administrator will be done through a web portal

# WAG principles and assumptions

■ no WAG specific middleware development

■ partners need to agree on the rule of the game (all resources be part of a network)

■ protection against bottleneck achieved by an administration task

# Current Achievements (1/2)

**(see the Architecture Document for justification)**

◼ **Inclusion of constraints given by NSAU and CAS/CEODE**

    ◆ **make use of Scientific LINUX 3 and of GridSphere**

◼ **Selection of the Wide Area Grid middleware : GT 4.0.7 for common runtime**

    ◆ **GT 4.2 rejected because compatibility problems with some components WSRF 1.2 implemented in GT 4.2**

◼ **Selection of the Monitoring and Discovery Services (MDS) for Information Services**

    ◆ **WS–MDS Aggregator Framework**

- WS–ResourceProperties (WSRF–RP)
- WS–ResourceLifeTime (WSRF–RL)
- WS–ServiceGroup (WSRF–SG)
- WS–BaseNotification
- WS–Topics

    ◆ **Implementation of the ISO 19119 Service Taxonomy**

# Current Achievements (2/2)

- **Selection for Data Management Services**
  - ◆ **OGSA–DAI for files and database exposition**
  - ◆ **SRB portlet for reliable file transfer from computer to computer**
- **Selection of GRAM4 for Execution Management Services**
  - ◆ **enhanced credential delegation mechanism**
  - ◆ **(xml is not yet used in the Job Definition Language)**
- **Selection of GWES for Business Process Definition Services**
  - ◆ **GWES (Grid Workflow Execution Service) comes from the Fraunhofer community**
  - ◆ **not based on WS–BPEL but on a "Grid Workflow Description Language"**
  - ◆ **technically founded on Petri nets**
- **Selection of GridSphere 2.2.x as a portlet container**
- **Selection of PACMAN for middleware update**
- **Ganglia, Inca, GridIce, MonaLisa could be used for Governance Services (monitoring)**

# Next steps

- **Review of the Architecture document (draft V 2.0) by interested agencies**

    - **get comments and concerns**

- **Distribute the final version to interested agencies**

- **Write the Wide Area Grid software Installation Manual**

- **Try to deploy a Wide Area Grid prototype using this manual**

    - **other agencies are welcome**

- **Write a "Lessons learnt" document**

- **Make this prototype a possible CEOS/WGISS contribution to GEO ?**

    - **needs to be discussed among us !**

- **Move all Wide Area Grid documents to the WGISS website**

- **Probably update the CEOS Interoperability Hanbook**

**Thank You!**