



The Supercomputer Company

Current Progress of Grid Project in KMA

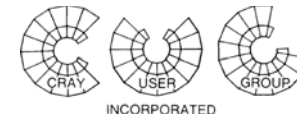
CUG 2006

Kim, Hee-Sik

Cray Korea Inc.



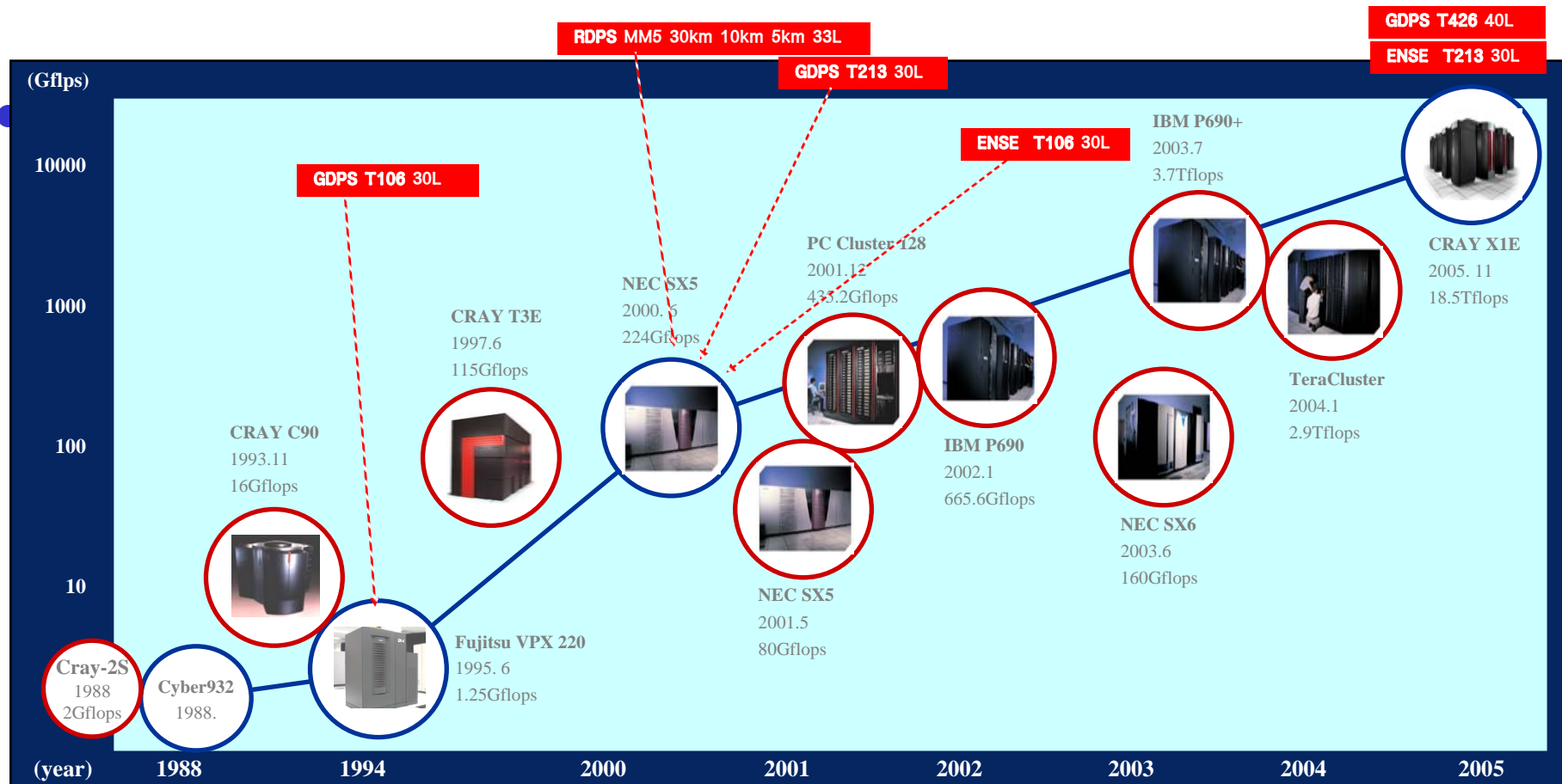
This Presentation May Contain Some Preliminary Information, Subject To Change



Outline

- KMA's Cray X1E system
- Relationship between Cray and KMA
- Grid
 - Grid Project at KMA
 - UNICORE
- Current Status
- Future plan

History of Supercomputer in Korea



High Performance computing resources in **KMA** and **KISTI**

KISTI : Korea Institute of Science and Technology Information

The specification of KMA's Cray X1E system



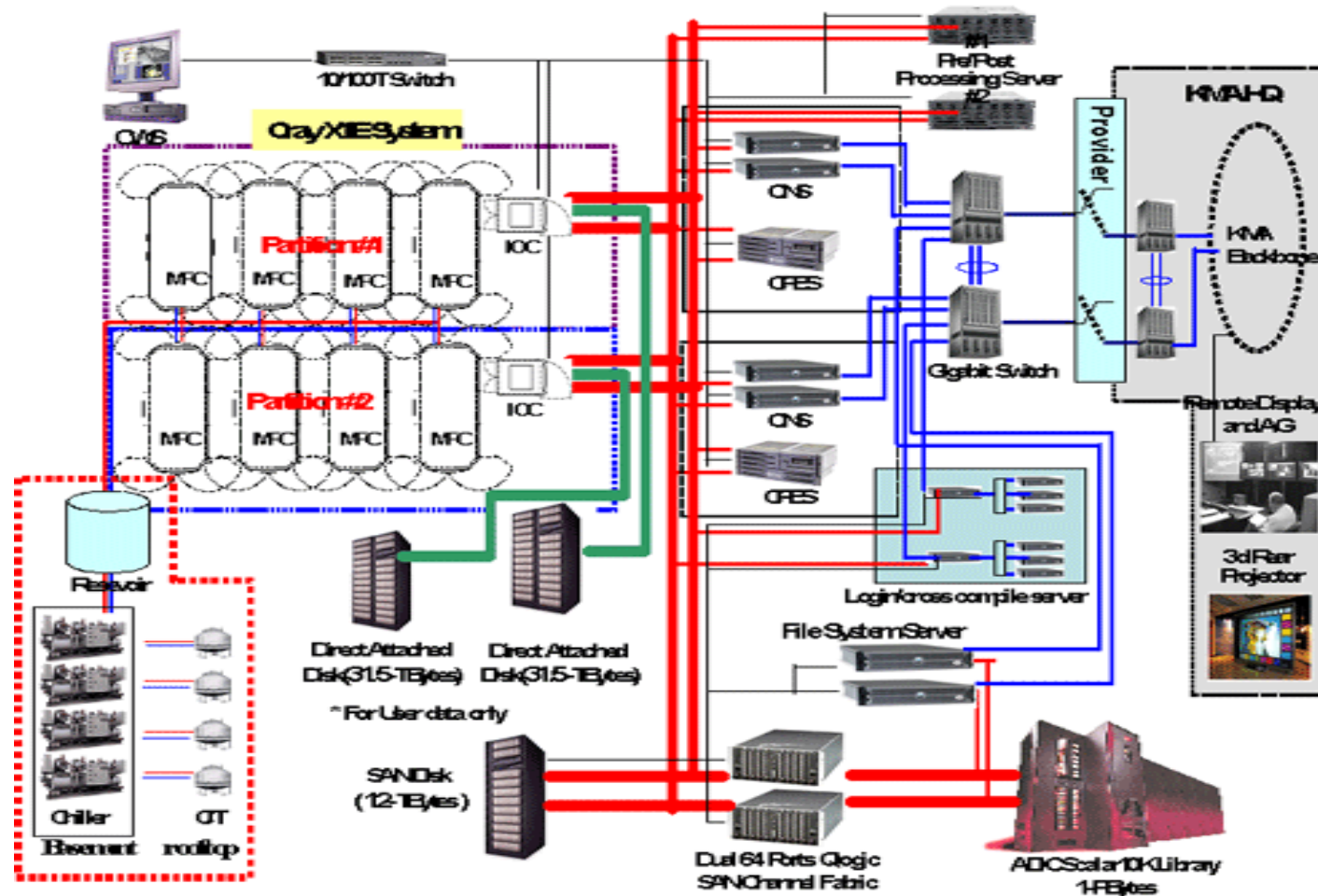
CRAY X1E



ADIC Scalar 10K 1PB

<i>Ref</i>	<i>CRAY X1E</i>
<i>Installation</i>	2005. 12
<i>CPU</i>	1024 MSP
<i>Peak performance</i>	18.5 TF
<i>Main Memory</i>	4 TB
<i>Capacity of DAS Disk</i>	67 TB
<i>Capacity of SAN Disk</i>	21 TB
<i>Capacity of Tape drive</i>	1 PB
<i>Functions</i>	For NWP Operation Research & Development

Network Configuration

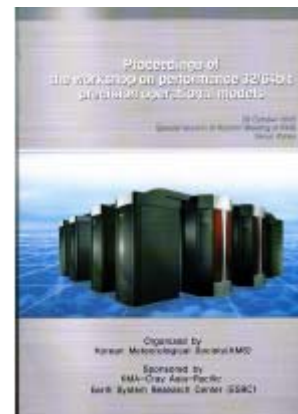


Relationship between Cray and KMA

- Cray Korea supports KMA's role including code optimization and Grid project with 9 local engineers.
- The joint KMA-Cray Earth System Research Center (ESRC)
 - Established by KMA and Cray.
 - To promote the advancement of atmospheric modeling over the East Asia Pacific region.
 - ESRC internship & Grant Projects
 - ESRC Workshop



Presenters '05 ESRC Workshop



'05 ESRC Workshop



Winners of '06 ESRC

What is a Grid?

1001 definitions

- Distributed, networked computing & data resources
- Networking and computing infrastructure for utility computing
- Distributed platform for sharing scientific experiments and instruments
- The next generation of enterprise IT architecture
- The next generation of the Internet and the WWW
- Computing from the wall socket
- The Advanced Network
- ... and 994 more ...

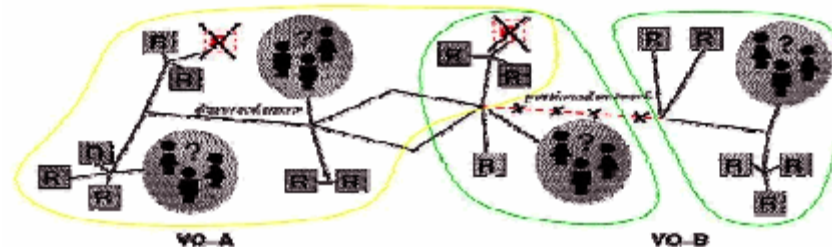
* Wolfgang Gentzsch, 2005

What is a Grid?

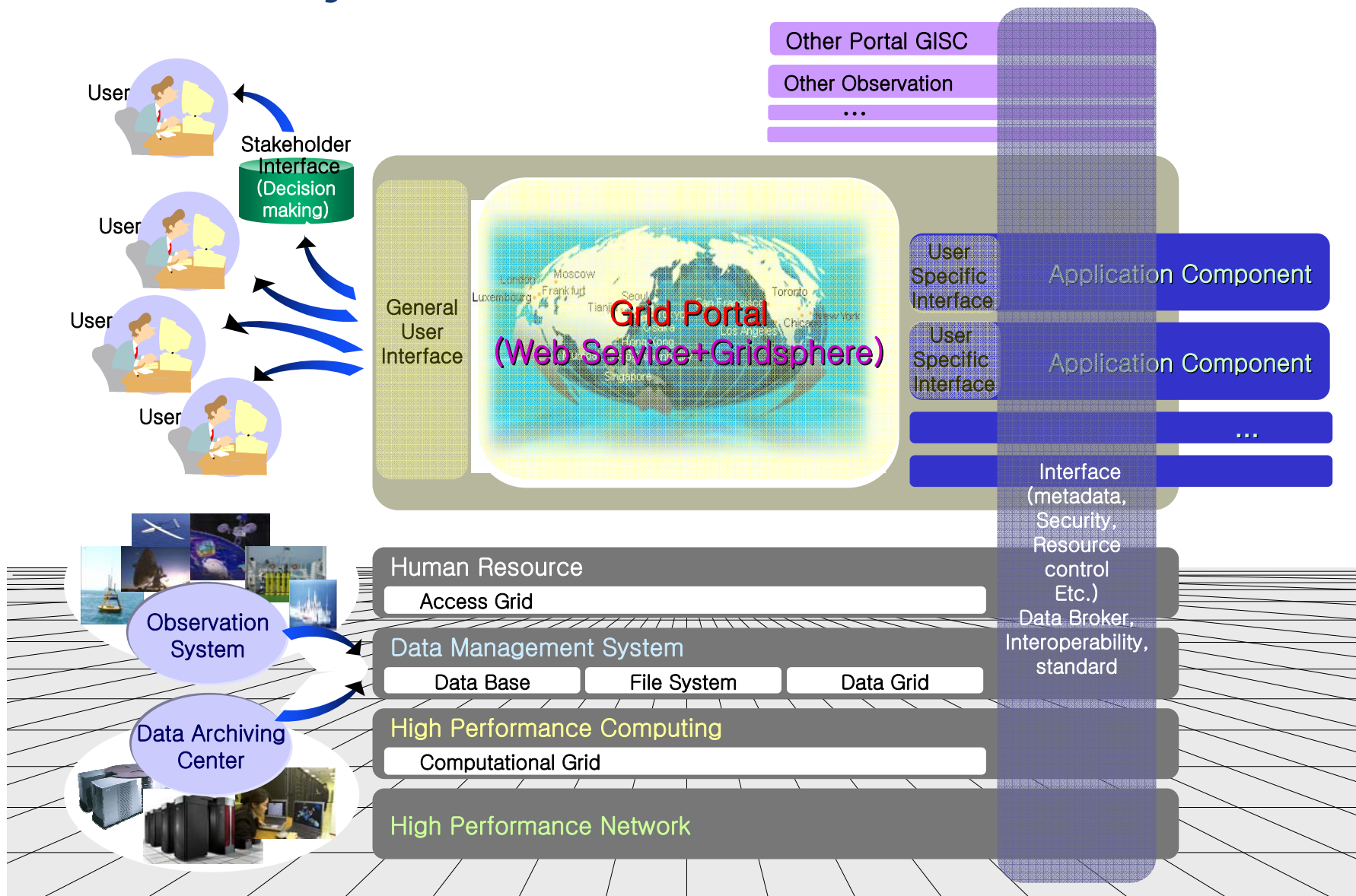
- To integrate the distributed computing platforms via express network to share computing and data resources



- Computational Grid
- Data Grid
- Access Grid



Grid Project at KMA



Current Status

- ROKAF
 - NWP and model research

- APCC
 - Climate research

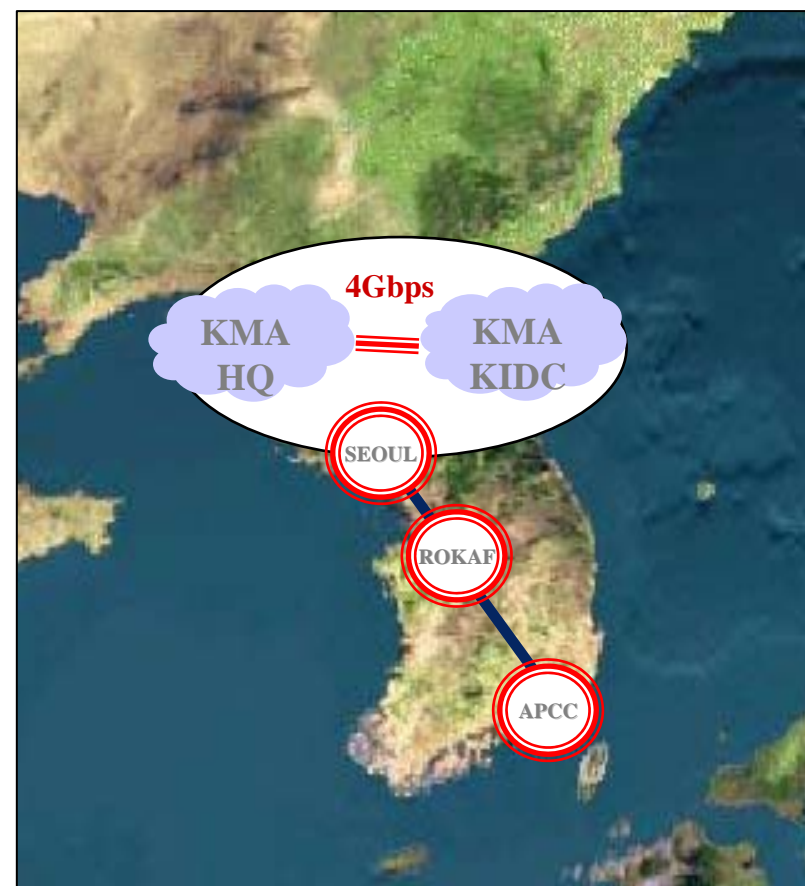


APEC Climate Center

- DWD
 - Run a simple script successfully to DWD
 - For MetGrid



Deutscher Wetterdienst



UNICORE?

- A vertically integrated Grid middleware system
- Provides seamless, secure, and intuitive access to distributed resources and data
- Used in production and project worldwide
- Features
 - intuitive GUI with single sign-on
 - X.509 certificates
 - only one opened port in firewall required
 - workflow engine for complex multi-site/multi-step workflows
 - matured job monitoring
 - interactive access with UNICORE-SSH
 - resource managements
 - production quality, ...

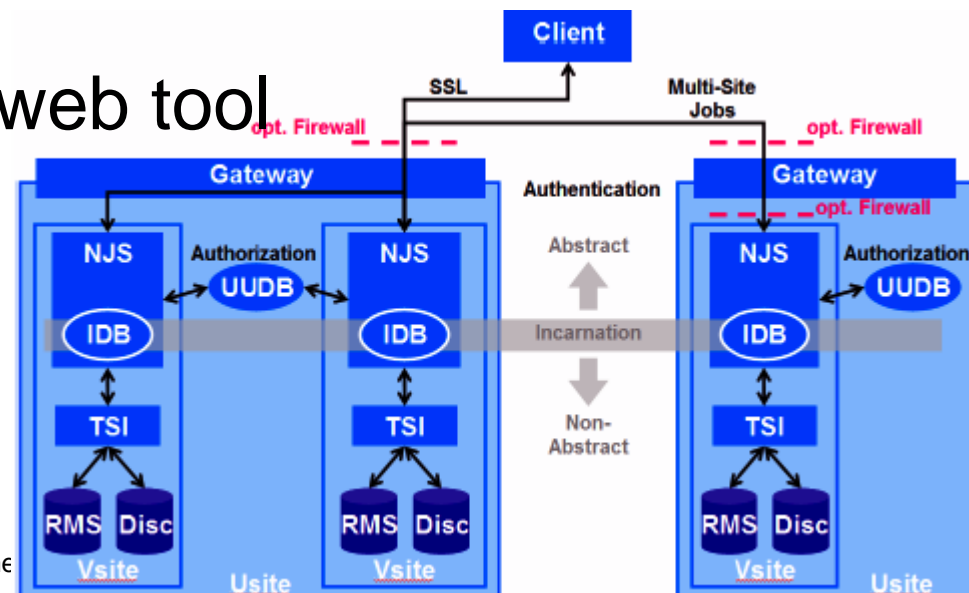
* Achim Streit, 2005

Why UNICORE

- Allow remote users to run on KMA supercomputer while minimizing security risks of unauthorized use
- Provide a simple interface to beginners in running meteorological applications on KMA supercomputer
- More practical to use operationally

UNICORE Software package

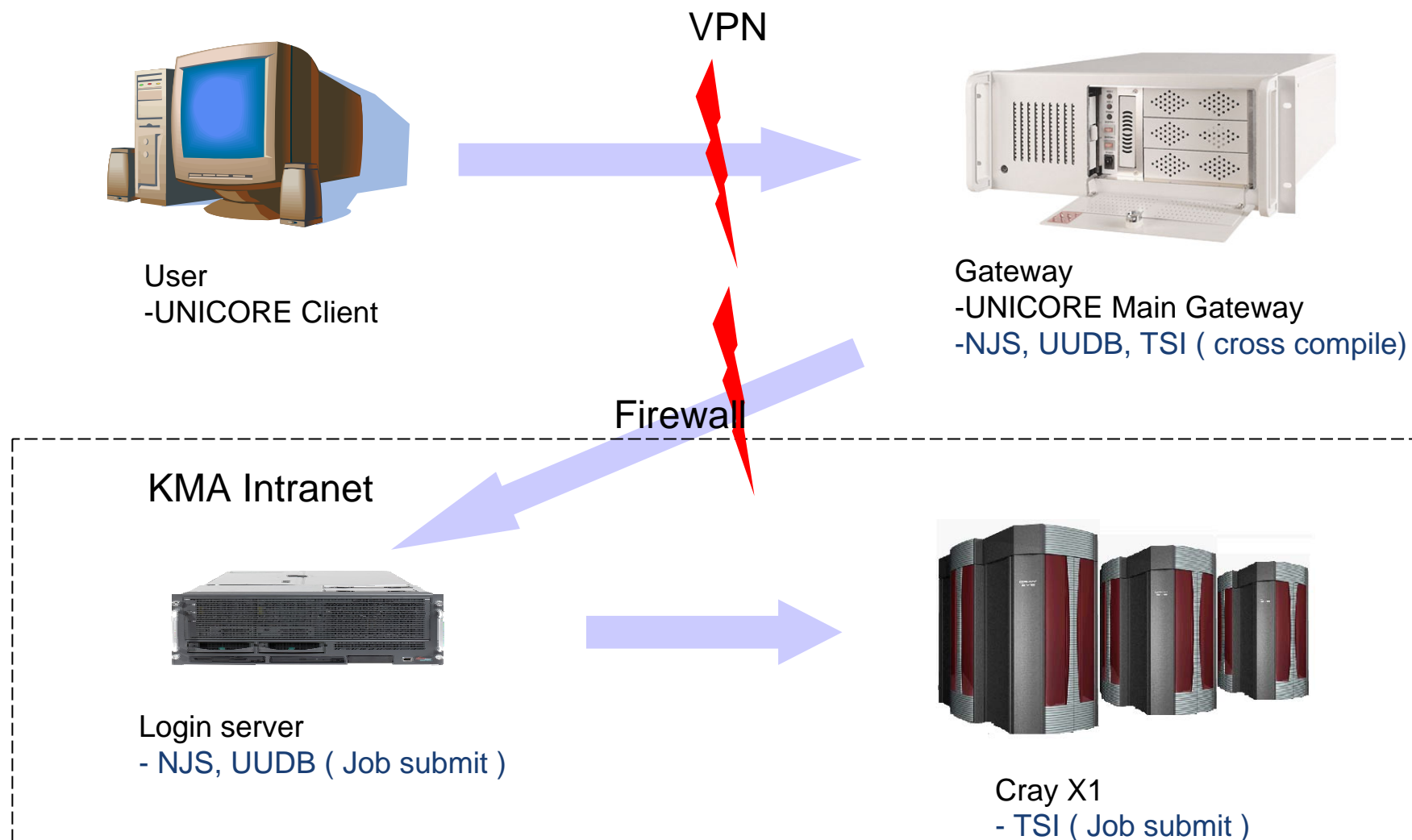
- UNICORE S/W consists of 5 packages
 - Client: Java based
 - Gateway: Java based
 - NJS (Network Job Supervisor): Java based
 - UUDB (UNICORE User Data Base): Java based
 - TSI (Target System Interface): Perl based



Install status

- Certificate Authority
 - Install the general CA
 - Create Gateway certificate, NJS certificate, User certificate
 - Install web CA issue site in Login server
- Packages
 - Client: PC
 - Gateway: installed in Login server
 - NJS: installed in Login server
 - UUDB: installed in Login server
 - TSI: installed in X1E (with PBS)
- Test to run simple job and meteorological application

UNICORE structure with VPN



Running application on UNICORE

The image displays multiple overlapping screenshots of the UNICORE Client software interface, showing various windows and job execution details.

Windows and Views:

- Job Preparation:** Shows the configuration of a new job, including the name (e.g., "HelloWorldJob", "New_Script1"), type (C shell), and dependencies.
- Job Monitoring:** Displays the status of jobs. The "Job Preparation" pane shows a tree view of jobs (e.g., "New_Job2", "New_Script1"). The "Job Monitoring" pane shows a list of jobs with their status (e.g., "PENDING", "READY", "EXECUTING", "SUCCESSFUL").
- Summary:** A table showing the execution history of a job. The table has columns: Time Stamp, Name, Description, Status, and Reason.

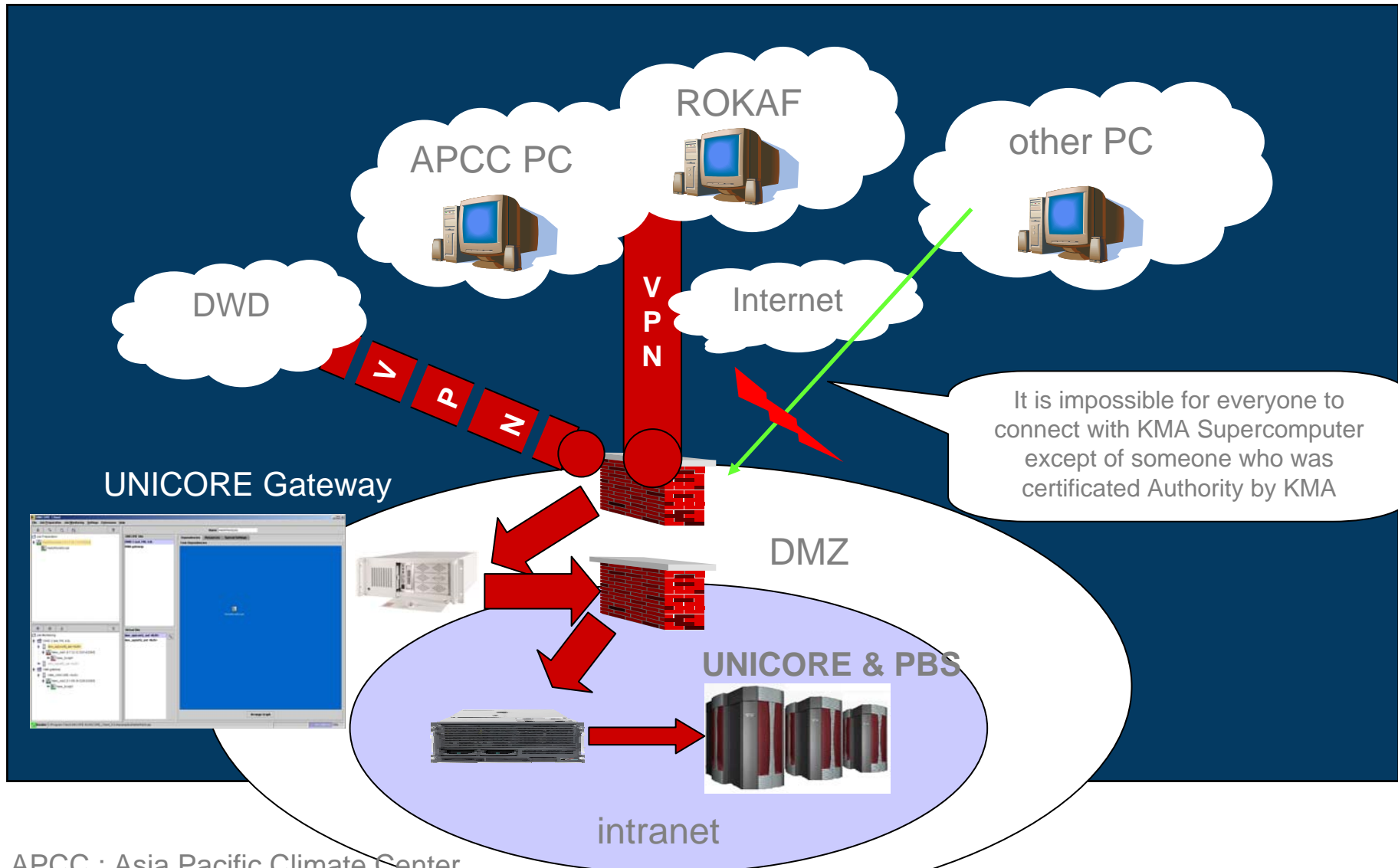
Summary Table Data:

Time Stamp	Name	Description	Status	Reason
11:09:45 02/03/2005	New_Script1	Execution	PENDING	Initial status
11:09:45 02/03/2005	New_Script1	Import: <Local: C:\wfrfeta_micro_lookup.dat -> eta_micro_lookup.dat>	PENDING	Initial status
11:09:45 02/03/2005	New_Script1	Import: <Local: C:\wfrfFLANDUSE.TBL -> FLANDUSE.TBL>	PENDING	Initial status
11:09:45 02/03/2005	New_Script1	Import: <Local: C:\wfrfnamelist.input -> namelist.input>	PENDING	Initial status
11:09:45 02/03/2005	New_Script1	Import: <Local: C:\wfrfRRTM_DATA -> RRTM_DATA>	PENDING	Initial status
11:09:45 02/03/2005	New_Script1	Import: <Local: C:\wfrfwrf.exe -> wrf.exe>	PENDING	Initial status
11:09:45 02/03/2005	New_Script1	Import: <Local: C:\wfrfwrfbdy_d01 -> wrfbdy_d01>	PENDING	Initial status
11:09:45 02/03/2005	New_Script1	Import: <Local: C:\wfrfwrfinput_d01 -> wrfinput_d01>	PENDING	Initial status
11:09:45 02/03/2005	New_Script1	Export: <AWRFOUT -> Local: C:\wfrfoutput>	PENDING	Initial status
11:12:36 02/03/2005	New_Script1	Import: <Local: C:\wfrfeta_micro_lookup.dat -> eta_micro_lookup.dat>	READY	
11:12:36 02/03/2005	New_Script1	Import: <Local: C:\wfrfFLANDUSE.TBL -> FLANDUSE.TBL>	READY	
11:12:36 02/03/2005	New_Script1	Import: <Local: C:\wfrfnamelist.input -> namelist.input>	READY	
11:12:36 02/03/2005	New_Script1	Import: <Local: C:\wfrfRRTM_DATA -> RRTM_DATA>	READY	
11:12:36 02/03/2005	New_Script1	Import: <Local: C:\wfrfwrf.exe -> wrf.exe>	EXECUTING	Start Action/Group processing
11:12:36 02/03/2005	New_Script1	Import: <Local: C:\wfrfwrfbdy_d01 -> wrfbdy_d01>	READY	
11:12:36 02/03/2005	New_Script1	Import: <Local: C:\wfrfwrfinput_d01 -> wrfinput_d01>	READY	
11:12:36 02/03/2005	New_Script1	Import: <Local: C:\wfrfwrfinput_d01 -> wrfinput_d01>	EXECUTING	Start Action/Group processing
11:12:36 02/03/2005	New_Script1	Import: <Local: C:\wfrfeta_micro_lookup.dat -> eta_micro_lookup.dat>	SUCCESSFUL	
11:12:36 02/03/2005	New_Script1	Import: <Local: C:\wfrfFLANDUSE.TBL -> FLANDUSE.TBL>	SUCCESSFUL	
11:12:36 02/03/2005	New_Script1	Import: <Local: C:\wfrfnamelist.input -> namelist.input>	SUCCESSFUL	
11:12:36 02/03/2005	New_Script1	Import: <Local: C:\wfrfRRTM_DATA -> RRTM_DATA>	SUCCESSFUL	
11:12:36 02/03/2005	New_Script1	Import: <Local: C:\wfrfwrf.exe -> wrf.exe>	SUCCESSFUL	
11:12:36 02/03/2005	New_Script1	Import: <Local: C:\wfrfwrfbdy_d01 -> wrfbdy_d01>	SUCCESSFUL	
11:12:45 02/03/2005	New_Script1	Import: <Local: C:\wfrfwrfinput_d01 -> wrfinput_d01>	SUCCESSFUL	
11:12:45 02/03/2005	New_Script1	Execution	READY	
11:12:45 02/03/2005	New_Script1	Execution	EXECUTING	
11:12:45 02/03/2005	New_Script1	Execution	RUNNING	
12:25:02 02/03/2005	New_Script1	Execution	SUCCESSFUL	Script reported no errors
12:25:02 02/03/2005	New_Script1	Export: <AWRFOUT -> Local: C:\wfrfoutput>	READY	
12:25:07 02/03/2005	New_Script1	Export: <AWRFOUT -> Local: C:\wfrfoutput>	SUCCESSFUL	

Gateway Information:

- DWD Gateway:** A red box highlights the "DWD 2 (ext, FW, 4.0)" job in the "Job Monitoring" pane.
- KMA Gateway:** A blue box highlights the "KMA_unicore -> NJS" job in the "Job Monitoring" pane.

Remote access to KMA's Cray X1E system



APCC : Asia Pacific Climate Center

2006-05-09

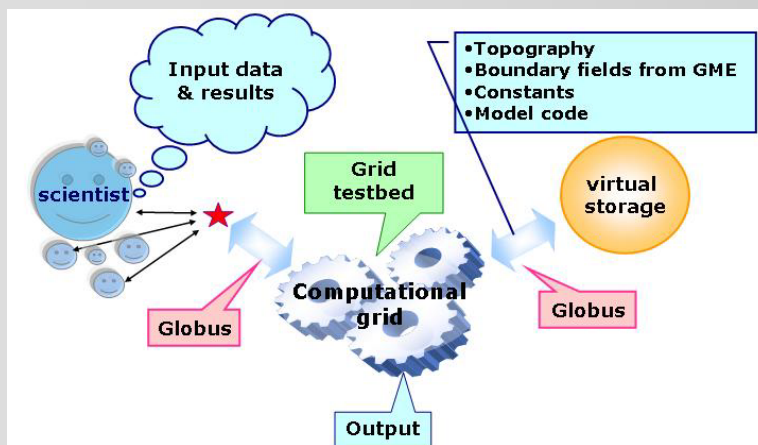
ROKAF : Republic of Korean Air Force

This Presentation may

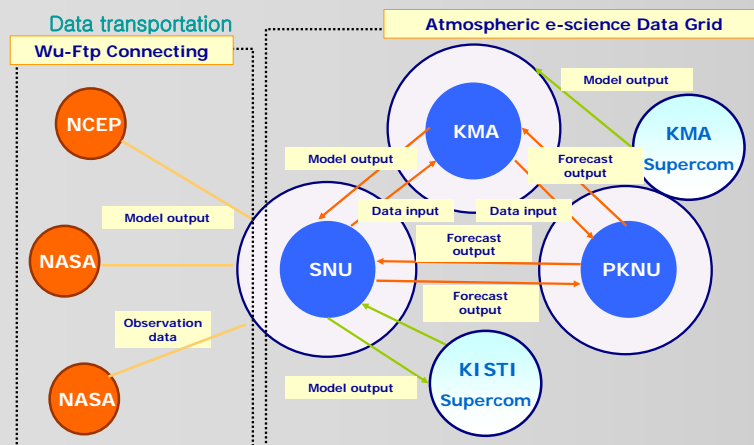
Information, Subject To Change

Future directions – uMeteo-K

- **ubiquitous Meteorology-Korea:** ubiquitous Korea for meteorological research cooperation system



Data grid for climate prediction



Future directions – MetGrid

Purpose of MetGrid

- All major global weather forecasting centers
- To share their global forecasts with each other as a multi-model ensemble
- To agree on areas of the world which merited further studies

Current Status & Goal

- Simple UNICORE test with DWD
- Setting up UNICORE including user interface for 2nd Supercomputer System
- Sharing data and computational resources
- Set up a project for carrying out the study and agree on resources
- Start of pilot phase (01/2006 ~)

Partners of METGRID

Name	System
CMA	IBM Power 4
DWD	IBM Power 3
ECMWF	IBM Power 4/5
KMA	CRAY X1E
Météo France	Fujitsu VPP 5000
NCAR	IBM Power 3/4
UKMet	NEC SX-6



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Questions? / Comments!

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Thank You!



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