

“ HEP Computing Coordination in India ”

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❖ *Setting up of grid infrastructure*

❖ *Making it available to all*

KARMA (BARC GRID TEST BED)



INTEGRATED PROBLEM SOLVING ENVIRONMENT

❖ *HIGH SPEED COMPUTATION (PARALLEL PROCESSING)*

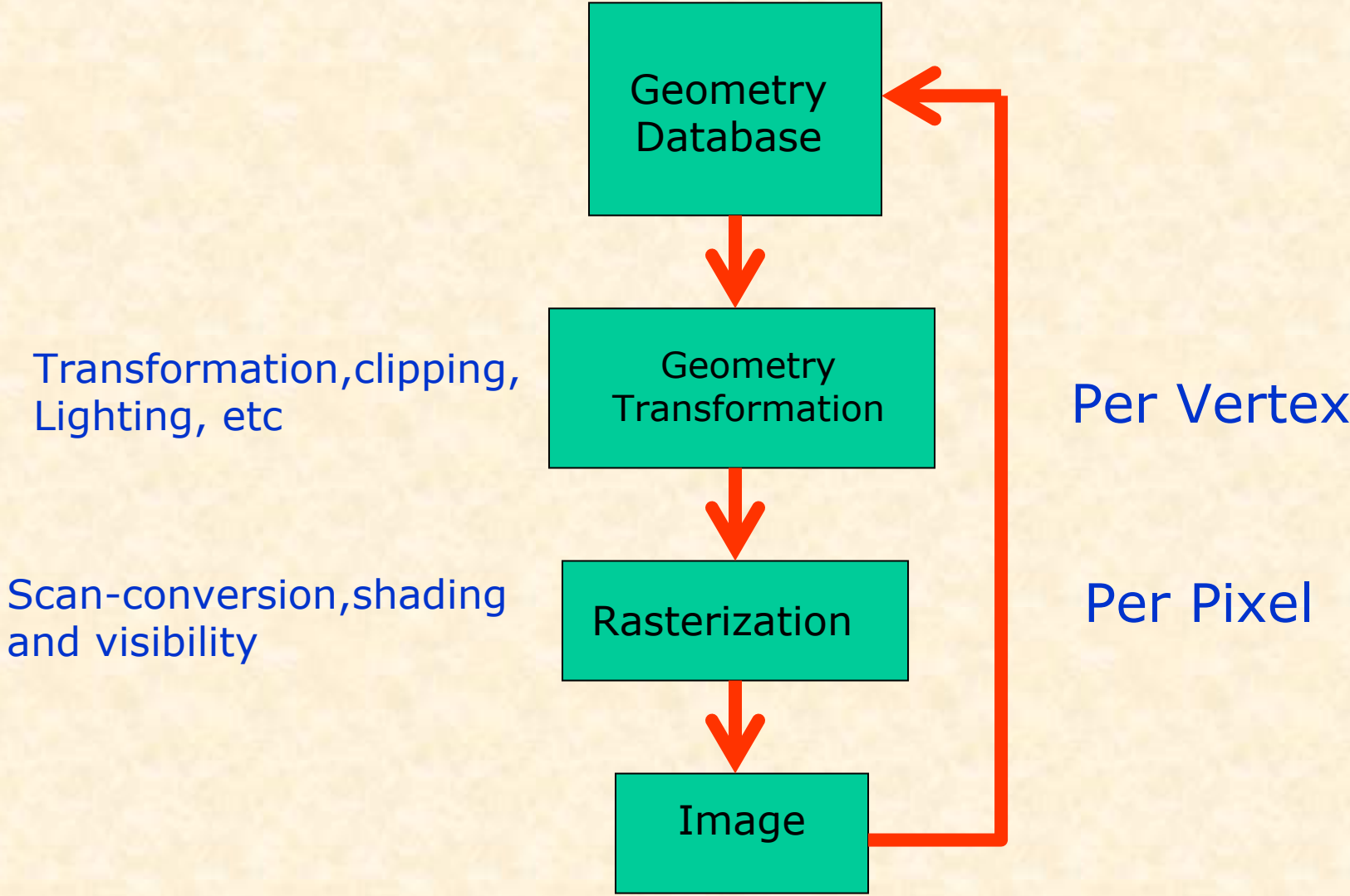
❖ *BETTER TURN AROUND TIMES (PARALLEL I/O)*

❖ *HIGH SPEED VISUALIZATION*

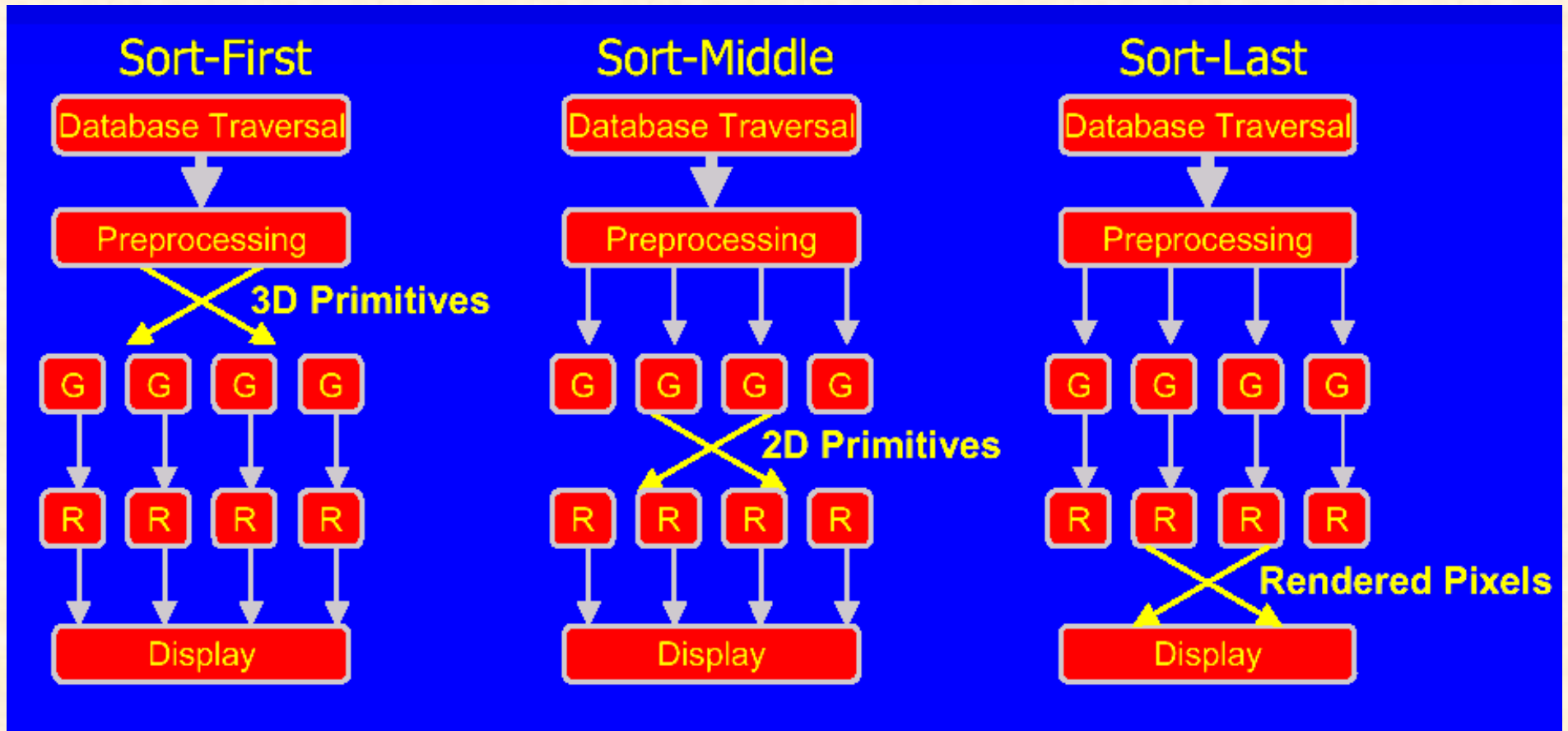
❖ *LARGE RESOLUTION VISUALIZATION*

*CLUSTER BASED
VISUALIZATION
SYSTEM*

Visualization Rendering Pipeline



Parallel Visualization Taxonomy



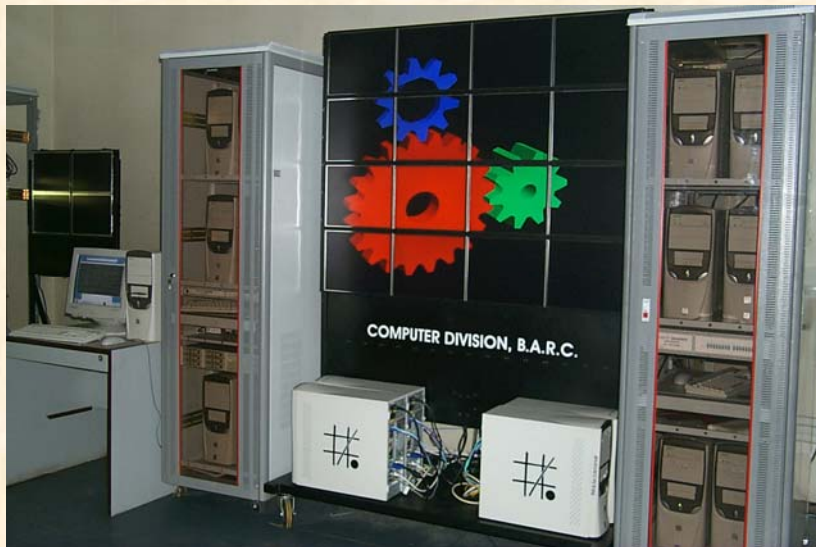
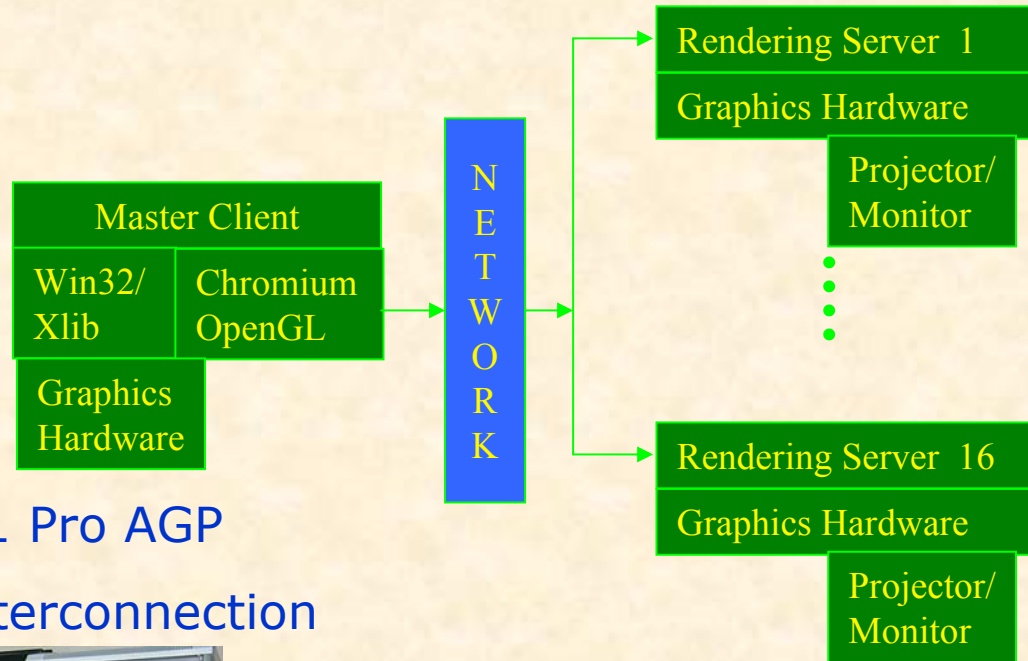
[Molnar et al. 1994]

Computer Division, B.A.R.C

Rendering Cluster & High Resolution Display

Rendering Cluster

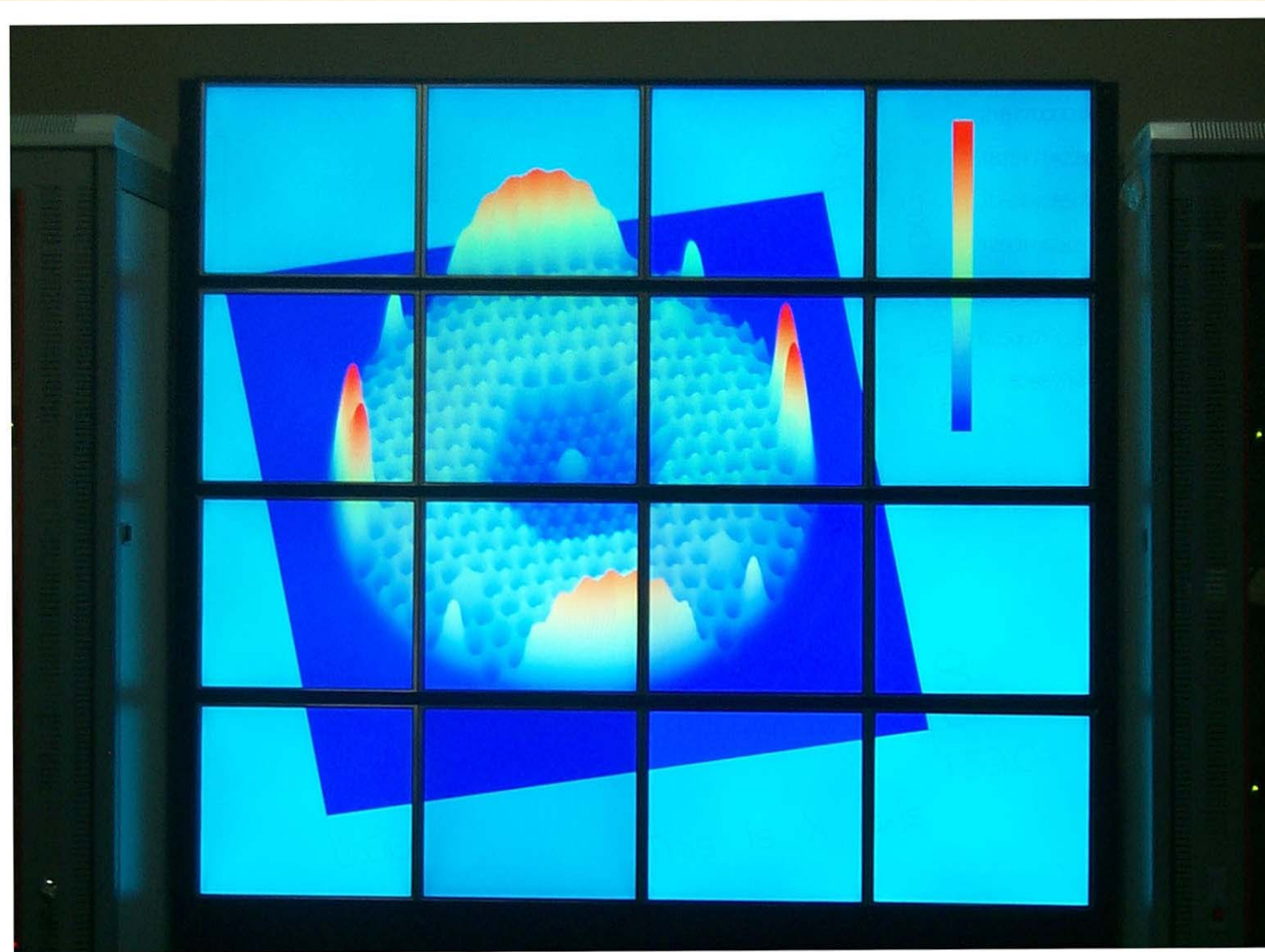
- 1 Master Client
- 16 Graphics Servers
- 1.7 Ghz P-IV Processors
- 512 MB RAM per PC
- Graphics Cards
- 64 MB 3DlabsOxygenGVX1 Pro AGP
- Fast / Gigabit Ethernet Interconnection

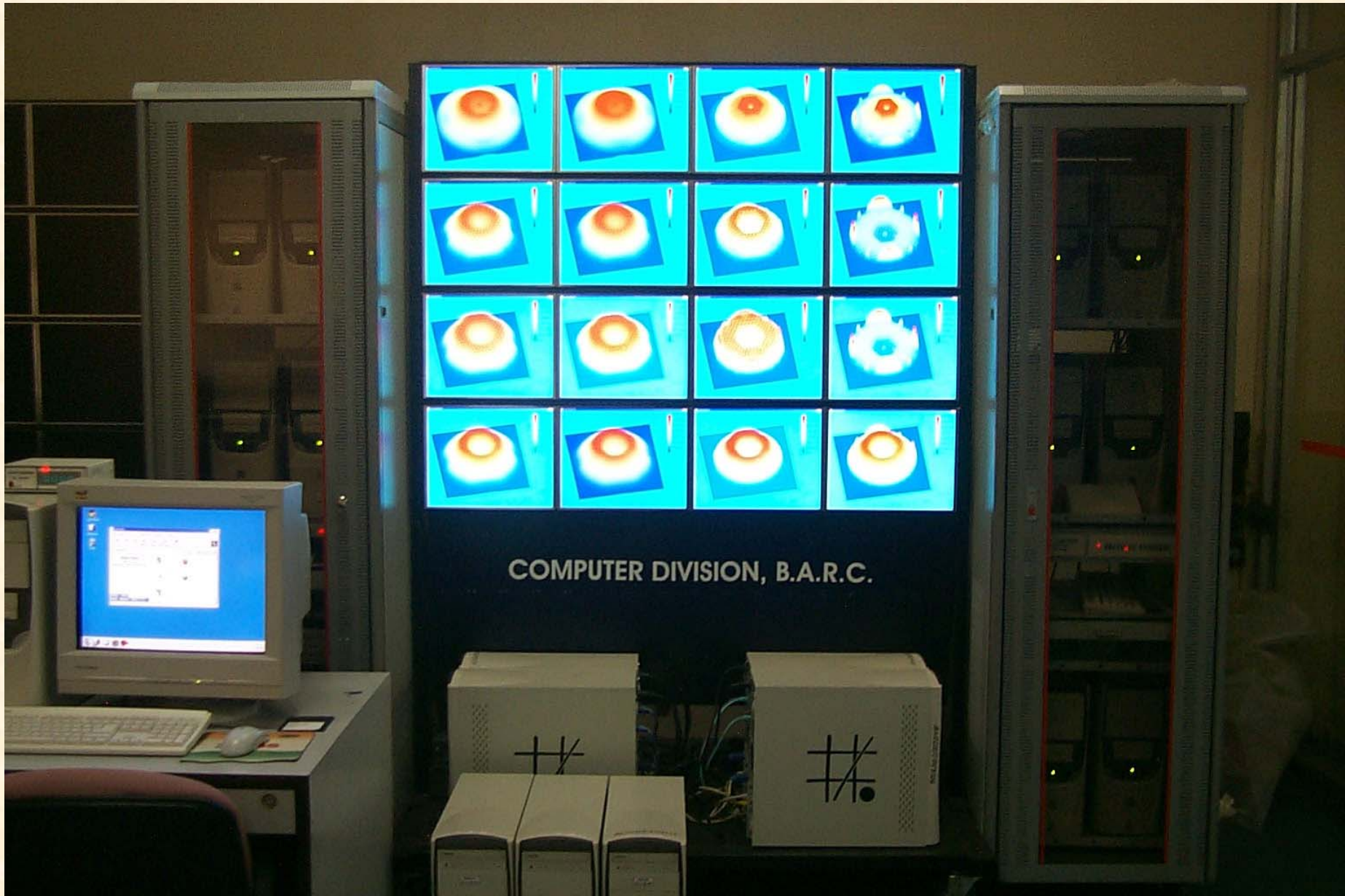


High Resolution Display

- Tiled 4x4 LCD Panels
- 5120 x 4096 total resolution
- 1280 x 1024 per LCD

Neutron Flux Distribution in a reactor





COMPUTER DIVISION, B.A.R.C.

Snapshots of Tiled Image Viewer





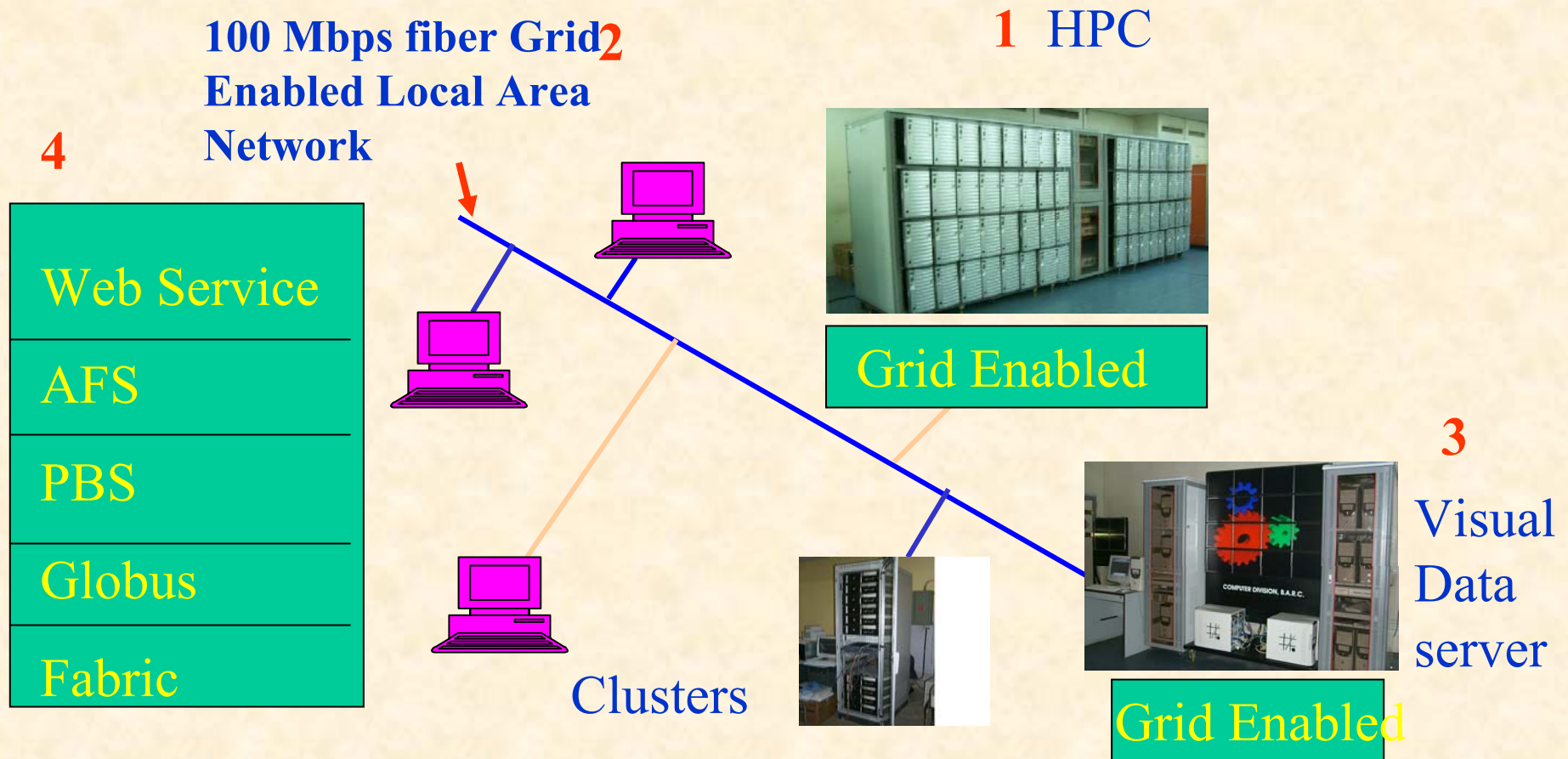
Post-tsunami: Nagappattinam, India (Lat: 10.7906° N Lon: 79.8428° E)

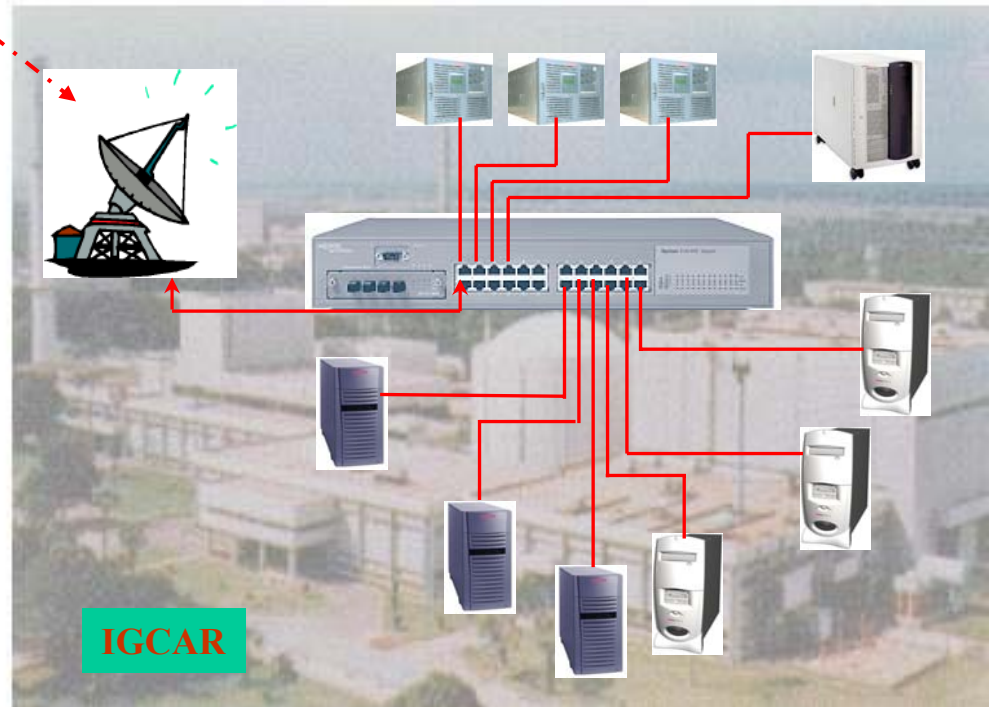
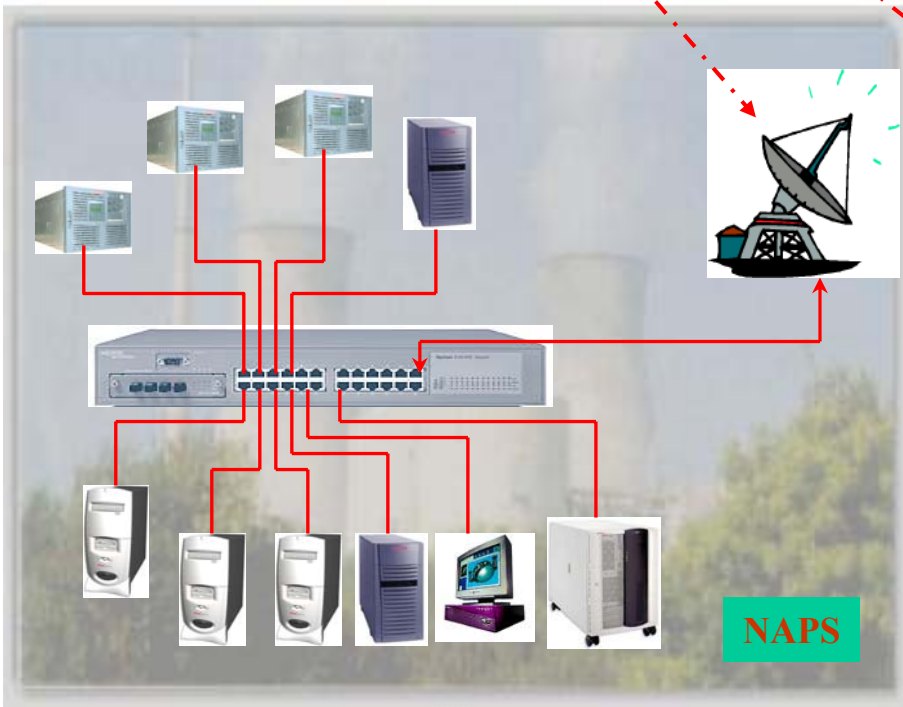
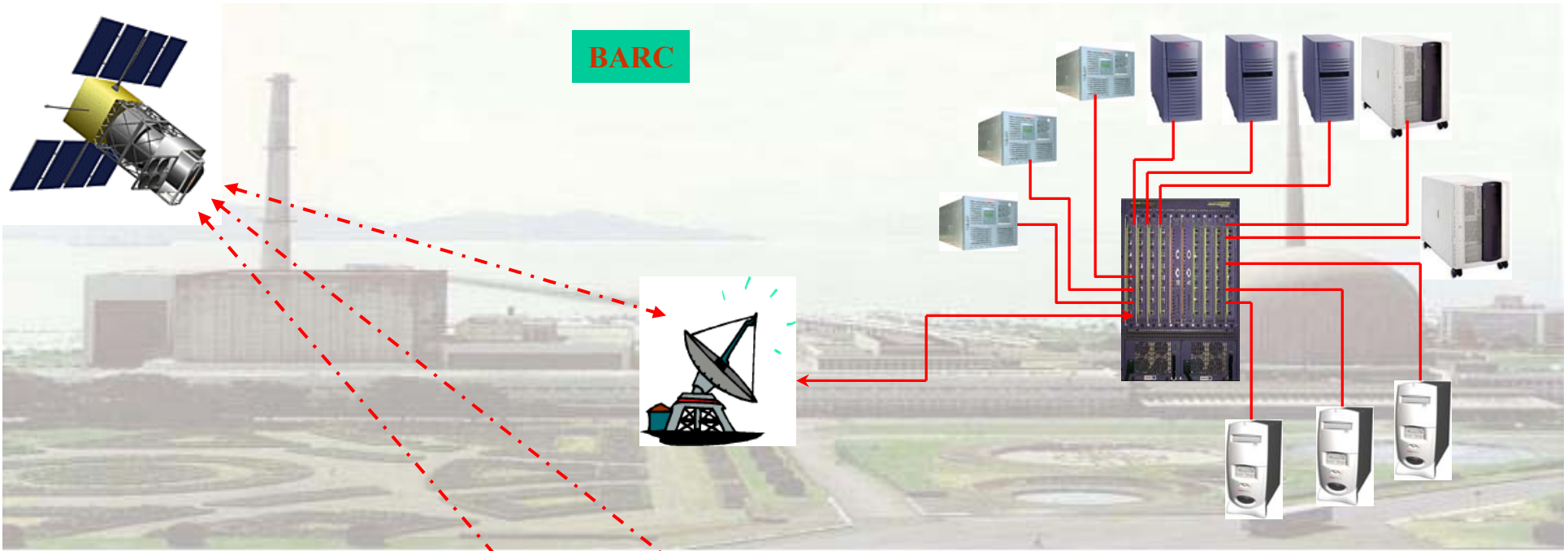
This one-meter resolution image was taken by Space Imaging's IKONOS satellite on Dec. 29, 2004 — just three days after the devastating tsunami hit.

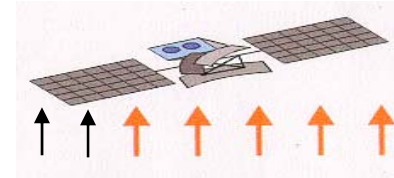
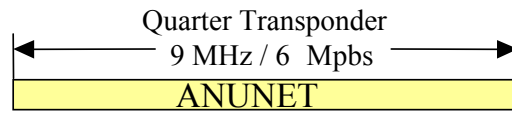
1M IKONOS Image Acquired: 29 December 2004 Credit "Space Imaging"

Computing Grid at BARC

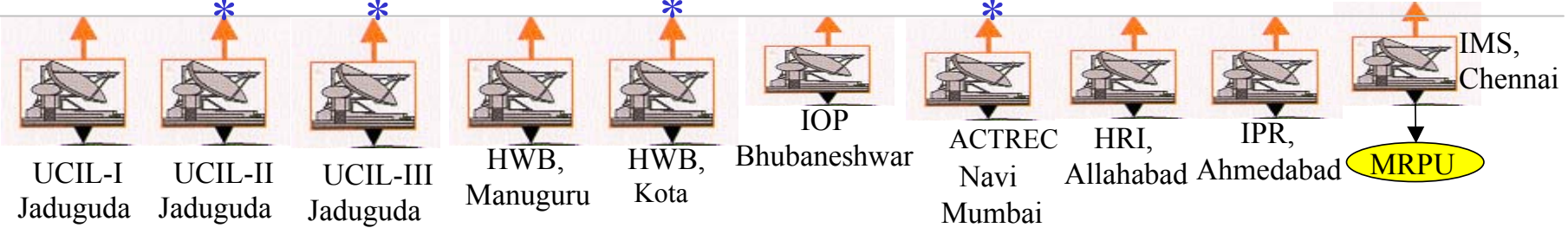
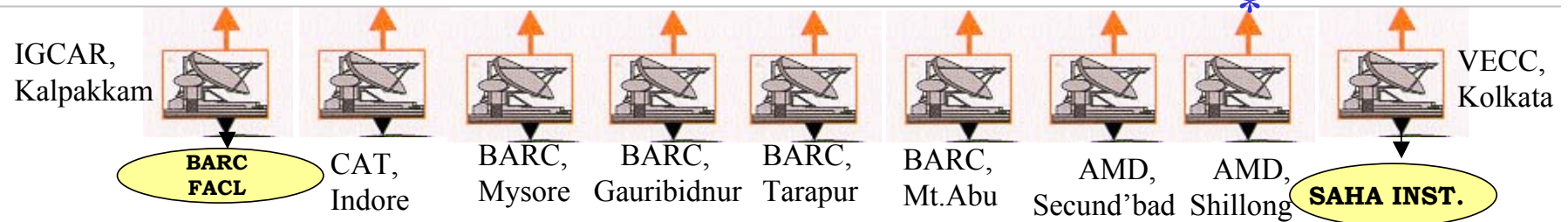
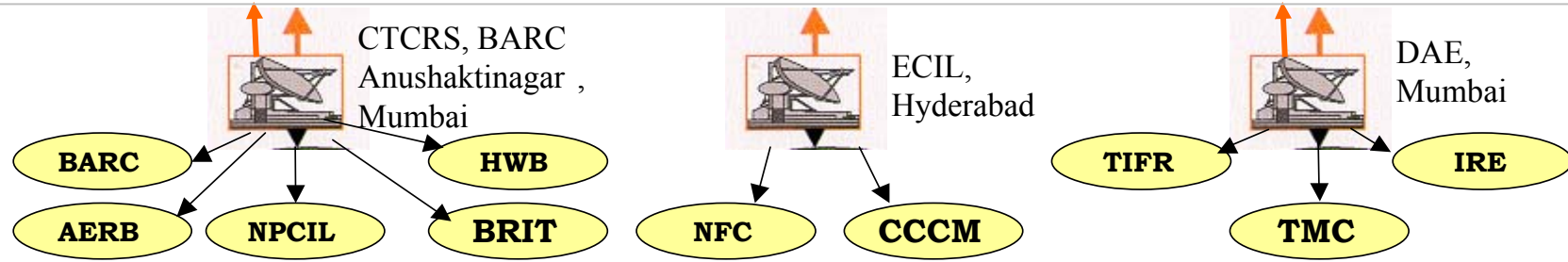
- Computing Grid system has been set up as a Test-Bed using existing Grid Technology Components







INSAT 3C
8 Carriers of
768 Kbps each



Notes: Sites shown in yellow oblong are connected over dedicated landlines.

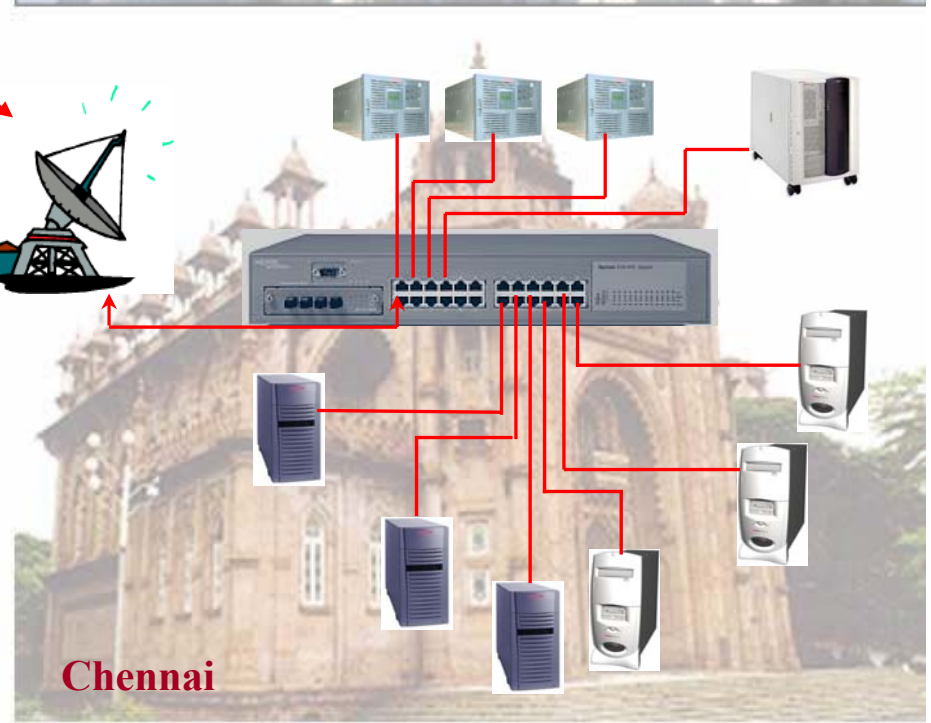
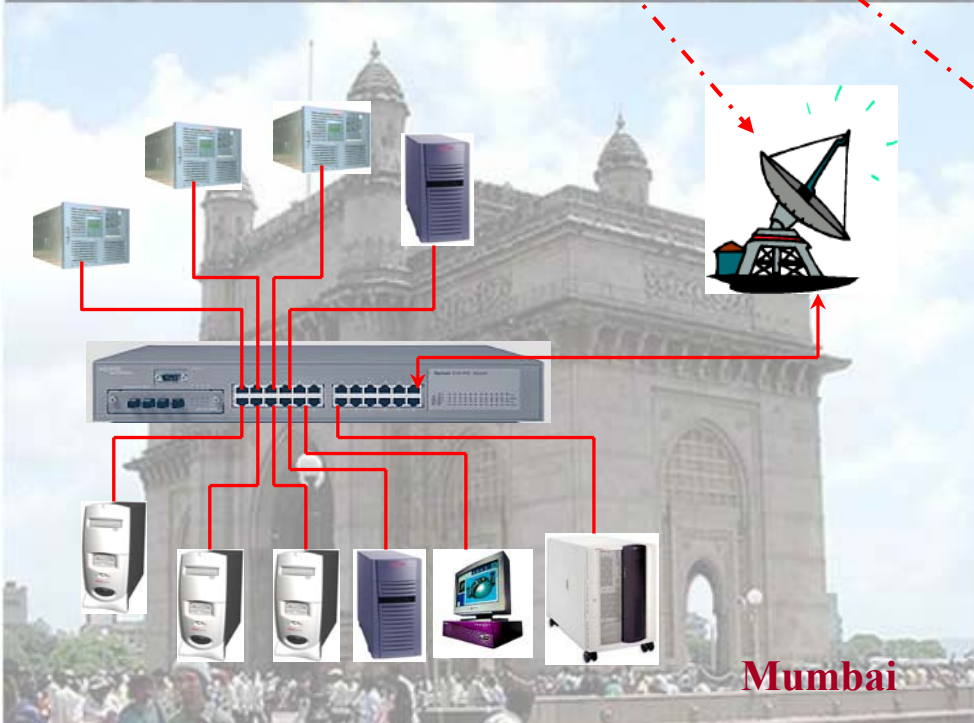
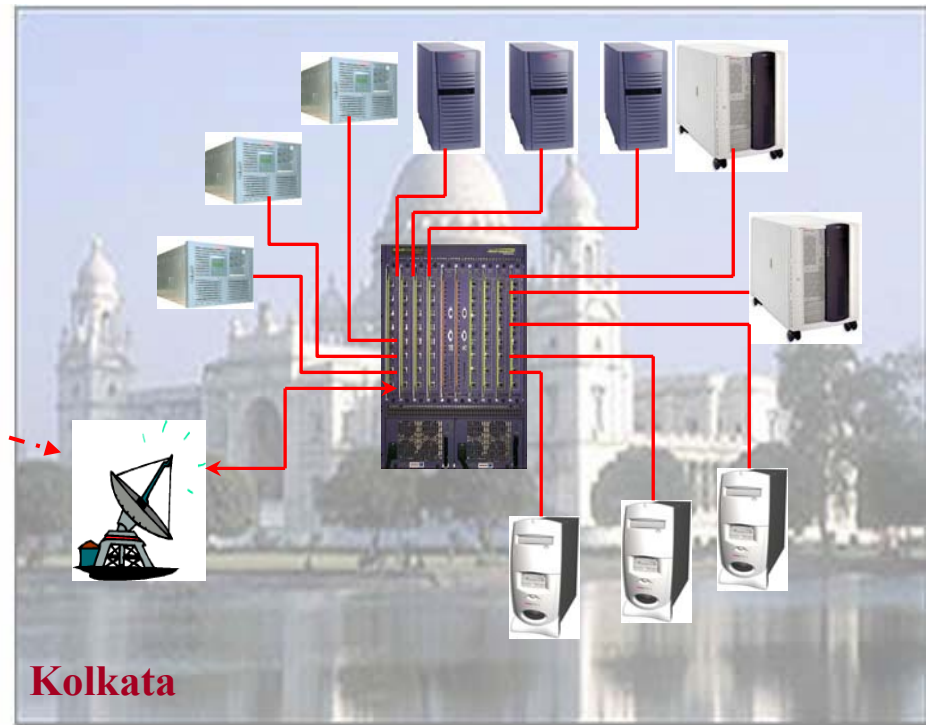
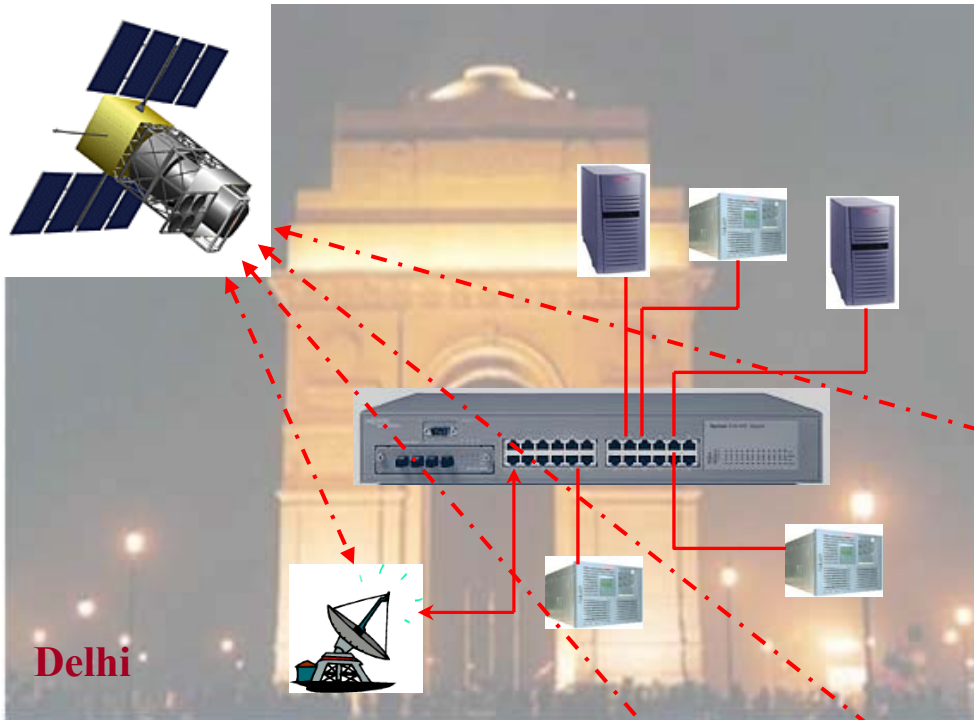
* indicates new sites being added.

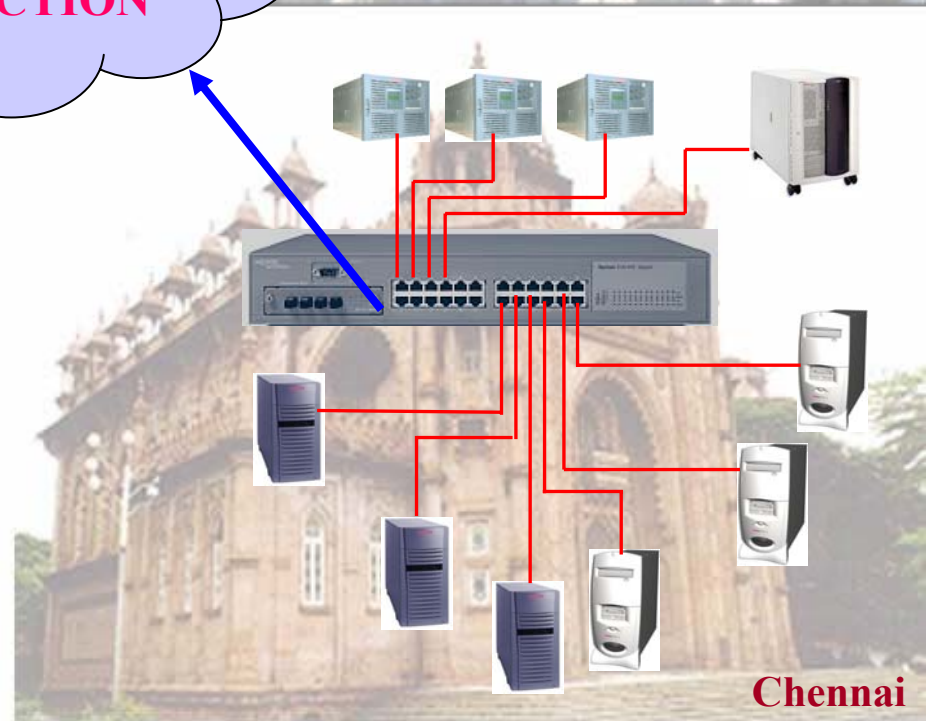
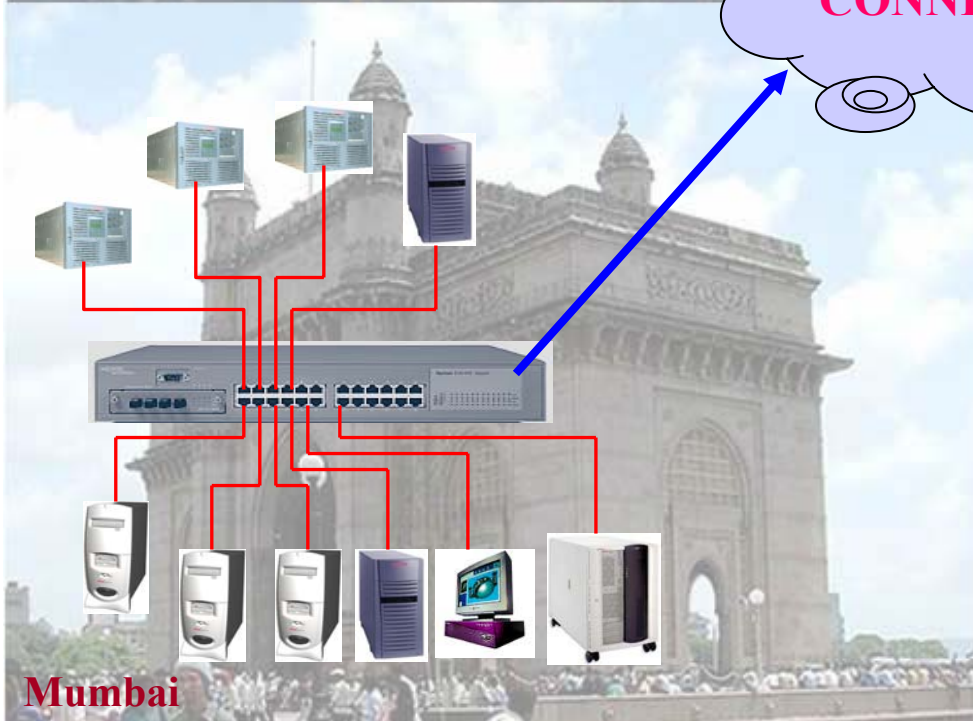
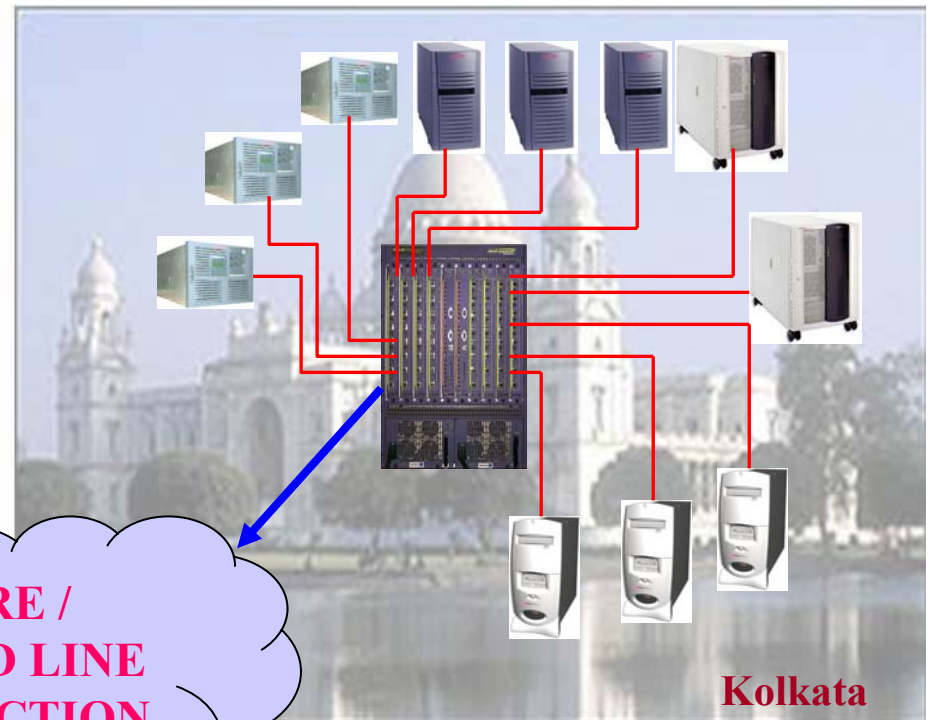
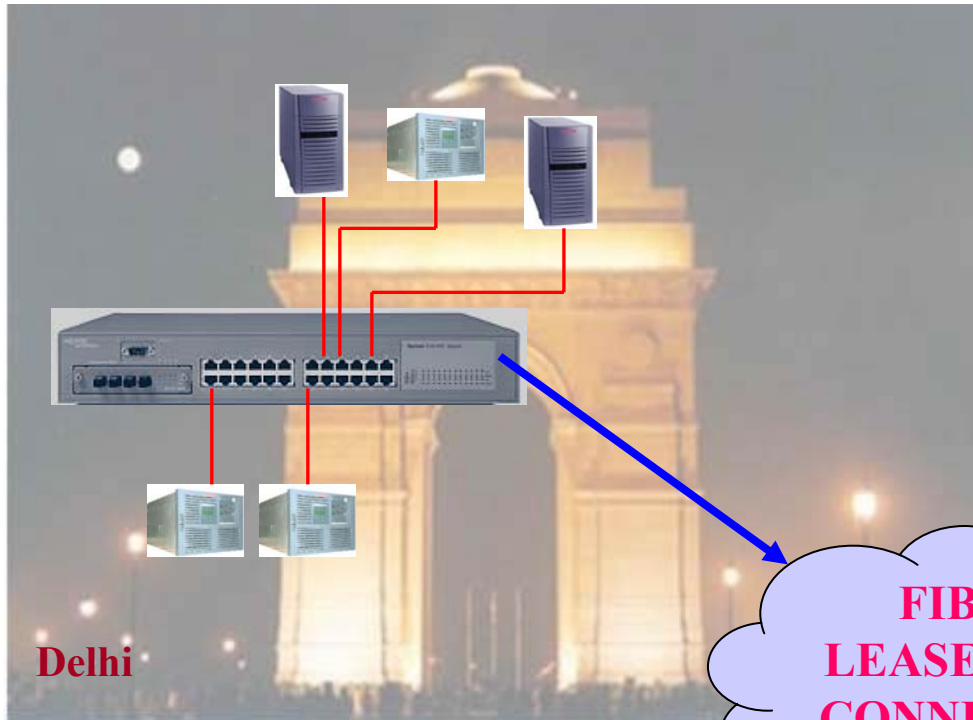
ANUNET WIDE AREA NETWORK: INSAT 3C : 22 VSAT sites, 13 non-VSAT sites

Jamming threats

- *Uplink jamming*
- *Downlink Jamming*
- *Power robbing*

- *Essential services required for IP over satellite*
- *Confidentiality*
- *Authentication*
- *Integrity*
- *Non-Repudiation*
- *Access control*





Tools Developed / Being Developed

- ❖ *Problem tracking system*
- ❖ *Correlation engine*
- ❖ *Farm management tools*
- ❖ *Visualization tool for LCG operations*

SHIVA Screenshots – User Home Page

The screenshot shows a Netscape browser window titled "Problem Tracking System - Netscape". The address bar contains the URL "http://lxplus004.cern.ch:8888/SHIVA/problems.php". The browser's menu bar includes File, Edit, View, Go, Bookmarks, Tools, Window, and Help. The page content features the SHIVA logo on the left and a navigation menu with links for Home, Register, Logout, Update ticket (with a ticket number input field), Open, List, and Projects. Below this is another set of links: Admin, Pending Emails, Change Password, Addressbook, and Update profile. A status message indicates the user is logged in as "zs (Helpdesk Administrator)" and is the operator for the SHIVA Helpdesk. A notification box states "107 problems found." Below this is a table of tickets.

Ticket No	Subject	State	Severity	Project	Proj Ver
SHIVA-1	This is for SHIVA project	CLOSED	NORMAL	SHIVA	1.1
SHIVA-2	Testing project SHIVA via SHIVA itself	CLOSED	NORMAL	SHIVA	1.0
SHIVA-3	Need to be able to change ticket no. in the 'update' form	CLOSED	URGENT	SHIVA	1.0
SHIVA-4	Login needs mouse click	CLOSED	NORMAL	SHIVA	1.0
SHIVA-5	Make emailing a problem simpler	CLOSED	NORMAL	SHIVA	1.0
SHIVA-6	How do I see all (open probably) problems for the project for which I am not troubleshooter?	CLOSED	NORMAL	SHIVA	1.0

The browser's status bar shows "Document: Done (7.109 secs)". The Windows taskbar at the bottom includes the Start button, several open applications (SHIVA_Over..., shiva_demo, ptsdemo, Problem Tr...), and the system tray with the time "2:59 PM".

SHIVA Screenshots – Severity Management Screen

Problem Tracking System - Netscape

File Edit View Go Bookmarks Tools Window Help

http://lxplus004.cern.ch:8888/SHIVA/projects.php?ActionID=311&UpdateProjectID=4&UpdateProjectID=48

Search

Mail Home Radio My Netscape Search Bookmarks

Problem Tracking System

Severity Management

Persistent Project : LCG 1.0

Projects LCG Versions 1.0

Severity List

Severity Name	Priority Value (0-255)	Deadline (days)	Assign Limit (days)	Warning Before (days)	Reminder Freq. I (days)	Reminder Freq. II (days)	Reminder Validity (days)
EMERGENCY	240	1	1	1	1		
CRITICAL	220	3	2	1	1		
URGENT	200	5	3	2	2	5	1
MAJOR	180	7	4	2	2	7	1
NORMAL	160	10	5	3	3	10	2
MEDIUM	140	15	7	3	3	15	2
MINOR	120	20	10	5	4	20	3
LOW	100	25	15	5	5	25	3
INFO	80	30					

Severity Name (25 char max)	Priority Value (0-255)	Deadline (days)	Assign Limit (days)	Warning Before (days)	Reminder Frequency I (days)	Reminder Frequency II (days)	Reminder Validity (days)
MAJOR	180	7	4	2	2	7	1

Add Severity Modify Severity Delete Severity

Document: Done (8.281 secs)

Start SHIVA_O... shiva_de... ptsdemo Problem... Problem ... 3:48 PM

Making Resource available

- ❖ *Premier National institutes
TIFR, BARC, IIT's and others*
- ❖ *University / Colleges located in urban areas*
- ❖ *Schools / Colleges located in rural access*

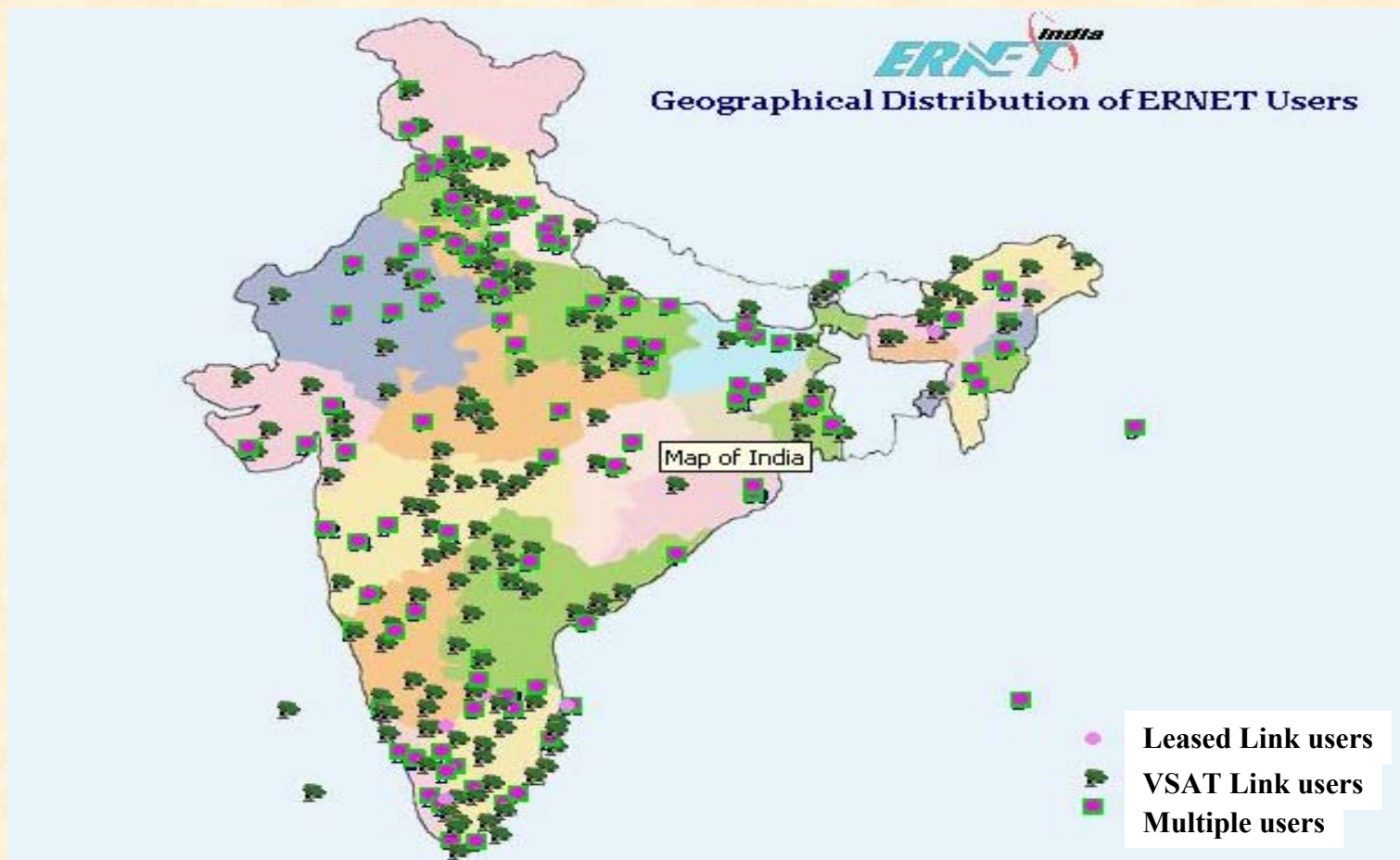
Monopoly of VSNL (a Govt body) ended on 7th October, 1998

Currently there are around 300 ISP's

Most of the premier National Institutes have good connectivity.

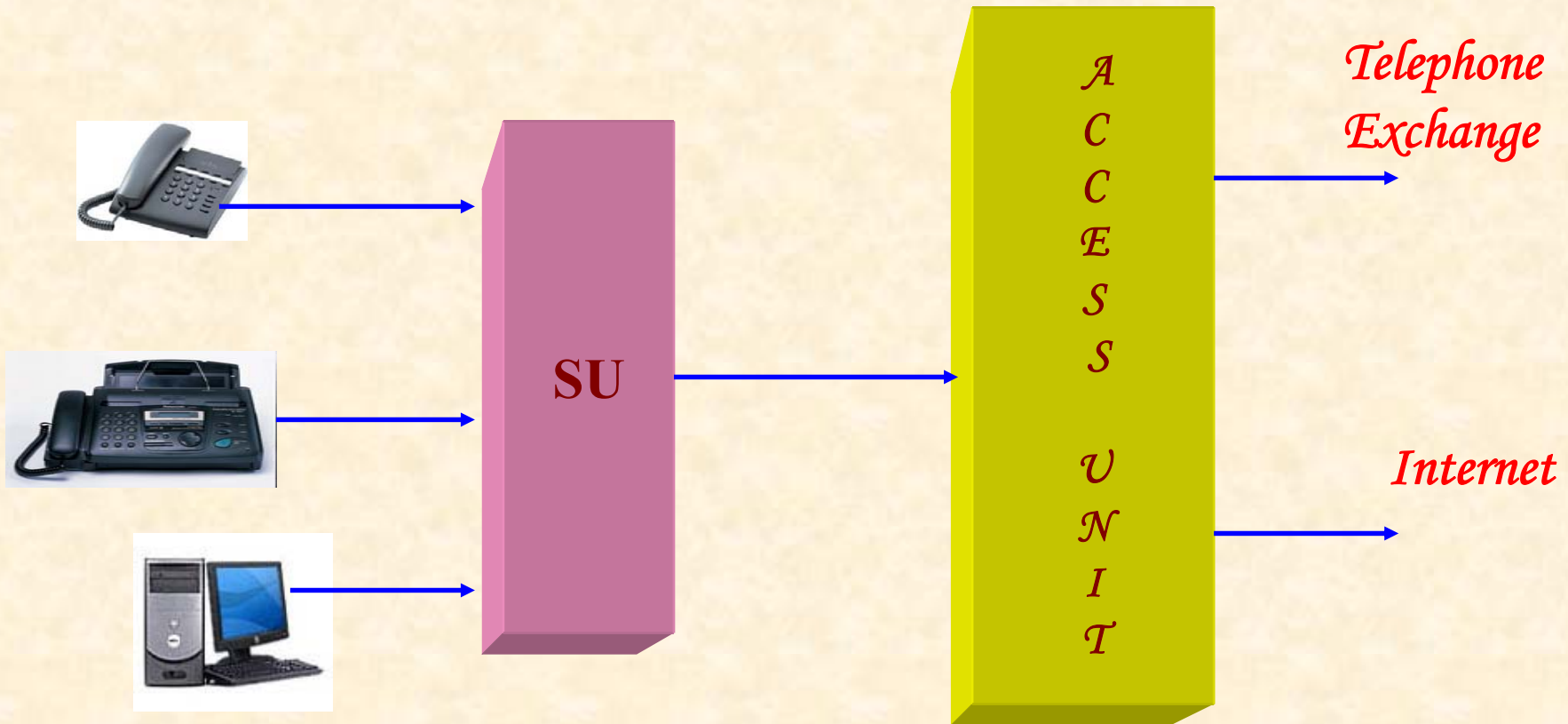
ERNET (Education Research Network)

- ❖ *Fore-runner for digital connectivity*
- ❖ *Covers all major educational institutes*



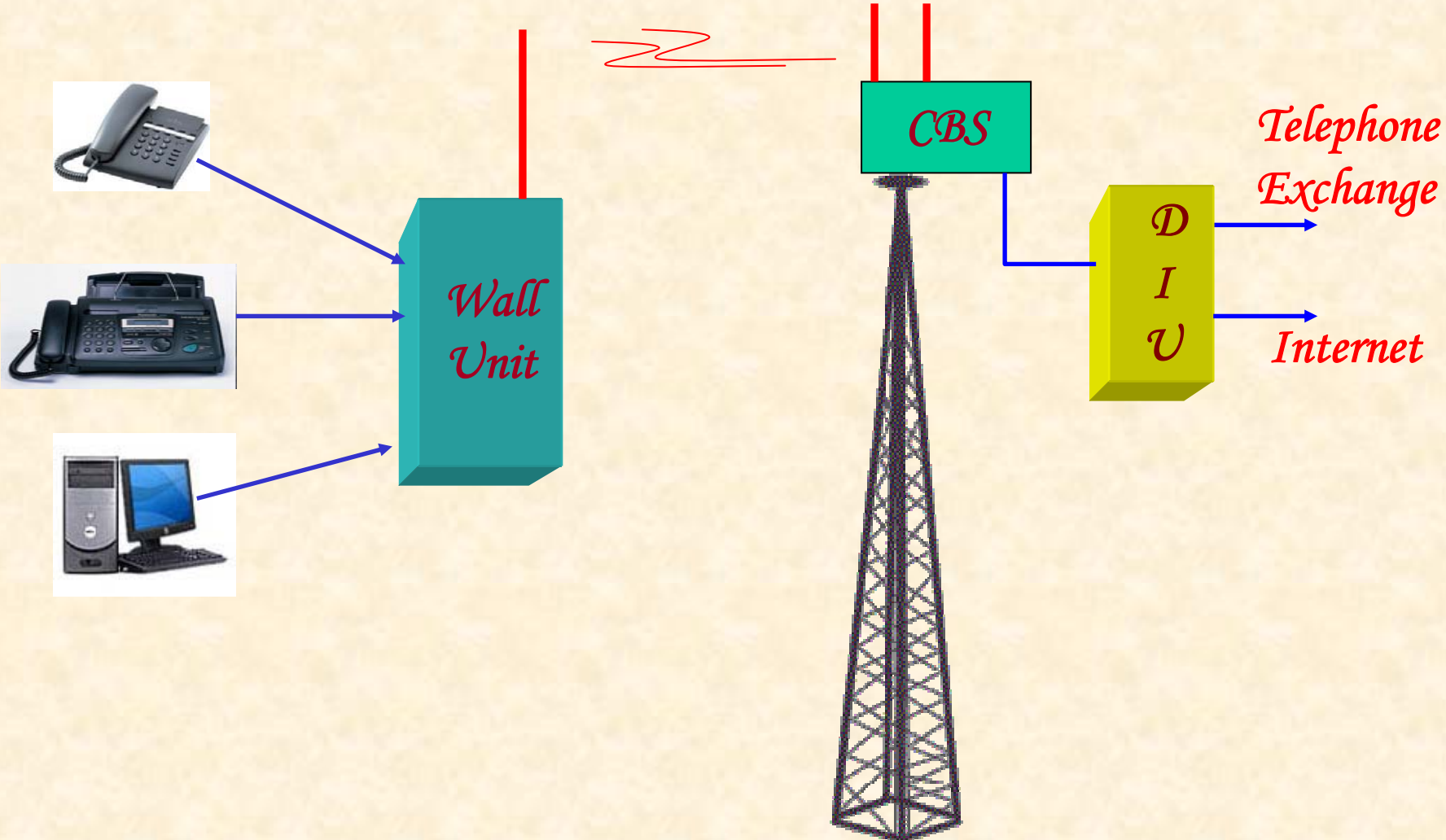
Rural connectivity ?

Conceptual Access System



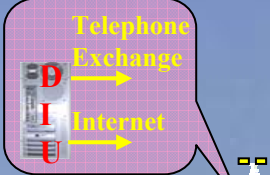
Su: Subscriber's Unit

corDECT Wireless Local Loop



CBS: Compact Base Unit

DIU: Dect Interface Unit



25 Km

10 Km

In Conclusion, the Current status is :

- Setting up of Grid Infrastructure has been completed*
- Major Research centres and Universities Will have access to LHC Grid Shortly*
- A lot remains to be done for interconnecting Schools/ Colleges in Rural areas to the Grid*

ACKNOWLEDGEMENTS

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THANK YOU