



# Satellite Data Platform of NRSC

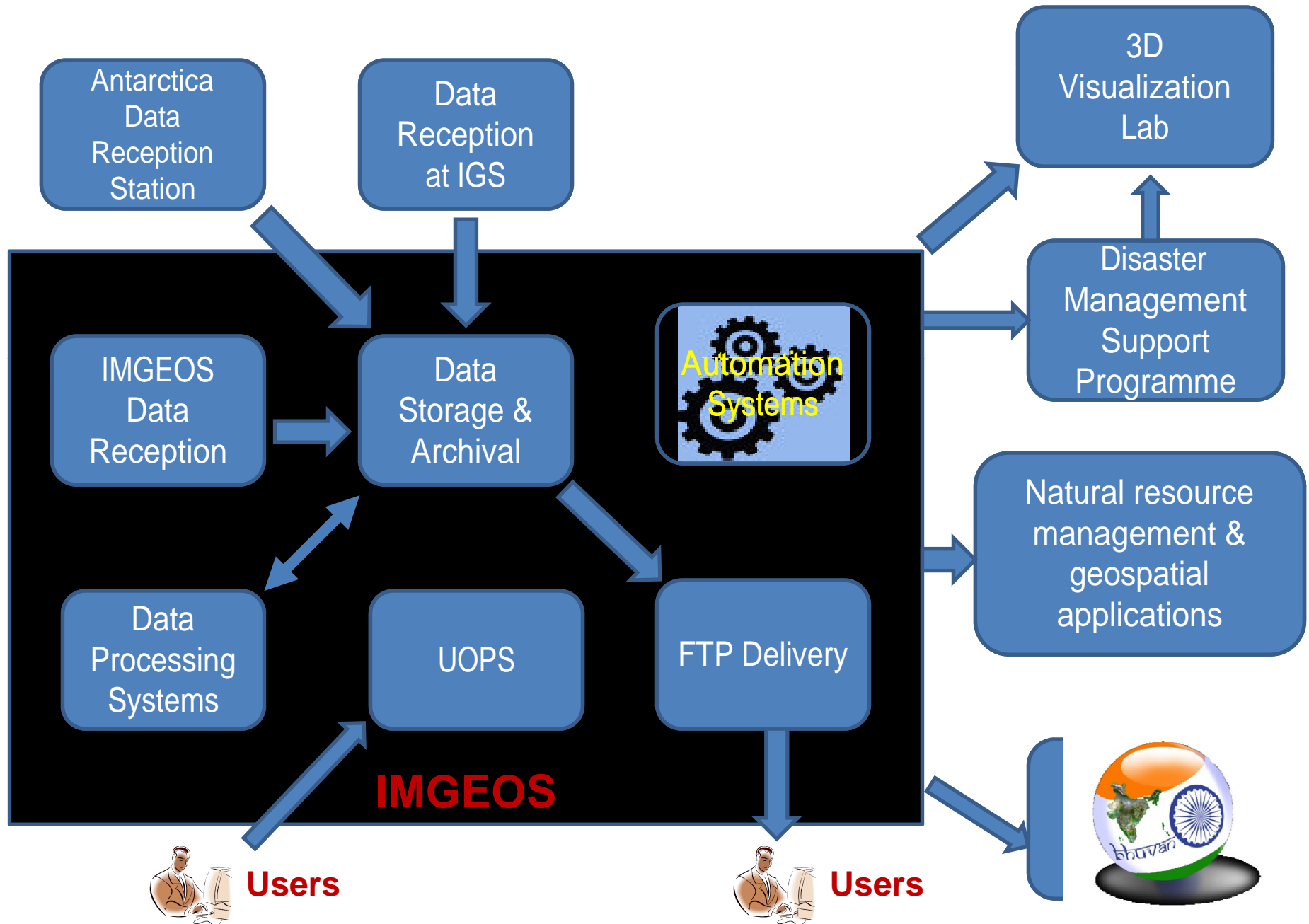
an insight into systems from acquisition to  
dissemination

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# A Brief Introduction - NRSC services

- Satellite data acquisition planning, reception, processing and dissemination for various Indian and foreign satellites
- Systematic archival of remote sensing data
- Providing geospatial solutions to various user agencies
- Support to disaster monitoring and management
- Online visualization and download services for satellite data and thematic information

# Overall picture

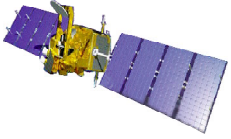


# Design Philosophy

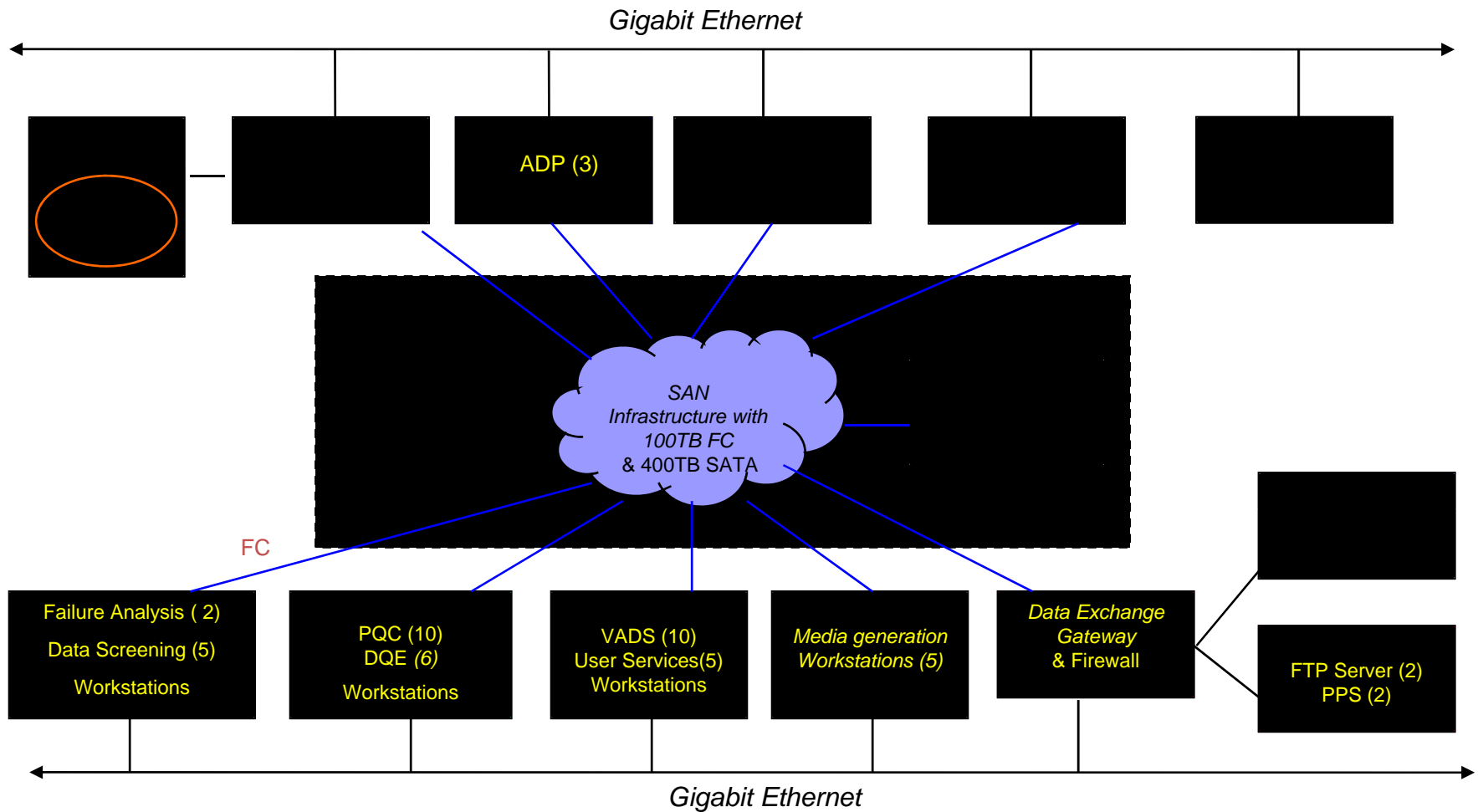


- Complete Chain Automation
- Always on
- No Single point of failure
- Optimal redundancies
- Satellite data available online
- Environment friendly
  - Green Data Centre
  - Energy efficient systems
  - Green Building
  - Solar Power Generation





# IMGEOS Architecture Diagram



■ Cat -II     
 ■ Cat -I     
 ■ Cat -IV     
 ■ Cat -III     
 ■ Workstation

DI – Direct Ingest, ADP- Ancillary Data Processing, DPS- Data Processing System, PQC- Prod Quality Check, DQE- Data Quality Eval, PPS- Payload Pass Prog, ADIF- Ancillary Data Infor Format.

## ...architecture continued



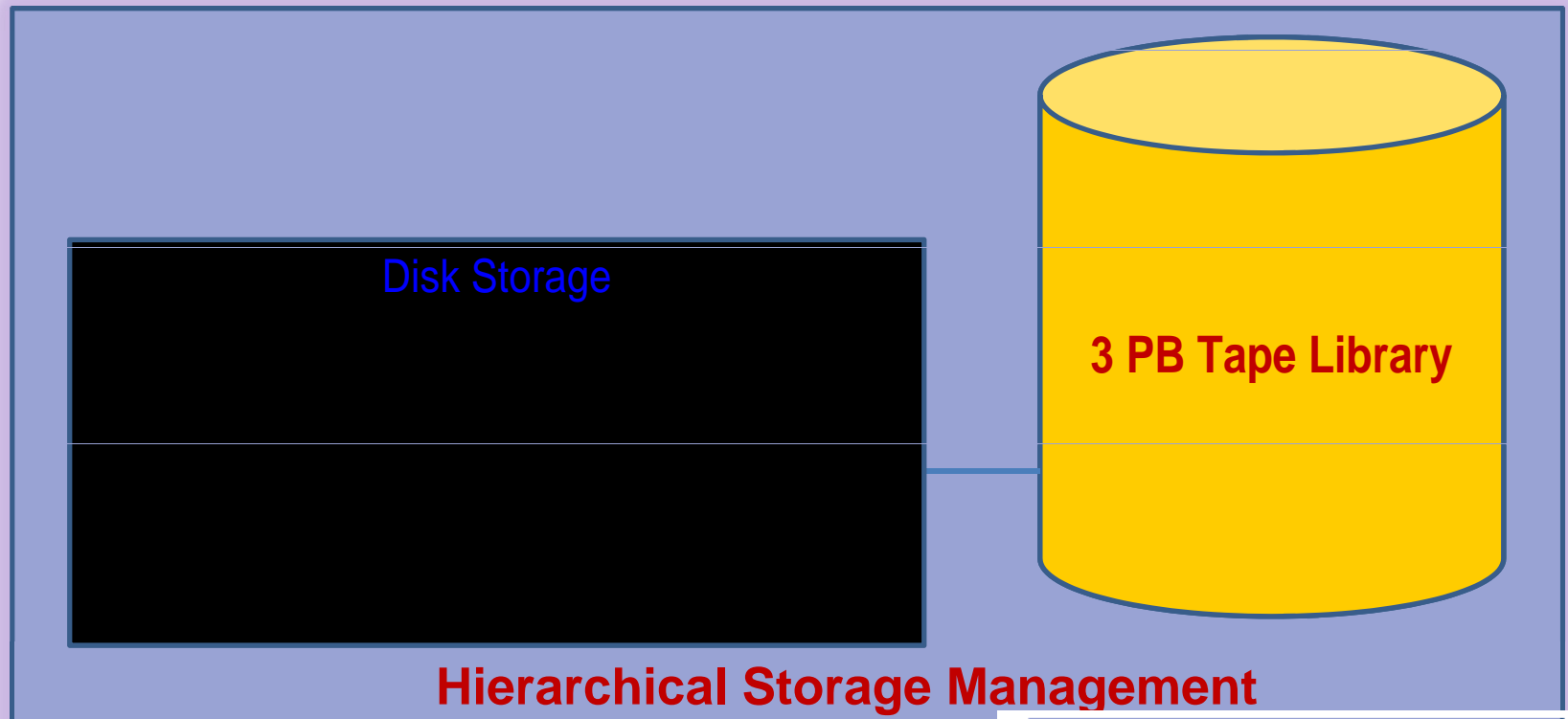
- Total of 60 multi-core Servers
- Tier-3 Data Center
- Entire enterprise is based on RHEL
- Dynamic work order scheduling
- Data processing on compute clusters
- N+1 redundant architecture

- 3 tier SAN storage
- Tier-1 with 100TB HS storage
- Tier-2 with 400TB MS storage
- Tier-3 Online Tape Library of 3 PB
- StorNext Filesystem for shared access with a Global name space.
- Three copies of data are kept online.
- One copy of data is kept in Vaults



# IMGEOS STORAGE ARCHITECTURE

....architecture continued



- DMX-4
- FC Disks
- RAID 5 / 1+0
- 16 FC Ports

- 2 Nos of CX-4 480
- SATA Disks
- RAID 5
- 16 FC Ports

- SL 8500 TapeLibrary
- 3000 Slots
- LTO-6 Tapes
- 16 Drives
- 8 Robotic Arms

# NDEM System Infrastructure

## Decision Support Centre

- National Database for Emergency Mgt.
- Hazard Zonation & Early Warning
- VPN Communications
- Decision Support System

**Servers:- 11**

**Workstations :- 23**

**NetApp FAS 3140 Unified storage**

**Dual ACT-ACT Controllers**

**FC and SAS Storage**

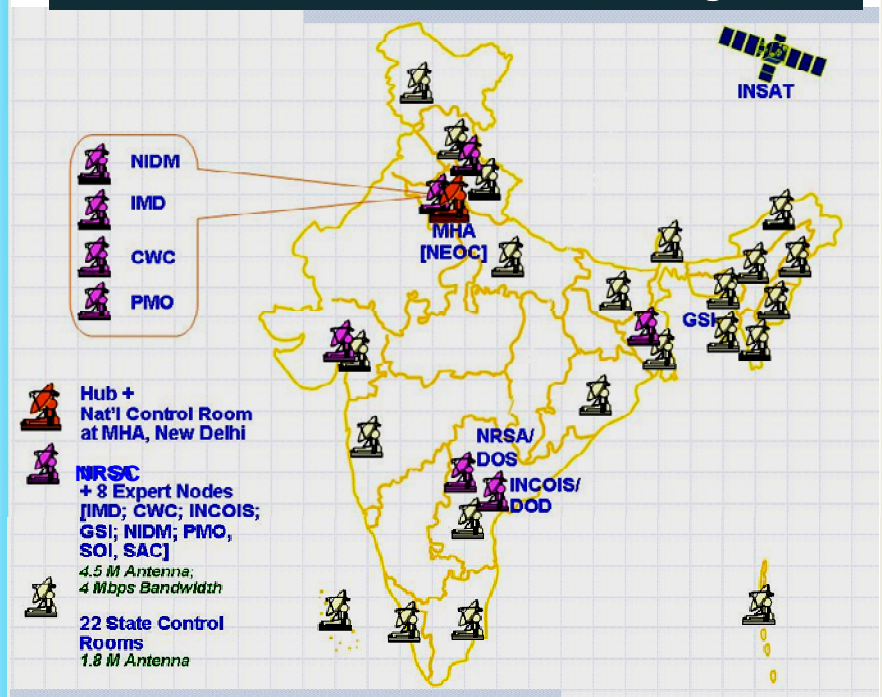
**Total Usable Capacity ~ 15 TB**

**Flood Management**

**Cyclone warning**

**Drought Monitoring**

## Virtual Private Network for Disaster Management





# RSA Systems Infrastructure

15 servers

10TB IBM NAS Gateway 300

39TB NetApp FAS 3140 Unified storage

- VTL Capacity ~ 20 TB
- LTO4 Tape Library with 2 Drives

## Softwares

ERDAS, ArcGIS, ENVI-IDL, MATLAB, E-Cognition, Sarscape, PCI Geomatica, Autodesk, MIKE, etc

## Atmospheric Studies

### 1 TFLOP HPC

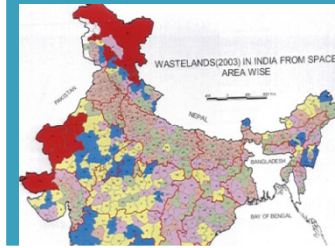
136 core Xeon based HPC Cluster

Compute Nodes: - 8\* 2 CPU

Total Memory:- 384 GB

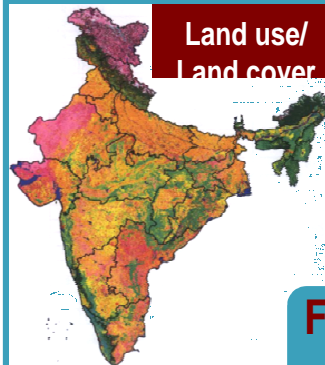
PFS Storage capacity:- 10 TB

## Wasteland Mapping



- Total wastelands in the country Wasteland Atlas
- Digital database

## Natural Resources Census



Inventory of Natural Resources & Periodic monitoring

## Forest Cover Mapping



- Forest Survey of India
- 1987 onwards (Landsat MSS to IRS LISS III)

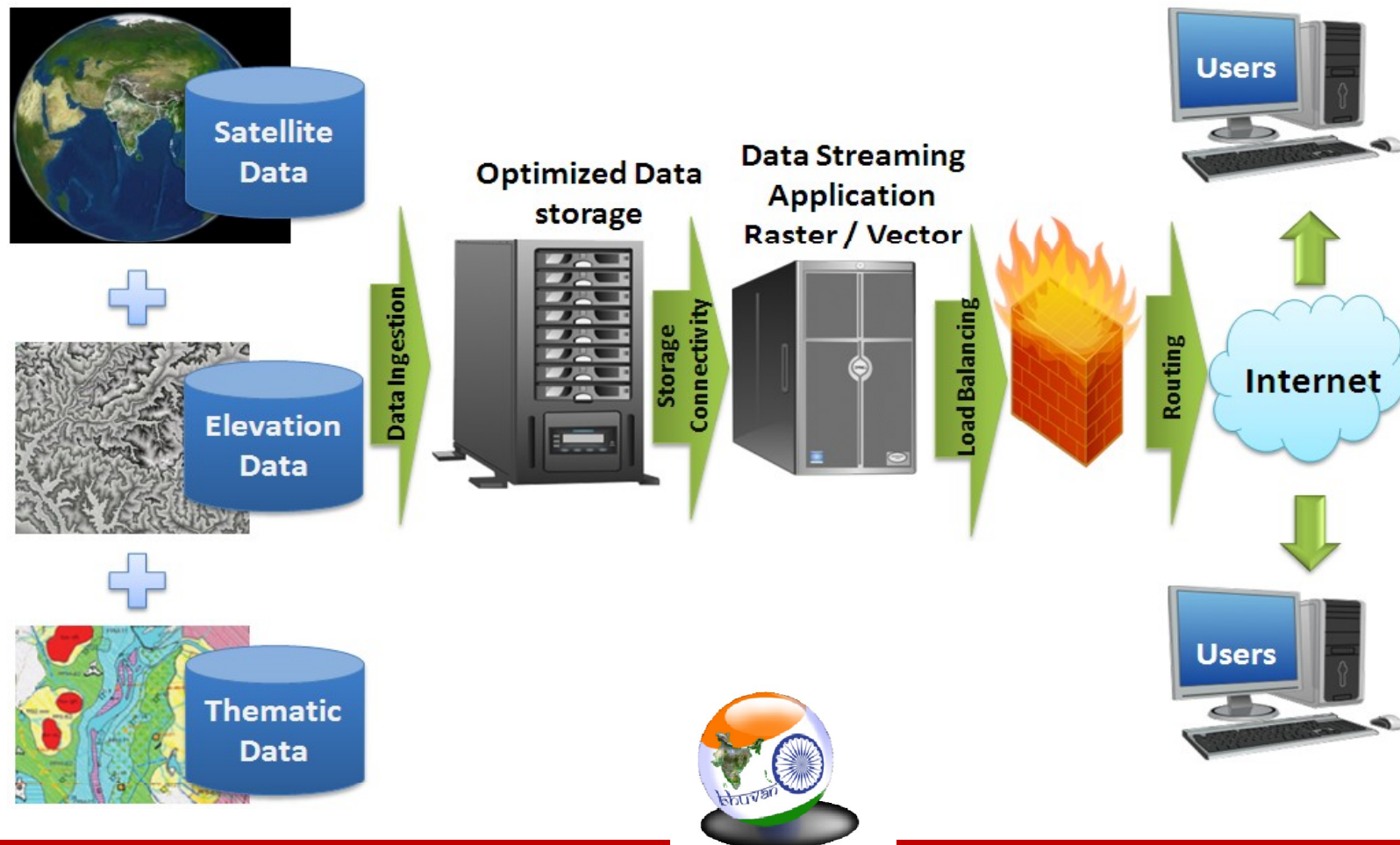
50,000 scale

## Snow/ Glacier Mapping

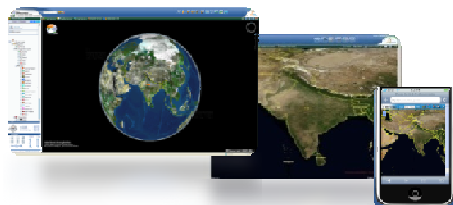


- Snow-melt Runoff Forecasting
- Glacier Retreat Study

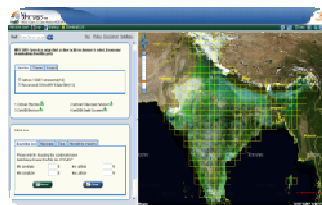
# Systems Setup for Bhuvan



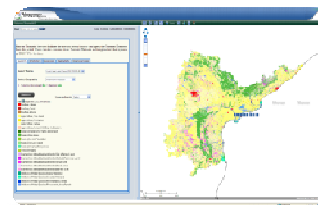
## Visualisation



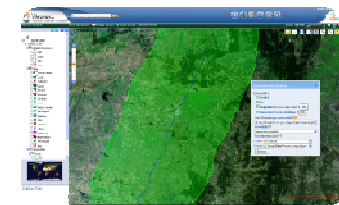
## Data Archive



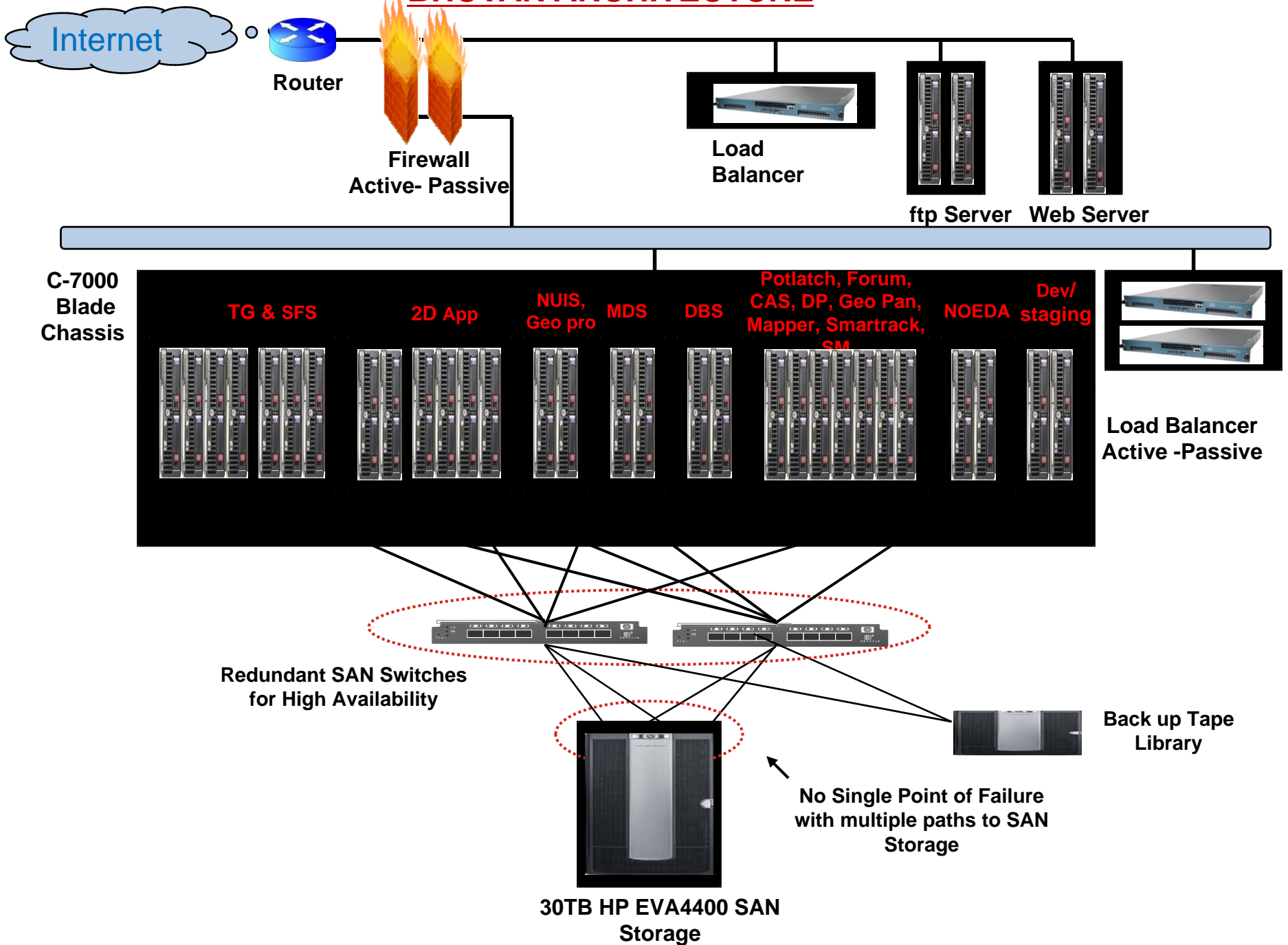
## Thematic Services



## Geo-Processing

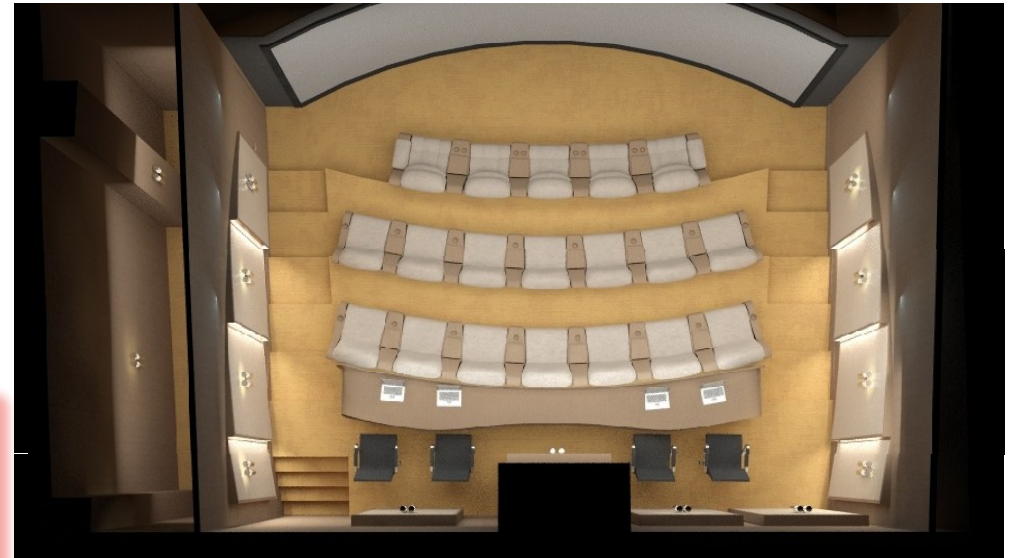
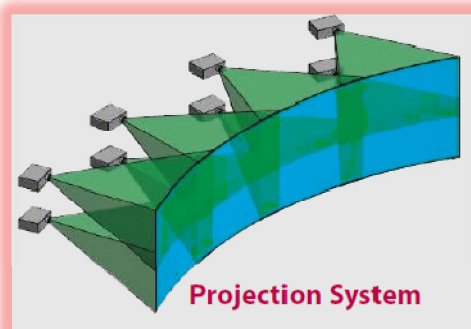


# BHUVAN ARCHITECTURE



# 3D Visualization System

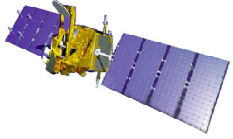
- Ensures full immersion for 5 persons.
- Collaborative mode for concurrent control using gestures over 46" multi-touch table.
- Create animations and fly-throughs.
- Integrate 3D models of structures.
- Supports all standard raster and vector formats.



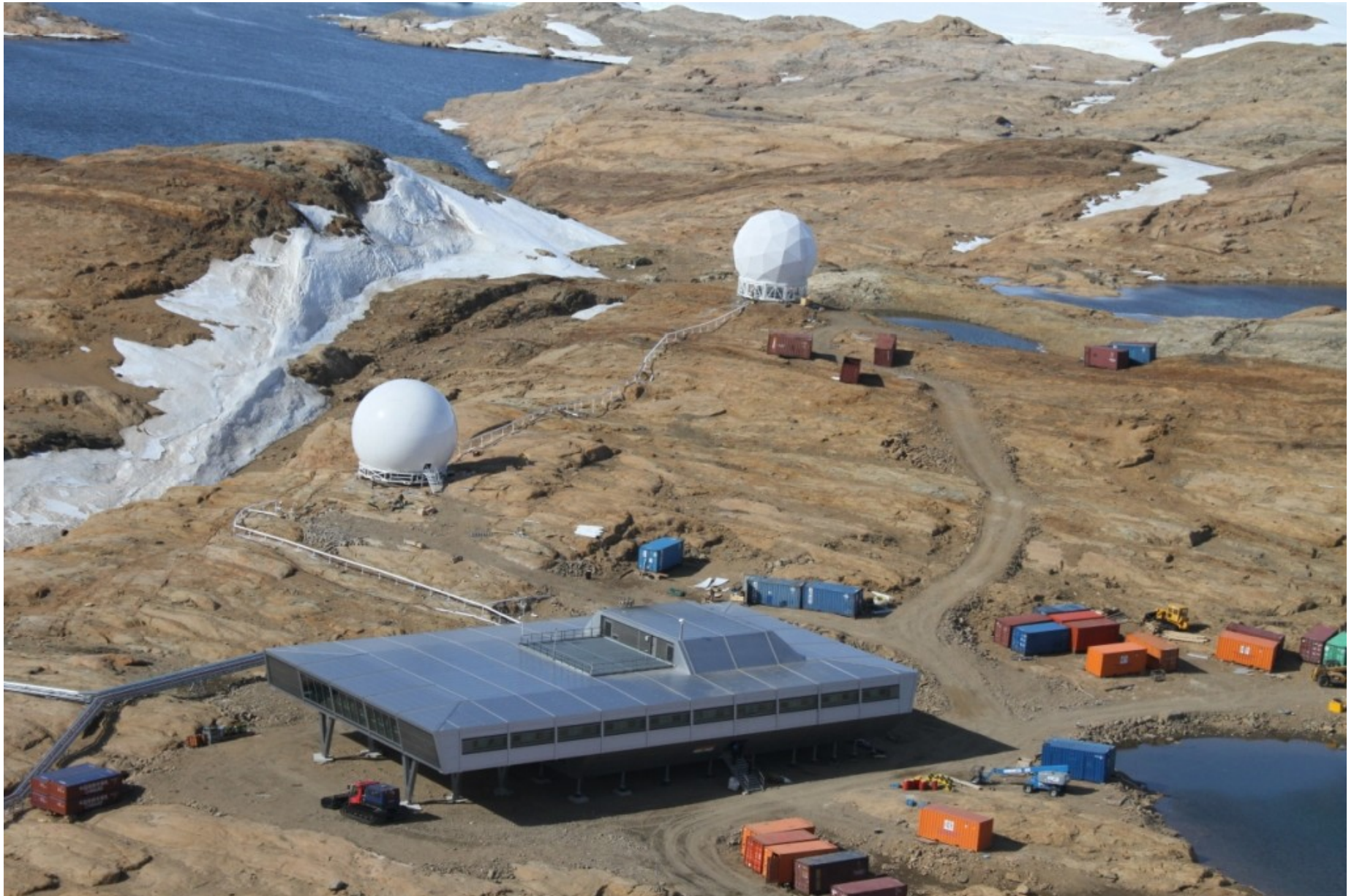
Description	Specification
Screen Size	7.8m x 2.4m, Cylindrical curved screen with 60° FOV
Projectors	1920x1200 Resolution, DLP in rear projection
Contrast Ratio	8000:1
Uniformity	Blending & Geometric Correction with MIPS hardware
Stereo	Fully Immersive Active Stereo, LCD shutter glasses
Visualization Software	Terrain Kit, VizDisplay

Thank You for Your  
Time





# View of Bharati Station





# Data archival evolution

All  
Current  
Data

- RS-1
- Carto-1
- Carto-2

- Landsat
- 1A / 1B
- 1C / 1D

