State Data Centre

Vol. 6 | No.5
October, 2008

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Introduction

▶ **Data centre**
A data center is a centralized repository, either physical or virtual, for the storage, management, and dissemination of data and information organized around a particular body of knowledge or pertaining to a particular business.

A private data center may exist within an organization's facilities or may be maintained as a specialized facility. Every organization has a data center, in that sense; data center may be referred as a restricted access area containing automated systems that constantly monitor server activity, Web traffic, and network performance.

NeGP (National e-Governance Plan)

The National e-Governance Program (NeGP), approved by the Government of India, aims to significantly transform and improve the way the Government provides services to its citizens. It is envisaged to move from a government-centric to a citizen-centric paradigm in service provisioning; to start treating citizens as government customers; and to empower them to demand convenient, cost effective and transparent services from the government.

NeGP comprises of several projects spread across a number of sectors which are to be implemented either by the line ministries/departments at the central government or by state governments, as well as integrated projects spanning across multiple ministries/departments/agencies.

As a part of NeGP, there is a requirement to create the core infrastructure which will support the various mission mode projects that are envisaged under the NeGP. SDC is one of the important elements of the core infrastructure which is required to be established in the States/UTs.

Basically the SDC will support consolidating the services, applications and infrastructure to provide efficient electronic delivery of G2G, G2C and G2B services.

It will be a well secured infrastructure created in each State where all the line departments who have their applications ready, would be in a position to host their applications and therefore, in a position to render services to end beneficiaries electronically.

The SDC infrastructure shall provide adequate space to house IT assets of various departments within the state in an environment that meets the need for reliability, availability, scalability, security and serviceability.

With the increasing needs and ever increasing complexity, it is being felt that such facility should be more professionally designed and must offer features like reliability for 24*7 operations, adequate redundancy, and protection against hazards, future expandability and security.

Keeping in mind each of the above requirements the task of creating a professionally designed modern data center was given to **M/S (N)-Code Solution, A division of GNFC.**

GSDC will act as a mediator and convergence point between open unsecured public domain and sensitive government environment. GSDC has been equipped to host / co- locate systems such as Web Servers, Application Servers, Database Servers, SAN and NAS etc.

GOG's Initiative

SDC would be integrated with the other two core infrastructure i. e. State Wide Area Network (SWAN) and Common Service Centre (CSC), thereby enabling the services to Government agencies, Citizens and Businesses.

It was, therefore proposed to create a Gujarat State Data Centre (GSDC) for the State to consolidate service, application and infrastructures to provide efficient electronic delivery of G2G, G2C and G2B services.

The Department of IT-Government of India has formulated policy guidelines wherein various issues have been addressed including the implementation options and international best practices.

Basically there are two options given to the States; one is that the state can create infrastructure of their own, where the entire physical and IT infrastructure shall be responsibility of the state government; and another is that the state can leverage on the physical infrastructure of a commercial IDC where the private sector will be involved including facilities and maintenance of the physical and IT infrastructure.

However in both the cases, the state IT Department/ State implementing agency shall be responsible for the security of SDC including technical and operational issues.

► **Steps taken by the GoG Initiative**
In the year of 2006 Government of Gujarat has taken initiative to build up the State Data Centre. The state has already identified the site for State Data Centre and is planning to build a total area of 4500 sq. ft. which will include a server farm area of about 2000 sq. ft.
The state has also identified a Gujarat State PSU **(Gujarat Narmada Valley Fertilizers Company Limited)** to undertake the construction of the facility which in turn will follow all the set procedures for procurement of all the components & **Gujarat Informatics Limited**, DST has been identified as the State implementation agency for the SDC.

This Data Center will provide the necessary facilities for the IT equipments in terms of regulated power, Air conditioned environment, Fire retardant infrastructure, Eco-friendly Fire suppression system, Access Control, security & surveillance system etc.
Several departments viz. Home department, Land records, Treasury, Sales Tax, Agriculture etc. will be able to house their IT equipments in the proposed Data Center.

The data center is set up at the following address:

Gujarat State Data Centre
Ground Floor,Statistical Bureau
Near police Bhavan,Sector- 18
Gandhinagar, Pin: 382011
Gujarat.

Government of Gujarat is also in the process of implementing **Four Mini Data Centres at Mehsana, Rajkot, Surat and Vadodara**, to provide decentralized delivery of services to reach the citizens in the urban and rural segments pertaining to that geographic cluster through their existing implementation partner. The proposed Mini Data Centres will provide the infrastructure required for running the localized applications and will provide online services to urban and rural citizens. The Gujarat SDC will act as DR for the localized applications running at Mini Data Centres.

The Mini Data Centres at Mehsana, Rajkot and Vadodara have already been set up and the Mini Data Centre at Surat is currently under implementation.

Deployment Architecture for delivery mechanism

The architecture of a Data Centre would be such as to provide a model environment capable of handling the typical business model of dynamic change supporting multiple G2G, G2C, G2B, B2C activities across all channels like CSCs, portals, kiosks etc.

As e-Governance applications are expected to grow, the Data Centre architecture shall be highly scalable and be built on a solid architectural foundation. The power and cooling system should at least meet with Tier-I requirements with possibility of upgrading to the next level. The State Data Centre Architecture would be multi-layered architecture and the applications to be hosted in the Data Centre shall support interoperability standards like XML, SOAP etc. The State Data Centre would provide infrastructure such as firewall service, directory service, web service, database service, portal, integration, management, data storage services and possibly a standards based messaging Gateway, which could be a shared infrastructure to all the applications /departments in the State Data Centre.

▶ Project Plan

The implementation of State Data Centre poses many challenges and is a complex task. The operational and design issues with regard to reliability, availability, scalability, serviceability, business continuity plan apart from optimum power and cooling are critical. Further, data security, ownership and efficient operations and management are vital issues.

The following have been kept in mind for the implementation of GSDC:

- There are 26 Districts in Gujarat
- There are 225 Talukas in Gujarat
- There are 80 Government offices of the various departments in each district.
- There are 6 Government offices of the various departments in each taluka.

Government of Gujarat provides connectivity through GSWAN in its current form & connects 225 talukas located in 26 districts with the state HQ located at Gandhinagar. The GSWAN connectivity extends to more than 2400 Government offices in these 26 Districts. Internet access provided by 10 Mbps connection from the State HQ. With more and more users accessing the GSWAN and the prevalent use of the video conferencing the state feels the need to create smaller Data Centers located in 6 of the 26 District HQs.

Component below is a list of key components that had been under prime consideration while designing Gujarat State Data Centre.

1) Civil Infrastructure
2) Building Management System
3) Fire detection/suppression
4) Access control System
5) Close Circuit Surveillance system
6) Rodent Repellent System
7) Intruder Alarm System
8) Public Address System
9) Electrical System
10) Un-interruptible Power Supply System
11) Air Conditioning System

The current network representation is as shown in the diagram below:
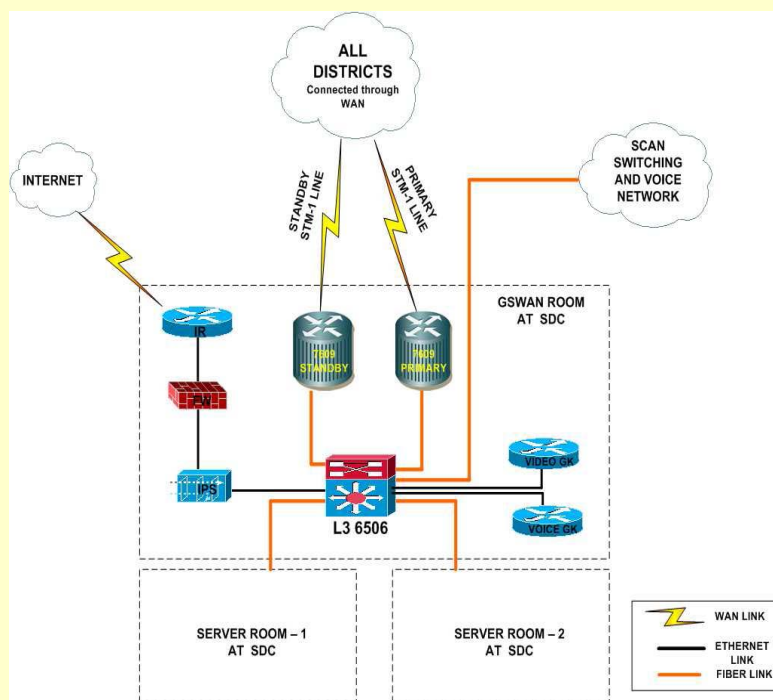
► **Brief Description about the existing set up:**
The National e-Governance Program (NeGP), approved by the Government of India, aims to significantly transform and improve the way the Government provides services to its citizens.

- At SDC, there will be two backbone routers available and in active-standby mode. Both routers will be connected to all 24 District Centers (DCs) by STM-1 line, which is also in active-standby mode. (If one fails another will takeover.)
- All DCs will connect to SDC router with 4 MBPS link (2 E1) and aggregate in one backbone router in the form of STM-1 line. The router will also have capability to handle the data traffic for secured data transfer between SWAN/Internet and SDC. Intrusion Detection & prevention system should detect malicious traffic and further protect the SDC environment.

- Intrusion system will also detect (and prevent) any interruption from Internet/extranet network. Firewalls will provide next layer of protection between the extranets (SWAN/ CSC/ Internet) and DMZ (which have hosted application servers).
- In the Data Centre, there are three main partitions as GSWAN network room, server room-1 and server room-2.
- 'GSWAN network room' accommodates all backbone setup and server rooms are for servers, data storage etc.
- All servers reside in two server rooms will aggregates at 'GSWAN network room' at layer 3 switch. This connectivity joins servers to GSWAN network across the Gujarat.
- The SDC provides Infrastructure Services such as Firewall Service, Directory Service, Web Service, Database Service, messaging and data storage services etc. which will be shared among all the applications / departments participating in the SDC. Using these services, the SDC ensures centralized delivery of citizen / departmental services. The SDC services will be deployed as components and therefore will have a potential for re-use in launching future services, without disturbing the existing architecture.

Racks, Enclosures

- The Database servers (RDBMS) are further hosted in higher security layer, comprising of components such as Firewall and Intrusion Prevention system.
- Application and System layer at SDC will be Multi-layered and designed to adhere to the open industry standards like XML, SOAP etc.

- The Intrusion prevention systems will carryout state-full inspection and multiple layers of Firewalls will manage the access control. At the same time more specific content level scanning products like Anti-Spam, network antivirus gateways should be provisioned at appropriate points to ensure content level scanning, blocking and access.

- In this secure infrastructure it is ensured that the security devices in the network such as Firewalls, Anti-Spam Filters, Proxy Servers, Anti-Virus gateways are in high availability mode, and these devices will be even distributed to optimize performance.

▶ **Design Specifications**
Following design considerations have been considered:

1) **Layout Planning:-**
   "Data Center layout" is the most important aspect of building any Data Center (DC).Layout is based on the Server room / farm, Communication room (connectivity with SWAN), Other areas such as UPS room, HVAC (Heating, ventilation and air-conditioning) room, Main switch panel room etc.

2) **Power requirements:-**
   While sizing the power requirement for the State Data Center, the electricity requirement for Cooling system as well as UPS inefficiency that shall take into account the requirement for charging the batteries is considered. Critical IT loads such as servers, routers, computers, storage devices, telecommunications equipment, etc., as well as the security systems, fire and monitoring systems that protect them.

3) **Air conditioning**
   Following criteria have been considered while designing the cooling systems:- Need for cooling, Cooling must be delivered where needed, Need of frequent air exchange & Future capacity expansion etc.

4) Racks, Enclosures

Reliable access to information is critical in today's on-demand business environment.

The requirements on IT professionals are ever increasing - greater network speed, greater reliability, and 100% uptime ... while resources are shrinking and responsibilities are growing. Monitoring and protecting critical assets and spaces from the environment and physical factors that can threaten continuous business availability is a key concern. Data Centers are mainly controlled remotely and human intervention is at minimum.

5) Fire Prevention System

Both heat and smoke detection system has been considered while designing the SDC also Where the Fire Prevention System will be mounted i.e. location of installation and that will be in conjunction with airflow patterns.

6) Server Requirement

State Data Centre is equipped for hosting Application as well as Database Servers of different Government Departments. Server's size is based on the application requirement, user load and data load. Also as the State Data Center shall be hosting applications and databases of all departments across the state and many of the applications / databases have common platforms.

7) Storage Solutions (SAN / NAS)

As high speed storage is required in production environment, provisions for different type of HDD types (Fiber & SATA) for different requirements have been made. An overall storage of 50 TB for production use and 50 TB for ILM, archiving, Data migration use is proposed.

8) Backup Solution

A backup solution has also been considered in the SDC design. This solution will provide: Scheduled backups, Schedule regular testing of backups and ensure adherence to related retention policies also on-demand backups of volumes and files should be available whenever required by the State Implementation Agency. Real-time monitoring, log maintenance and reporting of backup status on a regular basis must take place. 24x7 support will be available for file and volume restoration requests at the Data Centre.

9) LAN

Switching forms the backbone of any data center as it handles the total data flow and the speed at which it is delivered to the servers. The design of LAN has been based upon the Switching needs, Redundancy, Security etc. LAN has been designed in architecture to optimize the size of the LAN Switch that should connect users to the servers.

10) WAN

The WAN connectivity at the Data Centre would be provisioned through SWAN. All the indicated WAN links will be terminated onto the Core Router at the State Data Centre.

11) Physical Security

Guards are monitoring the entry to the Data Center. The entry of personnel into the Data Centre shall be restricted. Only pre-authorized officials/staff shall be allowed into the Data Centre using authentication procedures.

The entrance to the building will be guarded by the Building Management's Security Guards. At the reception, guards provided by the State will be deployed and will capture details of all visitors. Scanning of all personnel before entry into data Centre would be mandatory.

Entire Data Centre will cover using Closed Circuit Video Surveillance, Recording and Motion Sensors. The recorded video should be stored for a minimum period of 6 months. A 24-hour battery power backup is required for the access control system including the electric door lock(s).

✓ **Access Control System**

Access Control Systems provides the ability to monitor and restrict movements of people during and after working hours.

Access control is implemented in multiple levels starting from the main entrance to the facility. The system should ideally get enhanced to include critical areas within the premises. The Access System is integrated with window-based software.

✓ **Public Address System**

Making public announcement from the security control room Public address system is designed for clear and crisp announcements. The system utilizes Ceiling mounted speakers and can be utilized for Public Address and playing light music.

✓ **Comfort Air Conditioning System**

Comfort air conditioning has to be provided where continuous presence of human being is required to maintain the temperature at 25 degree C. The split air-conditioning systems with in door and Out door unit with remote operation facility will be placed.

Heavy-duty electric locks are installed for the main entrance doors. With time delay setting, the lock would effect after time is over.

12) Logical Security

Firewall facility has been used. Since firewall will provide perimeter security at the Data Center, installation of Four Firewalls in high availability mode at the SDC is considered.

Similarly content filtering gateway needs to be installed at the Data Center to provide protection against malicious content in the form of modified data packets, corrupt codes etc. An Enterprise Management Solution to facilitate monitoring and administration of the IT infrastructure is installed at the Data Center.

Benefits of State Data Centre

Several benefits are associated in having State Data Centre. Few among them are listed below.

- Latency Guarantees through SLA
- High Availability through Multi-Site Operations
- Full Outsourcing Service utilizing the Network
- Providing Optimal Services in a Seamless, One-Stop Format
- Resources on Demand
- Service Level Management (SLM)

All services provided by the Data Center include ongoing "measurement and analysis" incorporated within the operations process to ensure service level definitions and service quality.

Gujarat State Data Centre offers both conveniently located urban Data Centers for rapid on-site response, as well as suburban Data Centers for remote backup and storage solutions, responding to customer disaster-recovery needs in the event of natural or man-made disasters.

Applications to be hosted on SDC

The Government of Gujarat (GoG) has also made great progress in the implementation of their e Governance applications. Some of the largest application implementations include:

Value Added Tax (VAT) for Commercial Tax Department, Land Record Information Systems and Integrated Workflow and Document Management System (IWDMS) to name a few.

- Current applications
    - ✓ Land Record Information System at Village
    - ✓ Registration of Documents (Revenue Department)
    - ✓ State Wide Attention on Grievances by Application of Technology (SWAGAT).
    - ✓ Vishwa Gram- Village Panchayats of Gujarat State (under District Panchayat)
    - ✓ Gujarat Ration Card Computerization (GRCC), Civil Supplies Department : Taluka Office
    - ✓ Property Card Information System (PCIS), Revenue Department: Settlement Commissioner & 66 City Survey Offices.
    - ✓ Police Station Computerization.
    - ✓ Computerization of Pay and Accounts Office, Finance Department: Directorate of Accounts and Treasuries.
    - ✓ Value Added Tax (VAT) for Commercial Tax Department
    - ✓ Integrated Workflow and Document Management System(IWDMS)
    - ✓ Health Management and Information System (HMIS)
    - ✓ WHO – Integrated Disease Surveillance (Health Department)
    - ✓ e-Prima (Panchayati Raj Institutes – Maintenance of Accounts),Panchayat Department
    - ✓ Social Defense Integrated Scheme Computerization (Social DISC), Social Justice & Empowerment Department: Director of Social Defense and district Social Defense offices.
- List of Proposed Applications
    - ✓ IFMS-Integrated Finance Management System
    - ✓ HDIT - Application for Home Department
    - ✓ HMIS - Application for Health Department

◆ **e-Governance News**

2008 Top 25 Doers, Dreamers & Drivers

Good Governance magazine has conducted an exclusive survey titled "2008 Top 25 Doers, Dreamers & Drivers" in order to understand how state government are viewing e-governance projects and their readiness in this space. They have selected Top 25 for 2008 which includes constitution protectors, elected heads, policy makers, governor, state and local CIOs and representative from influential nonprofits and academicians. Shri Narendra Modi- Chief Minister-Gujarat State, Shri Rajkumar-IAS(Department of Science & Technology-Government of Gujarat), Ms. S Aparna (Commissioner- Surat Municipal Corporation) are one of them.

Editorial: August 2008

Top 2008 25 Doers, Dreamers & Drivers

Their ideas have in common, but strategies are different. What do they have in common? A willingness to challenge convention, confront entrenched bureaucracy and promote innovation. Our top Top 25 of 2008 includes constitution protectors, elected heads, policy-makers, governor, state and local CIOs and representatives from influential nonprofits and academicians. Welcome to Good Governance Magazine's annual tribute to *Doers, Dreamers and Drivers* who are shaping the future of government. Guess 2008's IT champions!

Web Corner

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