

An Update on SWANs

1.0 State Wide Area Networks¹

E-governance has been viewed as an important vehicle in enhancing the administrative efficiency and effectiveness with the objective of improving citizen services using information technology (IT). Internet and the possibility of delivering applications using networks has led decision makers to recognize the role of web technologies in providing visibility to governance and an interface with citizens. State governments plan to develop state wide area networks (SWANs) as a delivery platform for the e-governance applications. The SWANs may be viewed as the enabling infrastructure for rural connectivity as they provide the basic infrastructure which only needs to be augmented to support village level connectivity. The SWANs could be implemented through a variety of options ranging from captive networks to virtual private networks, to the internet, though the examples this far are of the former kind.

Earlier applications were implemented over leased/dial up lines. The state governments recognized that in order to increase access, multiply usage, and carry more data and applications, they would need to have a SWAN. SWANs were to enable carriage of voice and data in an integrated manner, rather than having separate networks for voice and data.

The high growth of the telecom sector since 1993-4, especially that of the incumbent BSNL at 18-22 per cent raises the prospect of a major jump in teledensity and hence of web and network applications to improve governance. Due to its extended outreach, SWANs were envisaged as a part of the IT policies formulated by several state governments from 1999 onwards. State governments were planning to use SWANs to link up the state capital with districts and taluka headquarters for voice, data and videoconferencing applications.

They were so structured that the primary responsibility for generating new applications would be with the user departments. The IT departments would act as consultants for identification of

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vendors, system development process and provide support during the implementation. The applications on the SWANs would interface with the Internet with suitable upgradation.

Towards supporting the existing efforts of various state governments and enhancing the enabling infrastructure for e-governance, the Government of India (GoI) announced a SWAN Policy in October 2004 (Appendix 6.1).

The government has announced a Rs 1,000-crore five-year SWAN project that will provide a multi-modal communication infrastructure for the country. The SWAN policy augments the e-governance program that is being implemented as mission mode projects. The Department of Information Technology (DIT) is the overall coordinating agency for the implementation of the policy.

1.1 Implementation Options

States would be eligible for funding to establish the SWAN using either of the following two options (<http://www.mit.gov.in/policyguidelinesforSWAN.pdf>)

Option I

- States to identify a suitable Public Private Partnership (PPP) model (BOO, BOOT etc.), select an appropriate agency through a suitable competitive process for outsourcing establishment, operation and maintenance of the SWAN.
- States to designate an appropriate Central/State agency to take overall responsibility for receipt of funding support, implementation and rendering accounts/utilization certificates.
- The entire process of outsourcing, including advising on the most appropriate PPP model, could be managed by an appropriate consultancy organization to be engaged by the designated agency through a transparent process under the direction of an implementation committee to be established by the states.

Option II

- Designate NIC as the prime implementation agency for the SWAN for establishment, operation and maintenance of the Network as an integral part of NICNET, with an appropriate end-to-end Service Level Agreement (SLA). In this alternative, funds would be released to NICS by DIT and execution would be carried out by NIC.

1.2 Eligibility Conditions for States for DIT Funding Support for Establishment of SWAN

- States would need to enter into firm agreements regarding bandwidth with operators in order to avail of DIT support for establishing SWANs. A State may opt for coverage up to district level only initially, or up to block level. Minimum bandwidth to be made available would be 2 Mbps up to district level as well as up to block level on a dedicated basis (leased lines/satellite). DIT would separately indicate norms for leasing of bandwidths in consultation with DOT and BSNL. States could utilize these norms as benchmarks for contracting. States would need to make available the 2 Mbps bandwidth (which is negotiated from the service provider) to the PPP vendor or to NIC depending on the implementation option adopted for establishment of the SWAN.
- A State would need to have undertaken implementation of at least three major statewide e-governance projects that require such connectivity of which at least one should have been completed in order to be eligible for funding support.

1.3 Norms for Sharing of Cost between Department of IT, GoI and State Govts.

- DIT support will cover the entire cost of establishment, operation and maintenance of the SWAN for a period of five years on 100% grant basis.
- DIT grant support will cover the cost of entire terminal equipment at each Point of Presence (POP). Support for the SWAN would cover only one PoP at each location (State/ district/ Sub-division/ block HQs) covered by the SWAN and for which bandwidth arrangements have been tied up by the state. All other costs would be borne by the states. The support would only be for the infrastructure but not for staff. Costs for infrastructure and bandwidth must be provided by the states. Any upgradation costs would also have to be borne by the states.

- The cost of consultancy for undertaking Technical Feasibility Study, advising on most appropriate PPP model, preparation of EOI, RFP, SLA, etc. and managing the bid process in case of Option I, will be provided as 100% grant by DIT to the agency designated by the states to undertake the selection of the consultant.

1.4 Implementation Status

A number of states have implemented SWANs to various levels. The states have envisaged different levels of connectivity and models of private participation. For example, while the Andhra Pradesh SWAN (APSWAN) envisaged connectivity from the state capital to the district headquarters, Gujarat SWAN (GSWAN) planned to connect the state capital, district capitals to taluka centers. In West Bengal, the connectivity is sought to be provided to selected blocks and villages. This has implications for the spread of such networks in rural areas. For example, where at least taluka level connectivity is sought to be provided through SWANs, the village level connectivity could be provided through wireless, thus reducing the time for deployment.

A number of implementation models have been used in practice for partnering with the private and public sector. AP used the Build Operate and Own (BOO) model, with the AP Technology Services, a public sector organization as the coordinating agency, Telecom Consultants of India, a public sector organization under the DOT and Infrastructure Leasing and Finance Services were selected as the bid consultants. Government of AP provided the sites and bandwidth and the private operator provided the equipment and services. In Rajasthan SWANs were to be implemented as a joint venture between the Government of Rajasthan, Housing Development Finance Corporation and Infrastructure Leasing and Financial Services.

2.0 Various SWANs (A Brief Overview)

1. Andhra Pradesh State Wide Area Network (APSWAN)
2. Gujarat State Wide Area Network (GSWAN)
3. Kerala State Wide Area Network
4. Rajasthan State Wide Area Network (RSWAN)

5. West Bengal State Wide Area Network (WBSWAN)

2.1 Andhra Pradesh State Wide Area Network (APSWAN)

The APSWAN linked the state capital to 23 district headquarters and two major cities in phase 1. It links State Secretariat and all district Collectorates with 2 mbps fiber optic line. was implemented on Build, Own and Operate (BOO) framework to a private party for five years, with government having option for equity participation at the end of five years. The bids submitted had different technology and architecture choices, making it difficult for evaluation. However, the perspective used was one of being pragmatic regarding the bandwidth requirements for the expected traffic. United Technologies Limited (UTL) that won the bid. Details are given in Appendix 6.2.

2.2 Gujarat State Wide Area Network (GSWAN)

The GSWAN has connected government offices at the state secretariat at Gandhinagar (called state center (SC)), district headquarters (called district centers (DC)) and taluka headquarters (called taluka centers (TC)). The GSWAN provides voice, video and data services, using state of the art technologies and has flexibility to expand and/or upgrade. GSWAN has been built on BOOT (Built Operate Own and Transfer) basis for a period of 8 years. Like in AP, the bids submitted had different technology and architecture choices, making it difficult for evaluation. However, the perspective used was one of having appropriate technology and redundancy for the expected traffic and service requirements. Gujarat Online Private Limited (GOPL), a joint venture with UTL, won the bid at Rs 2 crores per quarter. Details about the project are given in Appendix 6.3.

2.3 Kerala State Wide Area Network

The state government of Kerala has deployed a project called 'Akshaya' which was launched in November 2002. Akshaya, is envisioned as a low cost, voice, data and video connectivity model. The aim of the project is to offer e-governance and utility services to citizens of the state. The project has helped in taking IT to the remotest part of Kerala- Malappuram. Tulip IT Services Ltd was chosen as the wireless system integrator for the project. Malappuram has become the

country's first 100% eLiterate district. The government, which has invested Rs.300 million to make the Malappuram district fully e-literate, plans to cover the entire state by 2005 through 9,000 Akshaya centres. Details are given in Appendix 6.4.

2.4 Rajasthan State Wide Area Network (RSWAN)

RSWAN was to be implemented on a 2 Mbps dedicated line from the state capital to the districts, 64 kbps to the blocks and dial up to the villages. For provision of bandwidth, the project envisaged two alternatives: i) full cable laying as a part of the project for captive bandwidth and ii) leased lines from BSNL. The project cost was estimated at Rs 250 crores for the first option and Rs 50 crores for the second. The project was planned to be offered under a BOO framework to a private party. It was expected that the government of Rajasthan (GoR) would be able to guarantee an annual revenue of Rs 5 crores, being the amount that it would save out of its total communications cost of Rs 12 crores. TCIL was given the task of demand assessment and suggesting alternative project structures which was completed in April 2000. Details are given in Appendix 6.5. Appendix 6.7 shows the key features and applications of the proposed RSWAN.

2.5 West Bengal State Wide Area Network (WBSWAN)

The WBSWAN connects 18 district headquarters to the state headquarters over a 2 Mbps leased line and transmits data, voice and video. Appendix 6.7 shows the key features of the WBSWAN. The first phase of the project involving connectivity to the district headquarters was completed by August 2001. This was contracted out through a tender to the lowest bidder for expenses towards the hardware and one year's operating and maintenance costs as per the SLAs. Tata Infotech Limited (TIL) was the winning bidder. In the second phase, all block headquarters would be connected with their district headquarters on 64 Kbps leased line upgradable to 2 Mbps bandwidth. Selected panchayats would be connected with their block headquarters during subsequent phases of expansion of WBSWAN. Details about the project are in Appendix 6.6.

3.0 An Assessment

While most states have used a SLA framework for monitoring quality of services (QOS), the very few applications that are available render the costs too high for such QOS. The primary perceived benefit of SWAN has been monitoring performance of various government departments, mainly through video conferencing.

However, with the announcement of the SWAN policy, with its focus on proven implementation of applications, it is possible that state governments may wish to focus on content development as the primary driver rather than just deployment of infrastructure.

While a variety of technologies may be used, it is necessary that the states adopt open standards and develop SLAs with vendors so as to reduce the technology risk. While the earlier SWAN implementations did not actively involve the NIC, despite the available infrastructure, the SWAN 2004 policy provides for involvement of NIC, if the states so desire. Moreover, the SWAN 2004 policy envisages a greater role for NIC, as the agency for coordinating the standards and interconnections between the different SWANs through the NICNET gateway.

Another issue is of dovetailing of the various efforts undertaken by the DOT, BSNL, DIT, NIC in the provision of the enabling infrastructure for rural services.

Other observations on these SWANs are as follows:

1. Demand may have been overestimated if one accepts a slowness in the use of the network by government as being reasonable.
2. Little or no attempt (and certainly no formal attempts) at new applications to use the SWAN has been made. Most existing applications have been developed by the IT departments without a thorough review of the existing processes.
3. SLAs, rather than equipment and software specifications, have most certainly shielded the governments from technology risk. But SLAs may have been more ambitious than required to

result in higher costs. In the case of GSWAN the possibility for the BOOT operator to walk out with profit is not excluded. This arises due to a lacunae in the contract.

4. In the case of GSWAN, costs for traffic in excess of up to 8 Mbps, if realized at the very beginning, were to be borne by the private operator. In case of slower growth the cost of expansion up to 8 Mbps were to be borne by the government.
5. The fact of initiation by GIDB in the case of GSWAN may nevertheless not have meant a 'single window' for the private operator to deal.

4.0 Lessons

Application Development Process must be given primacy to ensure effective usage of SWANs. Customer perspective should be the driver of the applications. Top down approaches would hardly work. Applications would usually span interdepartmental boundaries and as such coordination across departments cannot be avoided. Data quality becomes particularly important since SWAN would transport the same widely. Application development needs to go beyond the initiative of individual officers to becoming a systematic process that is institutionalized. The possibility of using virtual private networks or even the internet itself for cost effective SWANs improves with the passage of time. State governments such as Gujarat and Rajasthan where n-Logue kind of initiatives exist could ensure coordination across the two, rather than viewing each as a separate stand alone activity.

Appendix 6.1

Government Policy: Guidelines for Technical and Financial Support for Establishment of SWAN, October 2004

SWAN have been identified as an element of the core infrastructure for supporting the e-Governance initiatives of the various state governments. Towards this, the Department of Information Technology (DIT) has earmarked a significant outlay. Under National e-Governance Action Plan (NEGAP), it is proposed to extend connectivity to the block level through NICNET/ SWANs. GoI support for the establishment of such infrastructure up to the block level will be provided by the DIT in accordance with the guidelines provided below.

The following issues have been considered while formulating these guidelines for technical and financial assistance to States for establishment of State Wide Area Networks.

a) Implementation options for States including

- (i) Using the NIC to establish the SWAN by suitably extending the existing NICNET upto Block level.
- (ii) To engage a competent private/ public sector agency through an appropriate competitive bid process under a suitable service level agreement (BOO/BOOT etc.) to establish and run the SWAN.
- (iii) To establish and own the SWAN infrastructure directly by the State and use a private service provider for operations and facility management.
- (iv) Any other PPP model considered appropriate by the State.

b) Upfront capital investment required to establish the SWAN

c) Recurring costs (bandwidth cost, other operational costs such as maintenance cost and cost of operational personnel)

d) Issues relating to obtaining and using the OFC bandwidth from service providers

- e) Sharing of cost between the GOI and State Governments for capital, recurring and manpower costs.
- f) Other generic issues that need to be taken into account including Monitoring of Service Levels of SWAN.
- g) Issues related to Standardization, Security, seamless interconnect requirements between NICNET and SWANs and also between SWANs.
- h) Issues regarding Organizational Structure, Command and Control. Accordingly, these Guidelines also include the Norms for complete outsourcing of the SWAN to a private/ public sector service provider.

Standardization and Interoperability

NIC will formulate suitable Guidelines for Standardization, Interoperability and Interconnect requirements between NICNET and the SWANs and also between different SWANs. The Core Group on Standards set up by DIT would vet these standards before notification by DIT. A SWAN set up under Option I would be outside NICNET, but it would be connected to NICNET through a gateway established by NIC for this purpose. NIC would issue necessary Guidelines in this regard. Irrespective of the implementation Option adopted, existing NICNET infrastructure should be used as a back-up for emergencies and disasters.

Service Availability and its Monitoring

End-to-end service availability on the SWAN and its independent monitoring is a prime requirement to have reliable, seamless networking across the States and to meet the objectives of this core e-Governance infrastructure. It is therefore necessary that appropriate Service Level Agreements (SLAs) be worked out between the States and the Implementing Agency and that an Independent Agency be appointed to monitor the performance with reference to the SLA and related aspects.

Security of Network

NIC will issue Security Guidelines for all the SWANs. States are required to strictly adopt and adhere to these Security Guidelines. In Option I, maintaining security on the network in accordance with the Guidelines to be issued by NIC would be the responsibility of the State to be met through the operator and monitored by the independent agency appointed for monitoring. Security requirements should be a part of the Request for Proposal (RFP) for Option I. For Option II, NIC will incorporate the necessary security requirements.

Management and Administrative Control

In Option I, the State will have total administrative and technical control of the SWAN and will be responsible for compliance with all guidelines through its designated Department/Agency. Appropriate agreements to give effect to this may be worked out between State and PPP Vendor. For Option II, an appropriate MOU will be worked out between NIC and the State with mutually agreed roles and responsibilities. A State-designated entity will supervise and control State applications and data on the network. Any connectivity requirement by the State will go through a pre-defined approval procedure of NIC before complying with the request.

Appendix 6.2

Andhra Pradesh State Wide Area Network (APSWAN)

Introduction

Government of Andhra Pradesh as part of its vision to improve services to its citizens through efficient and transparent administration, has planned to create the backbone infrastructure for

- Catalysing IT development in the state
- Supporting IT solutions for e- governance

The APSWAN linked the state capital to 23 district headquarters and two major cities in phase 1. It links State Secretariat and all district Collectorates with 2 mbps fiber optic line. The Chief Minister had negotiated with Bharat Sanchar Nigam Limited for providing the dedicated line at no cost until

November 2001 on the premise that this was the first project of its kind under a state government. Phase 2 would link the districts to the 1,124 mandal offices. Last mile connectivity to the villages was proposed to be provided by wireless in the local loop.

APSWAN was inaugurated on 1st of September, 1999 and was implemented on Build, Own and Operate (BOO) framework to a private party for five years, with government having option for equity participation at the end of five years. The BOO operator would bid for fixed quarterly revenues to provide the equipment at the network nodes and ensure operations as per a specified service level agreement. The AP government would provide the sites for the nodes. The primary applications so far have been video conferencing and voice communications. Appendix 6.7 shows the key features and applications of the APSWAN.

AP Technology Services (APTS), a state public sector organization was the coordinating agency for the bid preparation, evaluation and monitoring of the service level agreements. Telecom Consultants of India (TCIL), a public sector organization under the Department of Telecommunications and Infrastructure Leasing and Financial Services (ILFS) were selected as bid consultants by APTS.

The bids submitted had different technology and architecture choices, making it difficult for evaluation. However, the perspective used was one of being pragmatic regarding the bandwidth requirements for the expected traffic. United Technologies Limited (UTL) that won the bid at Rs 1.1 crores per quarter proposed a proven and not the latest technology. This reinforced the five-year time frame perspective, especially in the context of obsolescence of such technologies. It is estimated that the project cost was about Rs 20 crores.

Applications

AP State Wide Area Network will act as the basic information highway for the following IT related applications of the Government:

- Data sharing and interchange among different wings of the government resulting effective, efficient and transparent administration.
- Providing reliable and dedicated telephone facility to state government departments.

- Mailing and Internet facility for all the Government departments
- Provides high quality video conference facility that helps in administrative reviews and conferences
- Distance and On-line training for Government officials
- Demonstration of best practices
- Technical Features

Appendix 6.3

Gujarat State Wide Area Network (GSWAN)

Introduction

The GSWAN has connected government offices at the state secretariat at Gandhinagar (called state center (SC)), district headquarters (called district centers (DC)) and taluka headquarters (called taluka centers (TC)). The network consists of one SC, 25 DCs (one was a super DC at Ahmedabad) and 230 TCs. The GSWAN provides voice, video and data services, using state of the art technologies and have flexibility to expand and/or upgrade. GSWAN is implemented on 2 Mbps (upgradable to 8Mbps) dedicated lines from the SC to DC and on 64 kbps ((upgradable to 2Mbps lines) from DCs to TCs. The bandwidth is provided by the government of Gujarat (GoG). GoG has used the existing BSNL capacity. GSWAN connects about 560 offices in the network.

Satellite interconnect with GSWAN Hub has made all services of the network omni present in the state/country through portable VSAT terminal which was put into services in June 2002. It enables converges of remote locations in the state which are not a part of designed network. This has given tremendous flexibility to the state administration.

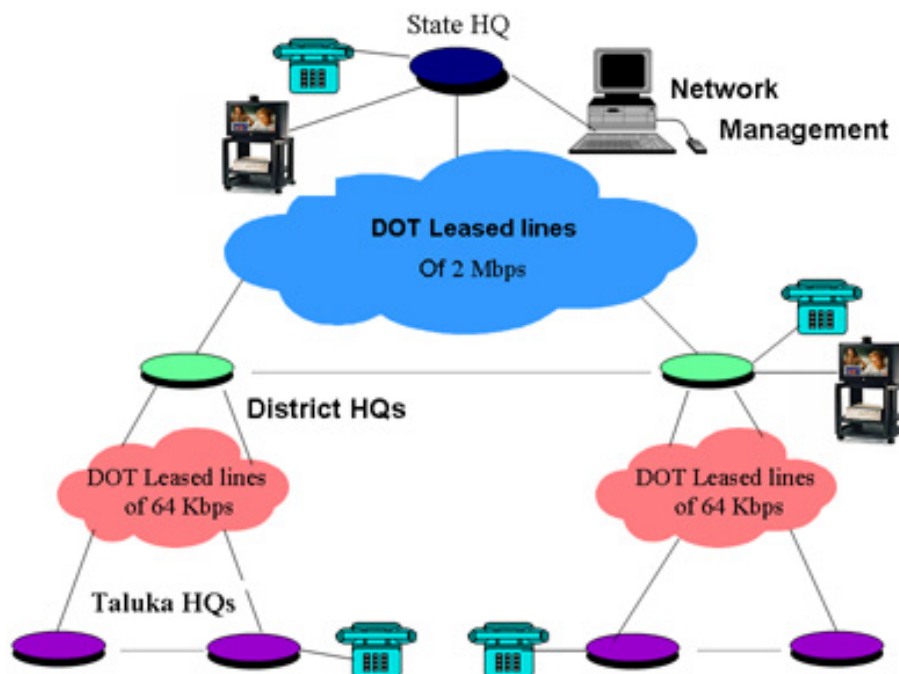
GSWAN has been built on BOOT (Built Operate Own and Transfer) basis. The BOOT period was fixed up for 8 years, after which project assets shall be transferred to GoG by the BOOT service provider at a nominal charge of Rs 1. The bidders were required to bid for a fixed quarterly revenue by SC, DC, and TC for the eight year period. The BOOT operator would provide the equipment at the network nodes and ensure operations as per a specified SLA. The GoG would provide all the sites. The BOOT operator could augment its revenues through information kiosks for the citizens, leveraging content from GoG. The Department of Information Technology, GoG, was the coordinating agency for the bid preparation and evaluation. TCIL were selected as bid consultants and were responsible for monitoring of the SLAs.

Like in AP, the bids submitted had different technology and architecture choices, making it difficult for evaluation. However, the perspective used was one of having appropriate technology and redundancy for the expected traffic and service requirements. Gujarat Online Private Limited (GOPL), a joint venture with UTL, won the bid at Rs 2 crores per quarter. It is estimated that the project cost was about

Rs 30 crores. The project was delayed, initially at the tendering stage due to the requirement of having to seek clearance from the Gujarat Infrastructure Development Board. The earthquake delayed the award of the bid, which finally took place in March 2001.

GOPL has chosen state-of-the-art technologies for implementing this project. The core of the network is built around state-of-the-art products from Cisco, Alcatel, Polycom and other carrier class equipment.

Figure 1: GSWAN Connectivity Concept



Technology and Architecture

The technology selected for the GSWAN was IP and all services i.e. Video conferencing, Voice (telephony) and data services are IP based. This is unique and distinct (may be first time anywhere on such a large scale) about GSWAN that all services are IP based. The details are provided in Box 1.

Box 1: Technology and Architecture

1. CISCO 7513 is the central router at Secretariat with CISCO 3661 and CISCO 1751 at District and Taluka level.

- There are at least 20 other offices at each district HQ, in the process of integration with the district wide area node (DC) through bare copper taken from BSNL.
- Each DC has 10 telephone (receive only) lines from PSTN terminating on to the CISCO 3661 for dialup services. In all there are 250 dialup ports available through the state enabling units/offices/individuals to hook on to GSWAN just by making a local call, from anywhere within the state.
- GSWAN planned to work in a star topology centered at Secretariat, Gandhinagar with arms extending to all districts, having further horizontal (district HQ level) and vertical downward extensions integrating multiple district level other offices and Talukas respectively with the state wide area network.
- Adequate dialup facilities were provisioned at all districts HQ nodes for enabling GSWAN access to the offices and units not physically integrated with the GSWAN.
- The open architecture of the system offers effective utilization of bandwidth resource, access drop-outs for public information centers (kiosks) etc. Design also ensures the services availability of the order of 99.95-99.99 %, under SLA.
- Integration of Secretariat Campus Area Network (SCAN) with GSWAN has induced mutual synergy in two networks. Web sever, DNS server, Mail server and data base servers are commissioned in the server farm and integrated to the network. All government offices have facility to host and manage their websites locally.

Appendix 6.7 shows the key features and applications of the GSWAN.

Appendix 6.4

Kerala State Wide Area Network

Introduction

The state government of Kerala has deployed a project called 'Akshaya' which was launched in November 2002. Akshaya, is envisioned as a low cost, voice, data and video connectivity model. The

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aim of the project is to offer e-governance and utility services to citizens of the state. The pilot phase in Malappuram is the largest rural wireless network in the country. The Akshaya project is being implemented through Panchayati Raj Institutions, and involves private enterprise in the development of training institutes and content generation.

The project has helped in taking IT to the remotest part of Kerala- Malappuram. Tulip IT Services Ltd was chosen as the wireless system integrator for the project. Malappuram has become the country's first 100% eLiterate district. The project has created over 620 kiosks and generated employment to over 2500 people in the area. The government has decided to replicate the Akshaya model in other districts of Kerala. The vision is that by 2006, Kerala should become India's first fully eLiterate State.

The government, which has invested Rs.300 million to make the Malappuram district fully e-literate, plans to cover the entire state by 2005 through 9,000 Akshaya centres. Akshaya eCenters provide training that not only familiarizes people with the basics and scope of IT, but also ensures hands-on skill in operating a computer. The project aims at providing e-Literacy to one person in every family. A carefully designed content module in Malayalam of 15 hours duration per person is a major highlight of the project. The process of providing the skill sets is creating a long lasting relation between the Akshaya centers and the families in the area. On a macro level, this will generate a statewide data warehouse and repository of relevant content for the families. Around 6 lakh people in Malappuram were trained since June 2003.

Technology used in Pilot

- Tulip chose a mix of wireless technologies, namely Wireless IP in Local Loop (WipLL) and Versatile Intelligent Network (VINE).
- There are seven VINE points, using 2.4 GHz frequency, spread across the district connecting to the fiber backhaul. The backbone is basically a number of radio links with high capacity.
- The throughput of radios in VINE is at 8 Mbps. This kind of network topology allows easy scalability. If the bandwidth requirement doubles to 16 Mbps one can simply add another pair of radios to the existing infrastructure.
- All the 630 Akshaya centers will hook up to 22 POPs using WipLL radio stations. WipLL is based on a Multipoint Microwave Distribution System (MMDS) used for Internet access.

- WipLL equipment from Airspan Networks (a UK-based company) has been used for this project.
- Sectoral antennae that cover 90-degree sectors are being used at the base station. Four such antennae offer complete 360-degree coverage. The transmission has a capacity of 4 Mbps although the mandated requirement is 16 Kbps to 64 Kbps. This bandwidth is being used to provide services like e-governance, voice, intranet, and video for e-learning.

While the work on connecting the centers is in progress, the government of Kerala has started planning for the next phase of the initiative of connecting the Gram Panchayats and other government organizations and bodies that go in to any effective e- governance model. All these would ride on the same network rather than each department trying to create its own network. It's like setting up a "Data Umbrella" over the entire district, from the last man to the district headquarters. The entire model is entrepreneur driven, with adequate room for provision of value added services to make it economically viable and self sustaining.

Although planned to be completed by 2004, after the complete rollout in March 2004, the Akshaya project will let the state government provide a range of e-governance and utility services to citizens. The project will allow citizens to use a service called 'Friends'. This is a single window distribution point for 35 services like payment of electricity bills, tax bills, and university fees. Around one million Keralites will access these services. Further, the state plans to use this wireless infrastructure for connecting all police stations, land records, the state forest department, and health centers. On the cards are services like online rural banking, online technology resource centers, e-enabled education centers, call centers, assisted health care, and e-post.

Appendix 6.5

Rajasthan State Wide Area Network (RSWAN)

Introduction

RSWAN will link Government offices at the State Secretariat (Sachivalaya), called as the State Centre (SC), District Head Quarter called as District Centre (DC), and all the Tehsil Head quarters called as Tehsil Centres (TC) and the State Data Centre. It was to be implemented on a 2 Mbps dedicated line from the state capital to the districts, 64 kbps to the blocks and dial up to the villages. For provision of bandwidth, the project envisaged two alternatives: i) full cable laying as a part of the project for captive bandwidth and ii) leased lines from BSNL. The project cost was estimated at Rs 250 crores for the first option and Rs 50 crores for the second.

The project was conceived in 1999 and was to be offered under a BOO framework to a private party. It was expected that the government of Rajasthan (GoR) would be able to guarantee an annual revenue of Rs 5 crores, being the amount that it would save out of its total communications cost of Rs 12 crores. Apart from the bandwidth, the operator would provide the equipment at the network nodes and ensure operations as per a specified SLA. The GoR would provide the sites for the nodes. The BOO operator could augment its revenues through information kiosks for the citizens, leveraging content from GoR. Options for making the network available to the industry and consumer sectors, either on a closed user group format or otherwise (depending on the policy) were considered.

PDCOR, a joint venture between the GoR, Housing Development Finance Corporation and ILFS, was the coordinating agency for demand assessment, project structuring, and implementation. TCIL was given the task of demand assessment and suggesting alternative project structures which was completed in April 2000. Since then, there has been no further progress on the VAN, primarily because there has been rethinking by the GoR on achieving the same value but through public Internet service providers. To provide last mile connectivity, especially to the Internet kiosks, wireless in the local loop was being considered, to be offered by a company called TENET. This company would operate as a franchisee of Shyam Telelinks, the fixed service provider in Rajasthan. A pilot project was being implemented covering a 1000 villages in Sikar district. Being a value addition for rural development, NABARD was financing the franchisee's operations.

Appendix 6.7 shows the key features and applications of the proposed RSWAN.

Technology: The salient features of the proposed network

- Implementation of State Wide Network should be in a phased manner. The first phase covers vertical connectivity from State Secretariat to the all District and Tehsil Headquarters for Voice, Data, Video and Internet. The second phase is Horizontal connectivity from the State Secretariat, District Headquarters & Tehsil Headquarters for Voice, Data and Internet. The year wise horizontal expansion of the network (both at District and Tehsil level) is required.
- Integrable with LAN's (SecLAN etc), WAN, State Data Centre, Communication Networks etc.
- The connectivity to end-user is based on standard leased circuits, dial up circuits or using Ethernet ports as appropriate for the individual offices.
- The network shall be based on latest State of Art Technology.
- The network shall be based on open Interfaces and standards to ensure interoperability.
- The network shall utilize vendor-neutral products and shall support multi networking protocols.
- The network shall provide secure links with sufficient speed and bandwidth to allow the exchange of information among the Government Departments.
- The network should strive to support all the users in the area of Network management, problem management and technical support.
- The network shall incorporate proven security techniques to prevent unauthorized access to the network, restrict to access information and systems and secure transmission of information.
- Network shall have provision for auditing to ensure the utility and security.
- Defined end-to-end quality of service (QoS) mechanisms to guarantee no degradation of service for voice, video or data on the network.
- Comprehensive convergence architecture for voice, data and video that is based on open industry standards.

Appendix 6.6

West Bengal State Wide Area Network (WBSWAN)

Introduction

The WBSWAN was inaugurated on 17th August 2001. It connects 18 district headquarters to the state headquarters over a 2 Mbps leased line and transmits data, voice and video. Eight sub-divisions have also been connected to the respective district headquarters over a 2 Mbps-leased line transmitting data and voice in the first phase. Appendix 6.7 shows the key features of the WBSWAN. As an attempt to learn what was involved in extending the SWAN to the block and village level, two blocks and one village were to be provided connectivity initially for data transfer alone. The selection of the two blocks also took into account the regional aspirations.

The first phase of the project involving connectivity to the district headquarters was completed by August 2001. This was contracted out through a tender to the lowest bidder for expenses towards the hardware and one year's operating and maintenance costs as per the SLAs. Tata Infotech Limited (TIL) was the winning bidder. The hardware, and operating and maintenance cost was about Rs 10 crores. The outsourcing of the operations and maintenance was to be reviewed after a year for possible management internally. The annual payments to BSNL for the bandwidth for the first phase was approximately Rs two crores. TIL had also been asked to extend the scope of WBSWAN to the eight cities, for which a proposal was expected. This was expected to be completed by December 2001. The second phase was expected to be completed by March 2002. Out of the 341 blocks, 326 already had fibre optic or microwave connectivity provided by BSNL.

In the second phase, all block headquarters would be connected with their district headquarters on 64 Kbps leased line upgradable to 2 Mbps bandwidth. Selected panchayats would be connected with their block headquarters during subsequent phases of expansion of WBSWAN. There was provision for horizontal expansion for connectivity at all levels.

The State has also introduced the 'State of the Art' computerised system in the Directorate of Commercial Taxes, full automation in all Treasuries, Smart Cards for registration certificates and driving licenses, digitization of land records in all the blocks and piloting a kiosk-based land record data

retrieval system. The GIS-based data is being developed for use in the Departments Development & Planning, Irrigation & Waterways, Municipal Affairs and Environment.

The proposed Tele-medicine network, computer terminals with a high-end network facility will be made available in an interactive configuration. Qualified medical experts from all over the country will be available for consultation. The rural healthcare centre will be provided with entire telecommunication facilities along with teleconference option.

Appendix 6.7

Key Features and Applications of the SWANs

The key features of the **proposed RSWAN** would be to facilitate:

- i. Data exchange between upcoming State Secretariat LAN and District Administration upto the level of Tehsils as well as among HODs and their district level offices
- ii. Statewide EPBAX that would allow various functionaries to carry out voice communication as closed-user group. This would result in saving of cost of STD and normal telephone charges
- iii. Access to Internet and e-mail
- iv. Linkages among LokMitra-JanMitra (e-Mitra) data centers

The key features of the **APSWAN** would be to facilitate:

- i. Efficient service management
- ii. Value added services support
- iii. On demand bandwidth allocation
- iv. Centralized performance monitoring
- v. Seamless migration path
- vi. Virtual Private Networks (VPN)
- vii. Multiple media options – Fiber support

Applications for all SWANs

- Communication
- Video Conferencing
- Virtual Private Networking
- Electronic Governance
- Electronic Data Interchange
- Electronic Banking (E-Commerce)
- Electronic distance learning, Electronic libraries online Project Monitoring etc.