





MADHYA PRADESH STATE WIDE AREA NETWORK (MPSWAN) CASE STUDY

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June 2016

The case study is developed as part of the Project Management Capacity Building program initiated by Madhya Pradesh Agency for Promotion of Information Technology (MAP-IT) with an objective to facilitate practitioners to understand the Madhya Pradesh State Wide Area Network (MPSWAN) E-Governance project's intricate features, issues and challenges faced by project implementers along with the feasible solutions.

It may not hold all historical facts related to the project.



MADHYA PRADESH STATE WIDE AREA NETWORK

INTRODUCTION

SWAN (State Wide Area Network) is the core infrastructure project to support e-Governance in the State of Madhya Pradesh. It is implemented jointly by Government of Madhya Pradesh (GoMP) and Government of India (GoI), under Mission Mode Project (MMP), National e-Governance Plan (NeGP), GoI. It aims to create a dedicated converged network for data, video and voice communications throughout the State.

Madhya Pradesh Electronics Development Corporation Ltd (MPSEDC) is the nodal agency for implementation of SWAN in the State. The project is executed under the Guidelines circulated by the Department of Information Technology (DIT), GoI.

The project intents to provide better state governance by ensuring reliable communication network for secured and high-speed connectivity. It aims to connect all block headquarters to the State capital through districts with the help of SWAN backbone (vertical connectivity) and Closed User Groups (horizontal connectivity).

DIT approved SWAN establishment in May 2008 and sanctioned financial aid of Rs. 174.21 Crore for the project with two-third of total cost covered by GoI and one-third by GoMP. Later the cost was reviewed to Rs 99 Crore.

The case study analyses the aspects of project management practices implemented in MPSWAN project. It maps four project phases namely: Inception, Planning, Implementation and Post-Implementation with five project management process groups and ten project management knowledge areas as prescribed by PMI's A Guide to the Project Management Body of Knowledge¹ (*PMBOK® Guide (Fifth Edition)*). Within each project phase, the performed activities are discussed, as appropriate. The case study also facilitates an evaluation of the appropriate processes against project management knowledge areas.

The inception phase discussion is on project background and high-level scope. The planning and design phase discussion revolves around overall as well as stage wise planning. The implementation phase addresses the development and the execution aspects of the project. Finally, the post implementation phase talks about project support and its status.

INCEPTION PHASE

The GoI approved SWAN scheme launched across the country, in March 2005, at a total outlay of Rs.3,334 crore was to be expended by the Department under Grant-in-Aid of Rs. 2,005 crore, over a period of five years. Under this Scheme, technical and financial assistance was provided to the State to connect all State Headquarters up to the Block level via District/ Divisional Headquarters, in a vertical hierarchical structure with a minimum bandwidth capacity of 2 Mbps per link. The State issued flexibility to enhance bandwidth upto 34 Mbps between SHQ and DHQ and upto 8 Mbps between DHQ and BHQ depending upon usage.

The State of Madhya Pradesh is divided into 51 districts and 309 blocks, with distinguished administrative boundaries. Interacting with public administration and government authorities was a significant challenge for citizens, whether it was coping with bureaucracy, ambiguous procedures, functional disintegration, vague and/or overlapping authority hierarchies and information fragmentation.



The government offices across the State lacked centralized control. The offices/agencies used standalonecomputerized systems for their requirements. The individual applications were implemented either on VSAT or leased lines or dial ups or its combination. There was no common connectivity network to connect all the departments.

Decentralization, prolonged turnaround time, redundancy, standalone processes, irregularities etc. were some of the major reasons that resulted in time lags between transaction, execution and reflection of the same in the State accounts. The physical disconnect between citizens and government posed a vast limitation to effective governance that ensued into customer dis-satisfaction.

In order to have improved, transparent and effective government delivery system, the project envisioned following dimensions:

- Linking all Government departments in the State
- Scalable high capacity network to carry voice, data and video traffic between different offices/agencies across the State
- Initiating business process re-engineering of government processes and policies to remove redundancy, duplication and, increase transparency and easy information flow
- Integrating the various standalone applications
- Interconnectivity and its interface with citizens [G2G, G2B and G2C] services
- Easy to access data and better decision-making.

MPSEDC appointed Software Technology Parks of India (STPI), an autonomous society under Ministry of Communication and Information Technology, GoI as Consultant for the implementation of SWAN project in the state. DIT Guidelines for Technical and Financial Support to have:

- One Point of Presence (PoP) at each State / District / Block Headquarter,
- Each PoP owns Configurable Aggregation Equipment to enable vertical and horizontal connectivity Gateway to NICNET (National Backbone) for Inter-State connectivity,
- Bharat Sanchar Nigam Limited (BSNL) bandwidth as the primary source of connectivity,

was brainstormed to arrive at the working model for MPSWAN².

STPI in consultation with MPSEDC carried out a pre-requisite study on overall requirements, site survey, network architecture design and risk impact of SWAN proposal. The same was submitted to DIT for scrutiny and clearance. Although DIT provided two implementation models, MPSEDC finalized Build Own Operate and Transfer (BOOT) / Public Private Partnership (PPP) model over National Informatics Centre (NIC) model. PPP model is executed by engaging private and public sectors through a competitive bid process.

With an objective to determine a comprehensive platform to computerize the systems and determine immediate and future bandwidth demands, a study was carried out by STPI/MPSEDC officials on the selected departments. Eventually, the project entered into exhaustive planning phase with the focus to have:



- Reliable communication network to provide connectivity between service delivery outlets and government departments
- Centralized and online monitoring of citizen charter and service status
- Anytime and anywhere dissemination of Government services and information
- Reliable and scalable network for Vertical and Horizontal connectivity throughout the State.
- Reduce the cost of communication between government departments at different locations.
- Secure and standard network infrastructure to enable Electronic Transfer of sensitive data, payments etc.

PLANNING PHASE

This phase covers all activities associated with pre-project implementation analysis. The feasibility study, site preparation, network operator selection, acceptance testing plan and its operation (for a period of 5 years) are to name a few.

In 2007-2008, around 51 State Government Departments, 09 Public enterprises and 41 Organizations were identified as the potential partners of MPSWAN for their e-Governance activities. To facilities these activities, MPSWAN architecture were logically divided into two components:

- Vertical component (SWAN Backbone)
- Horizontal component (User Departments Connectivity)

Vertical Connectivity was through conventional lease lines and all MPSWAN backbone lease lines were terminated on the routers placed at every SWAN POPs³.

The SWAN IP based network (IP based services) was divided into hierarchical 04-layer architecture with each layer representing following segments:

Tier1 = State Network Management Centre (NMC), Bhopal having Core Routers, Switches and other devices

Tier2=Distribution/Access Routers and other devices at Commissioner HQ POP's.

Tier3=Distribution/Access Routers and other devices at District HQ POP's.

Tier4=Access Routers and other devices at Block Level POP's.

And the locations of PoPs were as follows:

Tier-1 POP -- NMC at Bhopal: 01

Tier-2 POP -- all Divisional or Commissioner HQ: 07 (Excluding State HQ)

Tier-3 POP -- all District HQ: 40

Tier-4 POP -- at Block/Tehsil HQ: 292



Note: With the changes in the State demographics, the number DHQ, BHQ and demand for bandwidth were revised. As per the current statistics, there are 51 districts, and 309 blocks in the State. There are 360 PoPs established in the State and all are operational.



The four-tiered architecture is implemented for the first time by GoMP. The motive behind implementing Tiered Network Architecture Design is to have:

- State-wide inter-connectivity across Vertical Offices and Horizontal Offices.
- Multi-service network for Voice, Video and Data
- High-availability and resilient network
- Integrated network security for all layers including horizontal offices
- Scalable and High-performance network solution
- Efficient Network management



Note: Not all of headquarters are located at State Capital. Headquarters for Sales Tax/ Commercial Tax is at Indore, HQ's for transport department, land records department and provident fund department are at Gwalior, High Court and HQ for State electricity board is at Jabalpur. The bandwidth requirements may differ for each of

Most of the procurement and contract work was expatiated during this period. Procurement documents, procurement statements of work, terms and conditions for contract, standards for selecting contracts and guidelines for establishing vendor selection criteria were outlined. The executing part of the plan documented the process flow, roles and responsibilities for the teams, rules for bidder contact and negotiations. The control part of the plan indicated how the contract stipulated would be monitored and controlled, guidelines for resolving the dispute, process for accepting deliverables and payment criteria. The closing part demonstrated the guidelines of when the contract is considered as closed^{1,3}.

The due diligence activities highlighted the complexities encountered in setting up of SWAN in the State. SWAN implementation not only required infrastructure set up but also demanded major efforts to manage and optimize the network. Interlinking data-points, communication flow, 24*7 network performance monitoring, business processes reengineering, procurement of hardware/software, materials and supplies, infrastructure upgrade, stakeholder engagement, government approvals and clearance were few of the major tasks identified.

Under PPP implementation model, MPSEDC invited bids from eligible bidders for:

- Supplying of voice and network equipments, hardware, software etc.,
- Carrying out installation and commissioning,
- Providing Facility Management Service (FMS)

to MPSWAN for a period of five years.

The list of deliverables, acceptance criteria, handover criteria, service level agreement, penalties for implementation delays, network downtime etc. got drafted during this period. The roles and responsibilities of MPSEDC, third party auditor (TPA) and bidder (also called as Network Operator/System Integrator) were clearly defined to avoid any discrepancy in the later stages of the project³. MPSEDC and STPI acted as the coordinating agency for bid preparation and evaluation.

MPSEDC ascertained SWAN framework and non-technical infrastructure. Power, being a basic infrastructure problem in many parts of the State, all the blocks was provisioned with 3-phase electricity. The locations and space (rooms) to setup PoPs were identified and analyzed. However, there were instances where rooms were available but inadequate while at some places even obtaining a room was a challenge. With thorough planning and execution, rooms were constructed and sites were readied. Site readiness report was prepared and shared with the selected bidder on signing the contract.

MPSEDC was responsible for all the necessary approvals and clearance. Approval from Municipalities, Public works department (PWD), State electricity board, department of irrigation for laying of cables, Approval from DOT/TEC/ TRAI/concerned authorities/BSNL/other service providers for establishing network and connecting different network elements /ports to BSNL and, Approval from Wireless Planning Commission (WPC), Standing Advisory Committee for Frequency Allocation (SACFA) for using Radio/ Microwave/ Wireless links in Intra city/ Intercity were taken. However,



seeking appointments and coordinating meetings amongst above stakeholders was an enormous challenge, which was mitigated well with thorough planning and timely involvement.

MPSEDC also ensured Third Party Agency (TPA) access to Network Management System (NMS) and related systems.

The responsibilities of TPA were to:

- Monitor the MPSWAN performance for 24*7*365 days and ensure its compliance with the desired Quality of Service (QoS)
- Provide timely advice to MPSEDC on the health of the network, bandwidth upgrade, optimal utilization, futuristic enhancement and augmentation of capacity
- Perform inventory audit (physical inspection of at least 10% of PoP), SLA monitoring audit (as per SLA's signed by state, network operator), Usage audit, Security audits, Helpdesk & User feedback audit and, Review of Acceptance Test Plan

In short, TPA performed the role of a Technology Partner to the State Government in terms of all technical aspects of the SWAN.

The system integrator's scope of work covered Supply, Installation and Commissioning of MPSWAN along with its operation and maintenance for five years as per the service levels and deliverables specified by MPSEDC. The system integrator also ascertained site readiness for the implementation of SWAN infrastructure in addition to the entire internal electrification work required for the smooth commissioning of the PoPs².

(Appendix A for SI Responsibilities and Appendix B – MPSEDC, STPI, TPA and SI Responsibility Matrix)

The stringent timelines of 09 months for completion of MPSWAN project from the date of issue of work order, and handover of healthy network at the end of contract were the main criteria defined. The payment conditions to bidders were outlined too stating an upfront payment on satisfactory completion of 90 percent of the total work.

At this stage, the process became highly interactive and the lines between designs, build, test and implement became less distinct. Beyond inception, phases were indistinguishable. All the teams involved worked concurrently in repeated cycles of design – redesign, build- rebuild, and test - retest. Throughout development and implementation, there were plenty of challenges, which the teams successfully managed and overcame.

IMPLEMENTATION PHASE

The network operator contract was awarded to L1 bidder - M/s Tulip Telecommunications Limited in 2009. However, in May 2013, contract between M/s Tulip Telecom Limited and MPSEDC was terminated due to non-compliance and non-performance issues. Even though network was running, 90% of the said work was complete; communication was also up at most of the places, Tulip communication could not deliver the network as per the requirements specified in RFP. The video conferencing, IP enabled devices, remotely monitoring facility and even minimum resources for FMS were not provided. Time and again MPSEDC also facilitated SI by providing internal resources, extended timelines and even released partial payment, but the attitude of network operators indicated aloofness.

Subsequently, a fresh contract was floated and MPSEDC took the ownership of implementation of MPSWAN under a new implementation model. Under this model, the State directly establishes and owns the infrastructure and uses private operators for FMS.



At present, the project FMS is being provided by Netlink. The private vendors were contracted under Annual Maintenance Contract (AMC) for maintenance of network components (Routers, Switches, Modem, AC, DG, UPS), for a period of 3-5 years depending on the shelf life of the equipment. All warranties were directly taken from manufactures; gap infrastructure was purchased. Later, a fresh contract for FMS was floated.

Although BSNL (DDL) was chosen as the preferred bandwidth service provider for vertical connectivity, MPSEDC also contracted Reliance as alternate bandwidth service provider for vertical component connectivity, Bharti Airtel for horizontal connectivity and, both for equipment supply and maintenance in their respective arena. Besides this, MPSWAN is also integrated with NIC to provide reliability and uninterrupted delivery of high-speed data, voice and video.

At remote locations, Airtel provides wireless connectivity. At present, transformation from 'DDL' to 'hub and spoke' network topology ensures better control and transparency. However, there are some issues associated with this topology as it may cause communication time gaps. It also has redundancy issues. If the NMS network fails, entire State network may fail. To cater to these issues, GoMP has redundancy at power, equipment and link in terms of UPS, DG set.



MPLS by nature is a redundant network. ISPs are providing MPLS connectivity to POPs directly from SHQ, following hub and spoke topology through MPLS cloud at SHQ. As of now Reliance has setup 291 links for MPSWAN and is in the process of implementation of MPLS connectivity to rest of the locations. BSNL is also working towards transition from leased line network to MPLS based network and as of now 4 links have been commissioned.

Note: With the transformation of infrastructure to MPLS, the concept of commissioner/divisional HQ is no longer valid; State NMC directly connects to all District HQs.

To take charge of the vast infrastructure management, an autonomous body [District e-Governance Society (DeGM) was established as a nodal agency for better governance, operational control, smooth and speedy roll out of SWAN at District level. Similarly, Assistant e-Governance Manager (AeGM) was deployed at Tehsil/block level. Both acted as a monitoring cell for day-to-day progress of MPSWAN. During the entire tenure of the project, MPSEDC and DeGM worked closely to develop and monitor the PoPs functioning throughout the State.



During the entire course of the project, another major challenge faced was resource constraint. Limited manpower, handling multiple roles and responsibilities posed some delays in implementation and ownership of the project changed multiple times. A "Hindrance Register" was maintained for the project, which documented hurdles for each and every event. With effective communication and coordination amongst project teams, this issue was mitigated well.

During implementation of PoPs, an unanticipated issue surfaced. It was found that duplicate and stolen equipment; cables and batteries were being used. These were immediately replaced by higher configuration cables and batteries and shop owners were urged to bear the consequences of stolen equipment and completely put a stop to buying stolen goods.

KPMG was appointed as TPA to monitor performance and end-to-end service availability on MPSWAN. Monitoring was done by maintaining Antivirus Reports, Denial of Service Attack Log, Intrusion Log and Defacement Logs to name a few. Additionally, security and user authentication, logical isolation of departments, end to end data encryption, firewall to prevent hacking, 24x7 power supply and access to all equipment (Router/Switch/LAN-Extender/Radios/ IP Phones) were identified as critical requirements of this phase. The entire SHQ setup was divided into De Militarized Zones (DMZ's) which are segregated for maintaining the applications based on their criticality and security levels.

The State is also following CERT-IN guidelines for network security in the State.

Stringent built-in checks were set up to measure and control communications (traffic, packets) on the network link and link capacity usage. This helped reduce network congestion and improve network performance to a large extent. There was a need to protect all PoPs against viruses for which VoIP and VC equipment (with desktop camera) with centralized control at NMC were set up.

Central helpdesk was formed and stringent SLAs were defined. The trained network engineers were deployed at NMC, DHQ/BHQ PoPs, with the responsibility to monitor and maintain vertical and horizontal connectivity.

Phase-wise rollouts and learning from initial phases were applied to later phases. Involvement of ministries, equipment ownership issues, connectivity issue, transition/switching from a manual system to a transparent system, setting up of the entire infrastructure, manpower deployment, theft, insurance, extension/upgrade of network, co-ordination amongst various agencies and escalations were the key challenges faced. However, convergence of efforts, active involvement of various stakeholders, transparency of the processes and quality of service helped in accomplishing the intended purpose. Final Acceptance testing done by STPI for all the locations was audited by TPA. (Appendix 3 – Final Acceptance Testing)

In the later stages, considering the fact that all the sites at the block level are in wireless rural areas, connectivity was established through RF/LAN/LL (Radio Frequency/Local Area Network/Leased Lines.

During this phase, the teams instituted strict controls over measuring, updating and resolving issues throughout the project. In addition, a formal methodology was defined to handle change requests. Proactive measures were taken to mitigate strategic risks, in order to achieve targets.

During the entire project, planning and implementing processes became highly interactive and the design, build, test and implementation phases became less distinct. Beyond inception, phases were indistinguishable. All the teams involved worked concurrently in repeated cycles of design – redesign, build- rebuild, and test - retest.



POST IMPLEMENTATION SUPPORT

The network management system deployed at the Madhya Pradesh State Wide Area Network ensures healthy connectivity through the following tools:

- 1. Network Monitoring and Management (MN&M)
- 2. Helpdesk Management (HD&M)
- 3. Service Level Agreement Management (SLA&M)

MN&M - CA Monitoring tool provides 24*7*365 real-time monitoring of all equipment and links and also generates SLA reports. The current as well as historical statistics of network/link availability and utilization is available in graphical/tabular format. It facilitates teams to monitor all PoP statuses in a single graphical format.

HD&M - A comprehensive centralized helpdesk addresses internal and external day-to-day problems and queries. This system works 24*7*365 and provides reliable environmental support services to its users. CA Service Desk, an existing tool, with a capability for auto ticketing through SMS, is modified to allow users to log ticket-using Internet, email and telephone calls. The SMS pulls and push service is provided by MPSEDC. It also caters to manual ticketing option.

SWAN Helpdesk Numbers: 0755-2518411, 0755-2518412, 0755-2518413

SWAN Helpdesk email id: mpswanhelpdesk@gmail.com

(Appendix 4 – MPSWAN field service report)

SLA&M –Performance monitoring against specified SLA ensures robust and uninterrupted connectivity. Separate SLAs have been drafted for Prime Business Hours (PBH) and Non-Prime Business Hours (NPBH).

The severity of the MPSWAN Vertical Network is divided into groups/levels as follows:

- Severity level -1 is with Hardware, Software and Services at Tier-1 POP (State HQ)
- Severity level-2 Hardware, Software and Services at Tier-2 and Tier-3 POP (Divisional HQ/District HQ)
- Severity level-3 Hardware, Software and Services at Tier-4 POP (Block HQ)
- Severity level-4 Horizontal connectivity from SHQ/ CHQ/ DHQ/ BHQ PoPs to Horizontal client offices

During this phase, the stringent measures were ensured for effective monitoring and controlling via various reports with pre-defined frequency: - PoP Uptime and Downtime report (monthly), Latency Report (quarterly), Antivirus Reports (monthly), Call Response and Rectification report (quarterly), Link-wise Bandwidth Utilization report (monthly) and many more.

KEY LESSON LEARNED

- Technology can help bring 100 % effectiveness but not 100% efficiency
- Divide the sizable project into sub-projects/ phases and plan accordingly
- Active participation of all stake holders necessary
- Cogent skills to minimize stakeholder resistance
- Integration with multiple data, systems take much more time and raises lots of technical as well as human hassles



PROJECT CASE FACT SHEET

PROJECT CURRENT STATUS

The implementation of SWAN project has improved communication between G2G, G2B and G2C. As per current statistics, SWAN connectivity is showing 99% uptime at District level PoPs (Point of Presence) and more than 95% uptime for Blocks/Tehsils PoPs. Around 40 departments of the state Government are connected with SWAN and around 3600 offices of the entire state are connected through horizontal connectivity.

As of now, all the services deployed at MPSWAN are hosted at SHQ. The connectivity at various tiers is as follows: -

- 1. Connectivity at CHQ 34 Mbps
- 2. Connectivity at DHQ 8 Mbps and 16 Mbps
- 3. Connectivity at BHQ 2 Mbps to 4 Mbps

All MPSWAN POPs are protected against all types of virus attacks and are equipped with VoIP Phones and VC equipment (Desktop Camera) with centralized control at NMC.

At present, the network management system located at the State IT Centre, Bhopal is the CA Technologies proprietary tool with the following deployed modules:

- CA Service Desk
- CA e-Health
- CA Business Intelligence
- CA ARC serve Backup
- CA Spectrum
- CA Performance Manager (proposed)

POP LOCATION SUMMARY

Name of MPSWAN POP	No. Of Vertical POPs Operational	No. Of Horizontal connects Operational as on 2014
SHQ	1	206
DHQ	50	1359
BHQ	309	1404
Total	360	3005



MAJOR DEPARTMENTS BENEFITED:

As on date a total of 360 PoPs are established and operational and more than 800 numbers of horizontal connections have been provided to Transport (45), Treasury (220), Municipal Corporation Bhopal (81), Electricity Board (16), Excise (83), Commercial Tax (62), Panchayat (150) and High court (46).

Major departments of GoMP using SWAN:-

- Treasury Department (eTreasury)
- TGRS –Department of Registration and Stamps (on-line registry)
- Police Crime and Criminal Tracking Network and System (CCTNS) [Common Integrated Police Application (CIPA), Online FIR]
- Commercial Tax Department
- Excise Department
- Dial 100
- Virtual Class Room (VCR)/ Smart Class: State SWAN is available to 391 Schools and Colleges for virtual class room
 project. It is a unique idea to provide distance education through questionnaires. Interaction between students and
 teachers happen through virtual class rooms
- National Health Mission (NHM): MP Vision To equip people with knowledge and skills to keep themselves healthy. Provide effective healthcare to rural population throughout the State with special focus on most vulnerable section of the society.

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ABBREVIATIONS

MPSWAN	Madhya Pradesh State Wide Area Network		
NeGP	National e-Governance Plan		
Gol	Government of India		
GoMP	Government of Madhya Pradesh		
DIT	Department of Information Technology		
MPSEDC	Madhya Pradesh State Electronics Development Corporation		
BOOT	Build Own Operate and Transfer		
SHQ	State Head Quarter		
DHQ	District Head Quarter		
BHQ	Block Head Quarter		
РоР	Point of Presence		
RFP	Request for Proposal		
AMC	Annual Maintenance Contract		
AC set	Air Condition Set		
DG set	Diesel Generator Set		
UPS	Uninterrupted Power Supply		
FMS	Facility Management Services		
SLA	Service Level Agreement		
G2G	Government to Government		
G2C	Government to Citizen		
NO/SI	Network Operator/ System Integrator		
BSNL	Bharat Sanchar Nigam Limited		
NICNET	National Informatics Centre Network		



PROJECT ANALYSIS

Write down your understanding of the project in terms of Project management knowledge areas.

Project Management Areas	
Scope Management	
Time Management	
Cost Management	
Quality Management	
Human Resources Management	
Communications Management	
Risk Management	
Procurement Management	
Integration Management	
Stakeholder Management	

Highlight the major areas of strength in this project.

Highlight the opportunities for improvement in this project.

Highlight challenges encountered and lessons learnt in this project.

Appendix

Appendix A: Network Operator Responsibilities

- Supply, Installation, and Commissioning of all active and passive equipments
- Planning, Provisioning and commissioning of circuits for the MPSWAN backbone (Vertical Connectivity) including liaising with Leased line service provider for the same.
- Planning, Provisioning and commissioning of circuits for the user departments
- (Horizontal Connectivity) including liaising with Leased line service provider for the same. CUG creations for individual departments (CUG may vary from one to 500 circuits)
- Internet requirement of CUG created on MPSWAN will be met via Internet connectivity at NMC. Internet bandwidth per CUG and also per circuit in a given CUG should be done at NMC including billing of internet connections (CUG/individual circuit wise)
- Complete Operation and maintenance of MPSWAN including SWAN backbone and connectivity upto user departments at each level for 05 years from date of commissioning of complete MPSWAN network.
- Common Services to be offered are intra-office and inter-office communication of Data, Voice, and Video.



- VoIP service, Mail Server/Services, Video Conferencing, DNS Server/services, Web server/services, Internet.
- Training to GOMP nominees.
- O&M for 05 years (up to extension period if any) w.e.f date of commissioning of complete MPSWAN network as per SLA defined.
- NMC (Tier-1) operation will be 365*24 manned, Tier-2 POPs and Tier-3 will be manned during office hours i.e.
 365*12 (0800 to 2000 hrs) and Tier-4 POPs may be unmanned.

Appendix B – Responsibilities Matrix (before termination of contract)

SrNo	Activity	MPSEDC	STPI	SI	THIRD PARTY
1	Preparation of Tender Document for				
	the Selection of MPSWAN SI		*		
2	Tender Process for the Selection of				
	SWAN Operator	*	*		
3	Approval for Appointment of MPSWAN				
	SI	*			
4	Review and suggestion on the Network				
	Architecture			*	
5	Site Identification	*			
6	Site Handover	*		*	
7	Site Survey and Preparation			*	
8	Installation and				
	Commissioning of the SWAN			*	
9	Monitoring the Installation and				
	Commissioning of the SWAN	*	*		*
10	Acceptance Tests (Final Acceptance)	*	*	*	*
11	Onsite Inspection and Verification of	*	*	*	*
	Acceptance Tests				
12	Trial Run	*	*	*	*
13	Witness of Trial Run	*	*	*	*
14	Issue of Final Acceptance Test Certificate	*	*		*
15	Operation, Management and				
	Maintenance of the SAWN			*	
16	Centralized Monitoring from NOC (24x7)			*	
17	Supervision of the Monitoring of the				*
	SWAN				
18	Periodical Generation of NMS report			*	*
19	Verification of the NMS Report				*
20	Approval of NMS Report	*			
21	Periodical Auditing of the SWAN				*
22	Submission of the Audited Report of			*	*
	SWAN as advised by Consultant				

7.4.10 Responsibility Matrix.



Appendix C – Final Acceptance Test

- A. Partial Acceptance Testing: Includes the provisional acceptance of 75% (Indicative number for the state) of the sites including SHQ, DHQs, BHQs, and all co-located & remote offices in accordance with the requirements. The tests to include the following:
 - 1. All hardware and software items must be installed at a particular site as per the specifications.
 - 2. Availability of all the defined services shall be verified.
 - 3. Detailed test plan shall be defined by the third party monitoring agency in consultation with GoMP.
- B. Final Acceptance Testing: After successful installation of 90% {Indicative number for the state} of SHQ, DHQs, BHQs and all co-located & remote offices, an acceptance test in accordance with the requirements to be conducted.
 - 1. All hardware and software items must be installed at a particular site as per specifications.
 - 2. Availability of all the defined services shall be verified.
 - 3. Detailed test plan shall be defined by the third party monitoring agency in consultation with GoMP.
 - 4. Security audit of the network to be carried out by a certified agency.



Appendix D – Helpdesk Service Report

10/3/2016 No. 3 MPSWAN FIELD SERVICE REPORT Location Govt College HELPDESK Call Ref no 57807 DHQ BHQ Sailuna PRE-CHECKLIST: In the case of RF/RF-LAN: Check the LED indication on PoE (Power over Ethernet, LED blinks green in color). Ensure that Data-In cable of PoE is connected with computer/system. Ensure that Data-Out cable of PoE is connected with RF system (Wireless Eq). In the case of BSNL Leased line: Check the LED indication on Modem. Check the LED indication on Router (SYSTAT LED blinks green/amber in color)-Ensure that LAN cable of ethernet/fastethernet is connected with computer/system. In the case of LAN/OFC/Metro Ethernet of client Ensure that IO interface of computer system is working. * Ensure that LAN cable of Ethernet/fast-Ethernet is connected with computer/system. Check that proper IP address is configure on the computer/system. UPS Yes No Earthing voltage ALA Air Conditioning: Yes VNe PING TEST: No TRACEROUTE: V Yes Yes No Gateway IP. 10-125. 4 1 Google.com BANDWIDTH TEST: (www.bandwidthplace.com or Download Upload Aggregate Bandwidth www.att.com/speedtest or speedtester.bsnl.co.in) NA ISSUE/INCIDENT/PROBLEM/REQUEST DESCRIPTION no nner **RESOLUTION SUMMARY'ACTIVITY DETAILS:** 5 ne 21 bre ean 0 CALL STATUS: Closed Under observation Pending for customer clarification Pending for spare/other CUSTOMER COMMENTS/FEEDBACK IF ANY: imes Same scuer nen in 200. Aca student FOR MPSWAN USTOMER Sign Sign Name SAURABH E. Name alhotsa Designation resson gost Designation& Department with seal Department MPSWAN HELPDESK NUMBER FOR ALL TYPES OF SERVICE REQUEST IS 0755-25184 NI 12 NO. 4655 NO. 10246 IS NO. 1 AC LEASE LOG YOUR REQUEST through mail id inpswanhelpdesk@ginail.com TEST-Page 1 of 1



GUIDELINES TO MAP CASE STUDY WITH PROJECT PHASES, PROCESS GROUPS AND KNOWLEDGE AREAS

PROJECT PHASES

A project phase is a collection of logically related project activities that culminates in the completion of one or more deliverables. Different phases typically are completed sequentially, but can overlap in some project situations. Different phases have a different duration or effort. For project with more than one phase, these phases are generally sequential and defined by industry specific terminology. Collectively, these phases make an element of project life cycle. The project life cycle is a series of phases that a project passes through from its initiation to its closure. (A Guide to Project Management Book of Knowledge, Fifth Edition)

INCEPTION PHASE

This phase may also be called initiation, conception or preparation. In this phase, project charter is created and authorized. It considers alignment of the project within the organization's overall strategy, architecture and priorities. It addresses business justification, business benefits to performing and operating organizations. Project boundaries are defined. The key purpose of this phase is to align the stakeholder expectations with the project purpose, give them viability with the scope and objectives, and show how their participation can help the project.

PLANNING PHASE

This phase may also be called development, design, preparation or formulation. It determines whether the objectives stated in the project charter can be achieved as well as how the project will be accomplished. It considers development of project baseline and establishment of detailed project work and project management plan. It explores all aspects of scope, time, cost, quality, communications, human resources, risks, procurements and stakeholder engagement. It addresses the problem that is needed to be accomplished and considers project concept, feasibility issues and possible alternative solutions.

IMPLEMENTATION PHASE

This phase may also be called execution, implementation or deployment. It addresses the completion of the work defined in the master plan as per the project specifications. It involves coordinating people, resources, managing stakeholder expectations, as well as integrating and performing activities of the project in accordance with the project management plan. It may also address planning updates and re-baselining. It addresses resource management, interpersonal skill, conflict resolution, leadership and communication. It also looks into monitoring and controlling of variances in scheduled parameters.

MONITORING AND CONTROLLING PHASE

This phase empowers project teams to identify variances, process issues, and execution issues and take appropriate corrective actions. It involves managing unplanned changes that occur in the project. It deals with integrated change control, project and enterprise metrics, Earned Value Management, tracking, monitoring and reporting of project progress against the baselines.



This phase is coalesced with all other phases, hence not captured as a separate phase in the case study.

CLOSING PHASE

This phase is executed at the end of the phase/project. The closing phase is mandatory for all sub-projects/project. It may address acceptance testing, formal acceptance, implementation strategies, project documentation, post implementation audits. This phase is completes with records of lessons learnt that can be used as baseline for future initiatives. It also includes closeout meetings for teams to review their experiences.

Note: This phase is not explicitly captured in the case study.

POST IMPLEMENTATION PHASE

This phase may also be called operation, application maintenance and support. It addresses the responsibility for operations, maintenance, and support to the appropriate organizational unit or service. It frames the development of recommendation to support success in future projects.

Note: This phase is not covered under 5 process groups as specified in PMBoK

PROJECT MANAGEMENT KNOWLEDGE AREAS

The Knowledge Areas are the specialized domains in which a Project Manager functions throughout the project life cycle. The ten knowledge areas are used on most projects most of the time. These areas are: Project Integration Management, Project Scope Management, Project Time Management, Project Cost Management, Project Quality Management, Project Human Resource Management, Project Communications Management, Project Risk Management, Project Procurement Management, and Project Stakeholder Management. In this case study, all the knowledge areas are utilized, as appropriate.

Project Scope Management – It include all the work required, and only the work required, to complete the project successfully. Managing scope is primarily concerned with defining and controlling what is and what is not to be included in a project.

In this case study, the broader scope is to establish State Wide Area Network in the State of Madhya Pradesh and all the tasks associated with it. Other NeGP associated components i.e. State Date Centre (SDC), State Service Delivery Gateways (SSDG) and Common Services Centres (CSC) are out of scope boundary.

Points for discussion: Work Breakdown Structure – Sub-dividing the project deliverables and tasks into smaller, more manageable components. It provides a structured vision of what has to be delivered. WBS is a comprehensive tool for team communication, risk identification that helps the teams remain focused on overall project objectives and plan.

Project Time management: it deals with planning, estimating, managing and controlling activities/tasks required for timely completion of the project.

In this case study, timelines are provided by GoI. MPSWAN team had to fit the entire schedule into the timelines provided. Stringent checks placed by MPSEDC helped adhere to the final schedule.



Points for discussion: Any changes in the project budget should be recorded and approved through Change Control Board (CCB). CCB is a separate entity that focuses on reviewing all the changes coming into the project. The key here is to maintain and control change documents in an integrated fashion that would reduce overall project risks.

Tools and techniques for estimating activities/tasks and network diagramming to be used.

PROJECT COST MANAGEMENT: It deals with completion of the project within the approved budget.

DIT sanctioned financial aid of Rs. 174.21 Crore for the project with 66% of total cost to be borne by GoI and remaining 33% by GoMP. DIT covered support for only one PoP at each location (State/district/subdivision/block HQs), for which, bandwidth arrangements were tied up by the state. The cost of infrastructure, bandwidth and any up-gradation cost would be borne by the state. In addition, upgrade/ relocation costs also to be borne by the states.

Later, the financial aid was revised to 99.32 Cr with state covering 33% of the total project cost. However, GoI ended up providing only 12 Cr for the project while the rest of the cost was borne by GoMP.

Points for discussion: Any changes in the budget of the project need to be recorded and approved through change control board. Change Control board is a separate entity that focuses on reviewing all the changes coming into the project. The key here is to maintain and control change documents in an integrated fashion that would reduce overall project risks.

Tools and techniques used for estimating duration of activities/tasks and, earned value management for estimating variances and delays in the project

PROJECT QUALITY MANAGEMENT: The objective is to ensure that all the project requirements are met with and validated within the framework of the organization's ethics.

In this case study, KPMG has been appointed to ensure desired Quality of Service (QoS). This is in addition to the Governance Conformity Assessment Centres (eGCA)" established by GoI, across the country to provide the requisite facilities for testing, audit and certification.

Points for discussion: KPMG report on quality check and tools & techniques for quality planning, audit and control.

PROJECT HUMAN RESOURCES MANAGEMENT: HR management focuses on behavioral aspects of the people involved in the project. It takes time and effort to plan on how to use resources, how to make them more valuable and how to motivate them.

In this case study, after contract termination with Tulip communications, MPSEDC successfully managed the entire project with the available resources.

Points for discussion: RACI matrix to avoid any confusion among team members' roles and responsibilities and Tucks model for team building, staff management plan.



PROJECT COMMUNICATION MANAGEMENT: Objective is to provide timely sharing of information. Informal as well as formal communication modes should remain open through the project lifecycle. Communication among the people working in a project is always of extreme importance.

Points for discussion: Considering the project size and interest/involvement of stakeholders, communication issues needs to be addressed effectively and efficiently. A proper communication plan needs to be chalked out as it becomes very handy in case of restructuring. The change management process could be designed to cater the changes coming from various sources.

Project Risk Management: Objective of risk management should be to increase the likelihood of opportunities (positive risk) and decrease the likelihood of threats (negative risk).

Points for discussion: List of risks in the case study (not an exhaustive list)

Standardization and interconnect data and systems (mitigated by Business Process re-engineering and alignment of all processes with ISO standards)

Collaboration with multiple agencies (mitigation done through milestones check and monthly and weekly progress review meetings. SLA and Penalties defined for delays)

Changing mindset of stakeholder. (Mitigated by timely involvement in decision-making processes and sharing right information. Instill passive attitude in staff to minimize discrete behavior and maximize accountability.)

Installation of PoP. (Even at block level, getting space of PoP site was a big challenge)

Theft of cables and equipments (mitigated by creating awareness amongst people and for the theft of D.G. set, 12 V battery was replaced with 24V battery. 24V is not easily available and is not used elsewhere)

Ensuring security of data and system

Performance of PoP (getting online reports on the performance of PoP via performance tool (CA tool)

Downtime risk (alternate redundancy network connectivity consisting of Router, UPS and link) at 283 locations only for L1 order, was established)

Categories risks into various groups (technical, administrative, organizational, processes, regulatory) for better control and mitigation. All the risks could be recorded in risk register and weekly risk assessment meetings could be conducted at regular intervals to review the same. Adding risks into risk register was an iterative process and was carried out throughout the project tenure.

PROJECT PROCUREMENT MANAGEMENT: includes the process (vendor solicitation, evaluation, selection, contracting, control and close procurement) necessary to purchase or acquire products, services needed from outside the project team.

The procurement management followed all the steps defined in PMBoK as it falls under government norms. It was not just the Purchase Order to initiate the work.

Points for discussion: Government procurement process for the States @ http://NiSG.com



PROJECT STAKEHOLDER MANAGEMENT: Objective of stakeholder management is to analyze their expectations and appropriate management strategies for effectively engaging stakeholders in project decisions and executions.

In this case study, the major stakeholders associated (directly or indirectly) with the project were:

- MPSEDC
- Government offices / departments
- External as well as Internal Consultants
- Implementing Agency (M/S Tulip Communication)
- NICNET
- Third Party Monitoring Agency (KPMG)
- Govt. of India, Department of Information Technology (DIT)
- M/s Netlink for Facility Management Service (FMS)
- Bandwidth Providers (BSNL, Reliance, Airtel)
- Users/ Project Staff
- And many more
- Note: this is not an exhaustive list.

Point for discussion: Developing stakeholder analysis matrices to analyze their levels of interest, individual expectations as well as their importance and influence and accordingly, developing strategies to shift resistant and neutral stakeholders to supportive stakeholders, to provide value adds to project outcomes.

PROJECT INTEGRATION MANAGEMENT – Objective is to manage the interdependencies among all the knowledge areas.

Points to consider: - Creation of Project Charter – describes the high level project details, business justification, high level risk, assumptions, constraints, ballpark estimates and names of critical stakeholders. It is a critical component of initiating and planning process groups and referred throughout the project lifecycle.