GUIDELINES AND ARCHITECTURE FOR

GSP/ISP INTEGRATION WITH GST SYSTEM

(Version 1.1)

These guidelines and the architecture of connectivity are subject to change over time, at discretion of GSTN. The GSP and his ISP will need to make the necessary technology changes as and when that happens at his own cost. GSTN undertakes to commit to least possible changes with due concern to same, however, certain situations may demand the changes and may make them unavoidable.

1. INTRODUCTION

This document provides the instructions, guidelines as well as the technical architecture for GSP/ISP connectivity to GST System at DC1 (Delhi) and DC2 (Bangalore). The ISPs that bring the traffic of the GSPs to the GST System DC shall need to follow the provided connectivity methodology and adhere to the mandatory requirements. Some of the instructions are recommendatory in nature and should be used as best practices. Accordingly these are categorized into "**Mandatory**" and "**Recommended**". The mandatory ones shall have to be complied without exception. However, the recommended ones should be taken as best practices to be adopted.

2. MANDATORY GUIDELINES & RESPONSIBILITIES: GSP/ISP

For Integrating with GST System Project, GSPs shall opt for a robust, fault tolerant infrastructure with enterprise grade SLAs.

2.1. GSPs shall procure MPLS connectivity from any of the designated ISPs providing integration connectivity to GST System. The provisioned MPLS links shall be used to connect with GSTN DC1 at Delhi and GSTN DC2 at Bangalore. Please refer the diagram at **ANNEXURE A**.

2.2. GSPs / ISPs need to provide the CPE router (in HA) to terminate the MPLS connectivity at GSPs Data Center locations. The cost of these devices has to be borne by the GSP/ISPs. (GSTN

and/or its MSP will not provide any links or incur any cost for providing these devices to GSPs). These routers should provide the functionalities that are detailed below:

a. GSPs / ISPs must opt for enterprise class security for the environment being used to connect / integrate with GSTN, and ensure that they do not inject viruses, malwares, intrusions, C&C /bots threats etc into GST System.

b. GSPs must ensure that traffic originating from their end and destined to GST System is free from viruses, malwares, intrusions, Bots/C&C threats etc. GSTN will reserve the right to block/suspend the services of GSP if malicious traffic is found which may be impacting the GST System.

2.3. GSPs must adhere to all Government of India IT Security standards and regulatory requirements. GSPs must comply with IT Act 2000 (including 43A) and amendments thereof.

2.4. The ISPs will submit the list of GSPs that they connect to the GST System. ISPs should also be prepared to sign necessary agreements for compliance needs as applicable at various data centers (from data center providers).

2.5. Each on-boarded ISP shall bring and deploy their own infrastructure in GSTN datacenters in order to provide connectivity services to GSPs.

2.6. The access to GST system will be controlled through GSTN firewalls. The integration boundary from GSTN side will be the pair of aggregation switches or GST-GSP-Switches on which the cross-connect from ISP's devices will be terminated.

2.7. ISP's must provide ISP Routers (CPE Routers) in HA mode at both DC1 (Delhi) and DC2 (Bangalore) locations of GSTN.

2.8. ISPs shall arrange for the required rack space outside the GSTN cage area.

2.9. ISP Routers has to be hosted in the ISP's Cage area or ISP's Rack near to the GSTN DC1/ DC2 cage area, in a highly secured manner.

2.10. The cost of these ISP Routers (CPE Routers) has to be borne by the ISP's and GSTN and/or its MSP will not provide any links or incur any cost for providing these devices to ISPs. The hosting charges / cost of the required rack space (power, cooling, cabling, etc) has to borne by ISPs.

2.11. The addresses of the GSTN Data Centers at Delhi and Bangalore for the GSP's connectivity are given below:

Location	Complete Address	SPOC
DC1	GSTN Cage Area; Tata Communications Data Centers Private Limited, Next Generation Tower, Opp. Savitri Cinema, GK-1 New Delhi -110048	Bijesh Babu (VP-Data Center Technology) Bijesh.babu@gstn.org.in 9599925316.
DC2	GSTN Cage Area; Nxtra Data Ltd., Plot No: 111 & 112 EPIP Zone, Road No-7 Ph-1, Whitefield Bangalore - 560066	Bijesh Babu (VP-Data Center Technology) Bijesh.babu@gstn.org.in 9599925316.

2.12. MPLS connectivity order will be given directly by GSP's to their respective ISP's. The cost for all the MPLS link has to be borne by the ISP's/GSP's.

2.13. ISPs shall provide back-haul links at both the GSTN DCs i.e. DC1 (Delhi) and DC2 (Bangalore).

2.14. GSTN and/or its MSP (Managed Service Provider) will not provide any links or incur any cost for providing the MPLS connectivity to GSPs.

2.15. The provisioning of all the required cross-connects will be in the scope of ISPs. ISP's must provide the cross-connect from ISP Router (provided by ISP) from ISP cage Area / ISP's Rack to GSTN- Aggregation-Switch or GSTN-GSP-Switch kept within GSTN Cage area for accessing GST System. Also it's the responsibility of the ISP's to extend the connectivity from their respective MUX to their ISP Routers kept at ISP Cage Area at both DC1 and DC2.

2.16. GSTN provided GSP aggregation switches for GSP connectivity will support 1GB interface (copper or MM fiber SFP). The 10GB interface (MM fiber) will be provided on request with proper justification given by ISP and approval from GSTN.

2.17. If single mode fiber cable will be used by ISPs for providing cross connect from their devices (ISP Routers) to GSTN GSP switch within GSTN DC1 & DC2, the required SFPs to connect at the GSTN end shall be provided by ISPs with no cost to GSTN.

2.18. ISPs along with GSPs must provision adequate bandwidth end to end for connecting to GST Systems.

2.19. The ISPs providing connectivity services to GSPs shall provide identical setup in GSTN DC1 and DC2.

2.20. It is recommended that each GSPs shall configure their respective existing DNS infrastructure to delegate/forward DNS queries for the domain *.internal.gst.gov.in pointing towards GST System Internal AUTH DNS servers listed below:

NS1: ns1.internal.gst.gov.in A

NS2: ns2.internal.gst.gov.in A

2.21. GSP's has to route the GSTN related URLs IPs inside the respective ISPs/GSPs network and the IP details will be provided at the time of Integration.

2.22. The ISPs has to decide the appropriate WAN IPs & Routing Protocols for their respective PE/CE routers.

2.23. The ISPs shall ensure appropriate P-2-P VPN tunnel till their respective router for securing the data in transit.

2.24. The ISPs shall configure their routers to enable policy based NATing based on the GSP wise traffic classification.

2.25. GSTN will provide /26 IP prefix for the network address translation (using PAT) for each GSP.

2.26. Each ISPs has to enable policy based NATing which would used to classify traffic, take appropriate action and put necessary controls at ISP level.

2.27. ISPs router (at ISP Cage Area) shall have adequate number of interfaces to connect with both of the GSTN designated GSP aggregation switches (min 2 ports, 1gig copper/fiber). ISP's also has to extend both the cross connects.

2.28. ISPs routers shall support for L2/L3 port channel with LACP aggregation protocol.

2.29. ISPs routers must support for policy based translations.

2.30. ISPs and GSPs shall ensure Data Security over the Network by implementing End to End Encryption across the network (https over TLS 1.2, IPsec). GSPs and ISPs shall also ensure that all the interfaces between various applications and user are encrypted using appropriate protocols (such as HTTPS over TLS 1.2, IPSec etc), algorithm and key management systems.

2.31. ISPs and GSPs shall be responsible for managing and supporting their respective supplied hardware, software and services used for connecting /integrating with GST Systems. GSTN and /or its MSP shall not be responsible for managing or providing any sort of technical support for the systems, hardware, software, services procured by ISPs and GSPs for integrating with GST System.

2.32. ISPs and GSPs shall plan for and leverage their own resources or third party services to diagnose and troubleshoot any performance issues in their respective setup and/or provisioned MPLS links.

2.33. ISPs shall provide the details of GSPs being connected on their links so that firewall rules will be configured to allow access both in DC1 and DC2.

2.34. API application at GSTN end is in Active-Active at both DC1 and DC2.

2.35. Each ISP has to provide identical routers in DC1 and DC2.

2.36. The traffic over the MPLS links are business class traffic and ISP's should configure Class of Services or Quality of Services accordingly.

3. RECOMMENDED GUIDELINES & RESPONSIBILITIES: GSP/ISP

For Integrating with GST System Project, should plan for an an assured uptime of 99.9% with their ISPs as well as at their end.

3.1. It is recommended that GSPs should also consider a backup link to be provided from different service providers at their location.

3.2. For protecting the GST System, GSPs / ISPs are recommended to deploy various security devices including but not limited to Antivirus, Firewalls, NIPS, HIPS and WAF. GSPs should provision End point security solution including HIPS and Antivirus for all the servers being used / proposed to be part of the GSTN Integration /connectivity.

3.3. GSPs should meet the security requirements as specified by CERT-In (http://www.cert-in.org.in/).

3.4. GSPs is recommended to meet and comply with GoI IT Security Policies and all applicable GoI standards and guidelines.

3.5. It is recommended that products /OEMs used by ISPs for connecting to GST Systems must be in Gartner's Leaders quadrant. In case where there are less than 3 vendors/OEMs in the leader's quadrant, the vendors may be from Challengers Quadrant as well. In case there are less than 3 OEMs in Leaders + Challengers Quadrants combined, the OEMs may consider to be from Visionary Quadrant as well. The same is recommended for GSP end Routers as well.

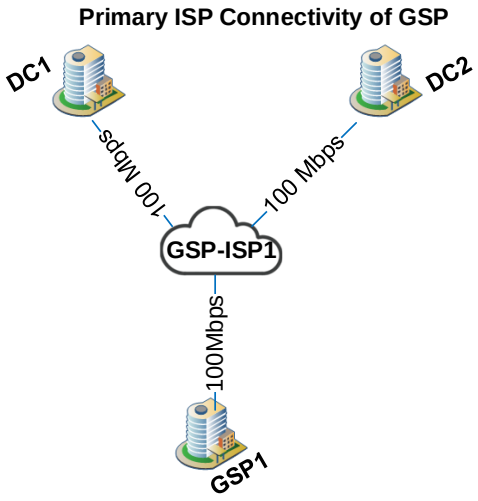
3.6. It is recommended that ISPs /GSPs ensure that end to end bandwidth utilization for the links connecting to GST System should not cross 70% at any point of time. And if bandwidth utilization reaches 70%, ISPs/GSPs may consider to increase the bandwidth at their own cost.

3.7. ISPs should provision adequate backhaul bandwidth as per number of on-boarded GSPs. However it may be noted that bandwidth estimation for connecting to GST system shall be done by GSP based on their user projections and to comply with the service levels/user expectations.

3.8. GSP's may choose the ISPs for redundancy (on the requirement of Primary and Secondary providers ISPs) for establishing connectivity with GSTN. The recommended connectivity is shown in the diagram given below:-

a. For the Primary MPLS link each GSP's/ISP's must provide MPLS links of EQUAL Bandwidth at GSTN DC1 and DC2. (This bandwidth should be equal to the GSP end MPLS bandwidth as well).

Pl Note: The bandwidth is indicative as an example only and GSP's has to decide on their final bandwidth requirement.



b. If the GSP decides for a Secondary MPLS link from a secondary MPLS provider, each GSP's must provide MPLS links of EQUAL Bandwidth at GSTN DC and DR without any cost to GSTN. This bandwidth provided at DC1 and DC2 should be equal to the GSP end MPLS bandwidth as well.

3.9. ISPs are recommended to ensure that traffic originating from GSPs and destined to GST System is logically separated from any other traffic.

3.10. ISPs and GSPs should perform regular hardening, patch management, testing and installation of software updates issued by OEM/vendors from time to time as per industry's best practices, thus ensuring overall security of their respective systems at every layer including physical security.

3.11. ISPs and GSPs should preferably nominate a project manager and technical SPOC, for overseeing all project related matters and issues.

3.12. ISPs and GSPs are recommended to provide a project management chart and document detailing the project management roles and responsibilities of each of the team member's involved. (The ISPs and GSPs Project Manager and technical SPOC is expected to interact with GSTN / the MSP as and when required).

ANNEXURE A

INTEGRATION DIAGRAM AND CONNECTIVITY: ISPs to GST SYSTEM