Goods & Services Tax Network (GSTN) System

GST System is arguably one of the most complex IT Systems in the world – in terms of scale, size and complexity. To give an idea about the complexity involved in the process, just consider this: Under GST, the buyer's returns will be auto populated by data from seller's returns and invoices uploaded by him. The software will have to match the data automatically from the returns and uploaded invoices and accept/reject/modify these invoices. GST system does not allow duplicate invoice upload. Synchronization between taxpayer's IT system and GST system will pose further challenges, and all these challenges will add to cost of administration and compliance, as service providers called GST Subidha Providers (GSPs) will charge the taxpayers for their services.[1] The GST Ecosystem is shown in the diagram below:

Source: http://www.ey.com/in/en/services/tax/ey-india-tax-insights-in-the-gst-regime-technology-can-help-create-a-credible-deterrence-for-tax-evaders-an-exclusive-interview-with-prakash-kumar, accessed 21/09/2017.

At the heart of the GST system sits the Goods and Services Tax Network (GSTN) as the technology backbone for GST, powered by the software built by Infosys. GSTN is a not-for-profit private limited company which was incorporated in March, 2013, with an authorised capital of Rs. 10 crore only, which are shared by the Government of India (24.5%), all States and UTs of Delhi and Puducherry and the

---

[1] http://www.gstn.org/ecosystem/pdf/GSP_Implementation_Framework_V_3.0.pdf, accessed 16/10/2017.

Empowered Committee of State Finance Ministers (24.5%), the balance 51% being contributed by private financial institutions.[2] Thus private players own 51% share in the GSTN, and the rest is owned by the government. The GSTN has also been given a non-recurring grant of Rs. 315 crores. The contract for developing this vast technological backend was awarded to Infosys in September 2015.

Expenses of the GSTN are to be shared equally between the central and the State Governments. The Central Government will have control over the composition of the Board, mechanisms of special resolution and shareholders agreement, and agreements between the GSTN and other state governments. Also, the shareholding pattern is such that the Government shareholding at 49% is far more than that of any single private institution.
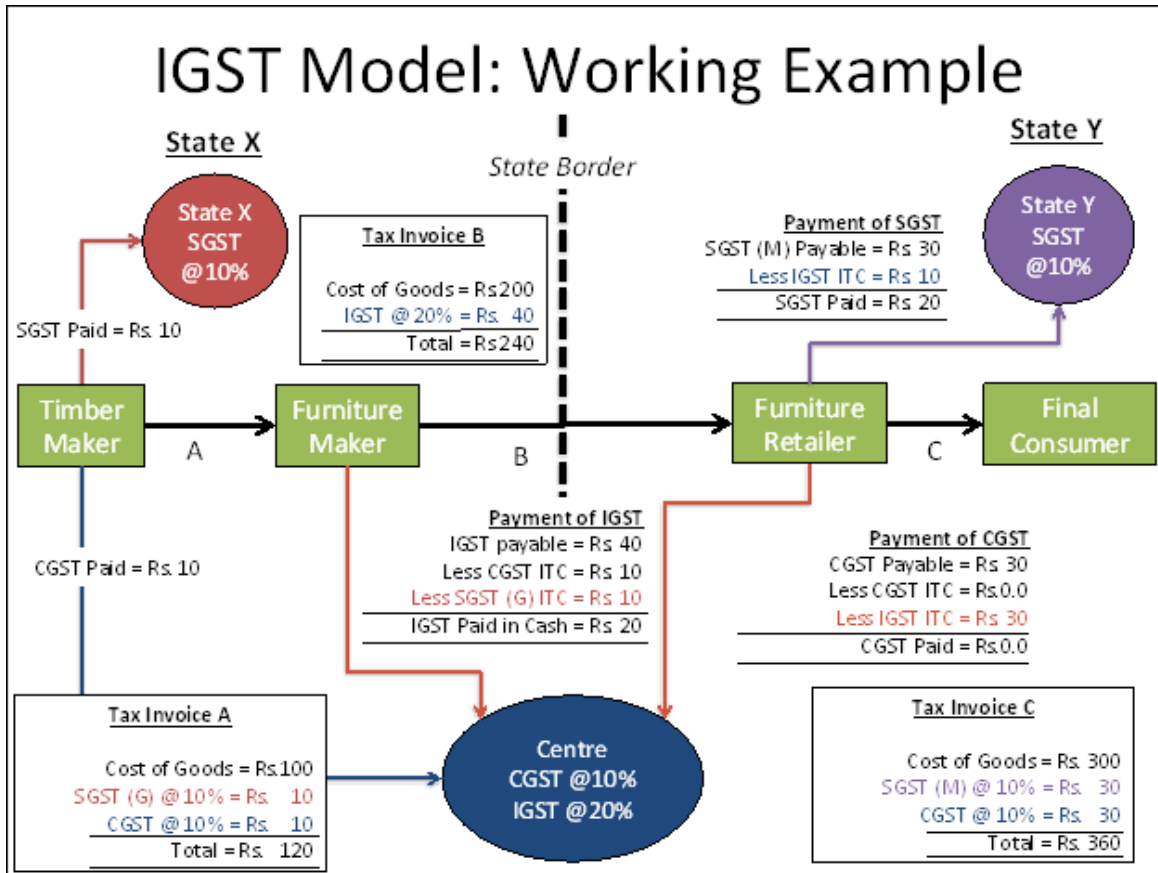
To state briefly, GSTN will establish a uniform interface for the taxpayer and also create a common and shared IT infrastructure between the Centre and States to deal with all GST invoices, returns, registrations, payments and refunds. It is to be a Trusted National Information Utility (TNIU), providing secure, reliable, efficient and robust IT backbone for the smooth functioning of GST and for handling perhaps the most complex of all tax systems in the world covering the Union and the 29 states of India as well as two Union Territories with legislatures.

GSTN is responsible for creating the IT infrastructure to migrate nearly 90 lakh existing entities registered with the Excise or Service Tax departments, and with VAT departments in the States, onto one single digital platform. Each of the States has a different format for VAT, and to integrate all these into a common compatible structure before migrating data has truly been a monumental task. GSTN has validated the existing business entities from the old databases using their permanent account numbers (PANs) and found 90 percent of them active. Almost 30 percent of these entities registered showed a turnover of under Rs 5 lakh, which meant that they could still claim the VAT credit, but lying below the GST threshold turnover of Rs 20 lakhs has no liability to pay the tax. With more registrations expected, GSTN will expand its capacity gradually to 1.5 crore entities. Each taxpayer is allotted a 15 digit GST Identification Number (GSTIN) which will be essential for any transaction. The new entities are required to register online. Over time, the GSTN is expected to be globally the largest commercial, real-time taxation software used anywhere.

GSTN is to manage the entire IT system of the GST portal, which is the master database of GST and will provide all necessary services to the taxpayers– from registration to payment of taxes and filing of returns. From registration to invoicing, filing of returns, payments and refunds – everything in GST will be handled by GSTN through the GST Identification Number (GSTIN) which is a unique number based on a taxpayer's PAN. Every taxpayer will receive the GSTIN once he/she is registered with the GSTN common portal. GSTN is equipped to handle 3 billion invoices per month, apart from return filing for about 90 lakh taxpayers. GSTN portal will maintain all tax details which can be used by the government to track every financial transaction pertaining to GST. GSTN will provide a common interface for the taxpayers, while at the same time creating a shared IT infrastructure between the Centre and States. The infrastructure is extremely complex and sophisticated; without this it would not have been possible to create an efficient settlement mechanism for the States and the Centre, especially in relation to the IGST for inter-state trade,

---

[2] 10% each by HDFC, HDFC Bank, ICICI Bank, NSE Strategic Investment Co. and LIC Housing Finance Ltd (11%).
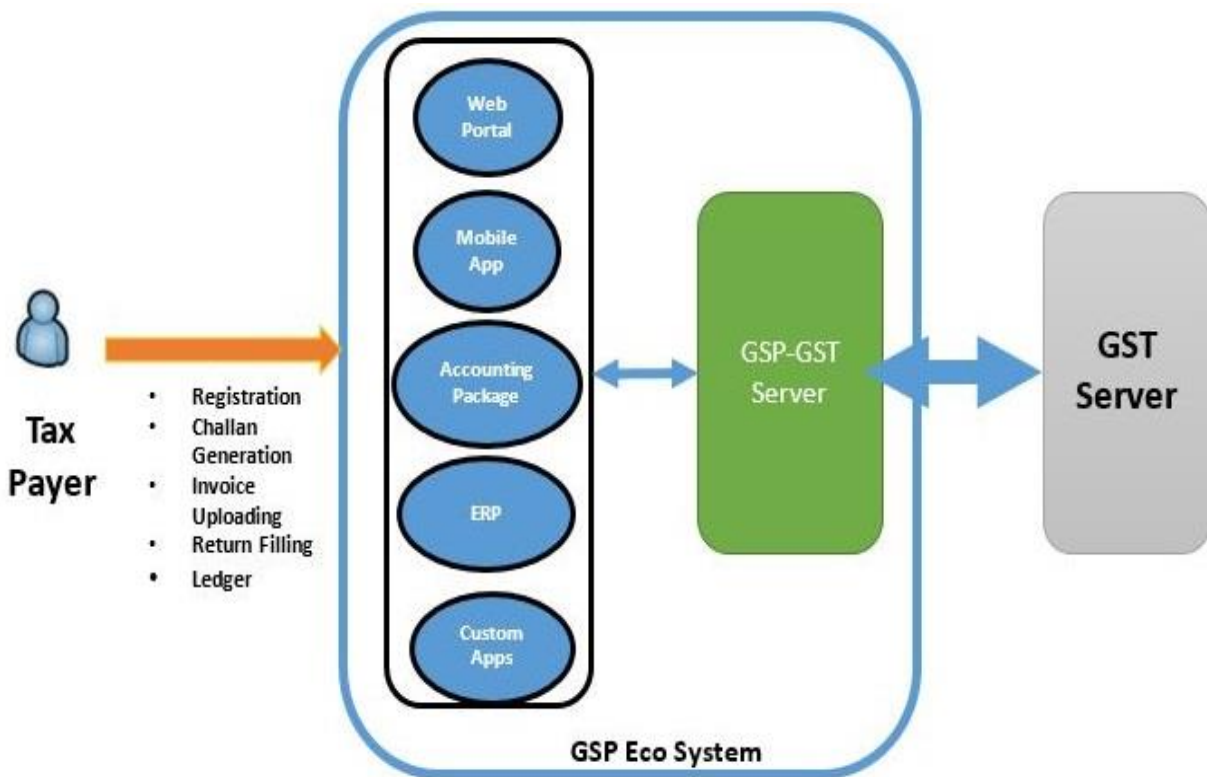
considering the huge volume of pan-India transactions. IGST will also be levied on all imports. A change from the present regime would be that the States where imported goods are consumed will now gain their share from the IGST paid on imported goods. A working model of IGST, as released by the Press Information Bureau, is shown below:

IGST Model: Working Example

State X   *State Border*   **State Y**

State X SGST @10%

SGST Paid = Rs. 10

Tax Invoice B

Cost of Goods = Rs 200
IGST @ 20% = Rs. 40
Total = Rs 240

Payment of SGST
SGST (M) Payable = Rs 30
Less IGST ITC = Rs 10
SGST Paid = Rs 20

State Y SGST @10%

| Timber Maker | A | Furniture Maker | B | Furniture Retailer | C | Final Consumer |

CGST Paid = Rs. 10

Payment of IGST
IGST payable = Rs 40
Less CGST ITC = Rs 10
Less SGST (G) ITC = Rs 10
IGST Paid in Cash = Rs 20

Payment of CGST
CGST Payable = Rs 30
Less CGST ITC = Rs 0.0
Less IGST ITC = Rs 30
CGST Paid = Rs 0.0

Tax Invoice A

Cost of Goods = Rs 100
SGST (G) @ 10% = Rs. 10
CGST @ 10% = Rs. 10
Total = Rs. 120

Centre CGST @10% IGST @20%

Tax Invoice C

Cost of Goods = Rs. 300
SGST (M) @ 10% = Rs. 30
CGST @ 10% = Rs. 30
Total = Rs. 360

Source: http://pib.nic.in/newsite/PrintRelease.aspx?relid=148240 accessed 22/09/2017.

Complexity of any tax structure has multiple facets – technical, structural as well as operational. A crucial part of the administrative and compliance costs of GST will concern the technological backbone of the new tax regime, the GST Network (GSTN). As already stated, GSTN is a non-profit non-Government company in which the Centre, States and some private banks and financial institutions are the stakeholders, but it will operate through multiple agencies whose services would not be free to the taxpayer for providing G2B (Government to Business) services. GSTN will develop the IT infrastructure of the "GST System" and provide the interface through which taxpayers will interact with the Government, for registration, uploading of invoices, filing of returns, and other purposes. This will constitute what in Computer parlance is known as the "front-end" interface of the system, while the back-end interface will enable interactions between the GST system and tax authorities in the Central and State Governments including CBEC for approval of registration, scrutiny of returns and assessment of taxes, refunds of credits, etc.

All payments, uploading of invoices and filing of returns will have to be done electronically by all taxpayers only through the GST portal. Access to and use of technology is therefore crucial for all taxpayers registered with the GST Network, without which they cannot conduct business. But recognising that many taxpayers – especially those belonging to the MSMEs, may have no access to improved IT infrastructure necessary for billing, accounting, inventory management, invoicing, etc. or may not have any familiarity with IT system at all, GSTN has created an ecosystem of service providers who are called GST Suvidha Providers (GSP) for providing innovative solutions (Portal, Mobile App, Enriched API) who will act as enablers for the taxpayers to comply with the provisions of the GST law through its web portal. GSPs will play a very important role in making the GST rollout smooth and convenient for taxpayers, and in bridging the gap between the taxpayer's IT systems and the GST system. 34 companies have been identified and notified as GSPs last December (2016), which include accounting software companies, ERP solution providers, IT companies, the big four accounting firms and certain other companies providing accounting and billing solutions. Further, the continuously evolving laws, rules, return formats make it even more complex and challenging as it has to instantly adapt and implement these changes requiring it to be robust and flexible at the same time. The GSP ecosystem and its architecture for integration into the GST system are shown in the two diagrams below:

Source: http://www.gstn.org/ecosystem/, accessed 22/09/2017

4

**GSP's/ISP's Network Integration Architecture Diagram**
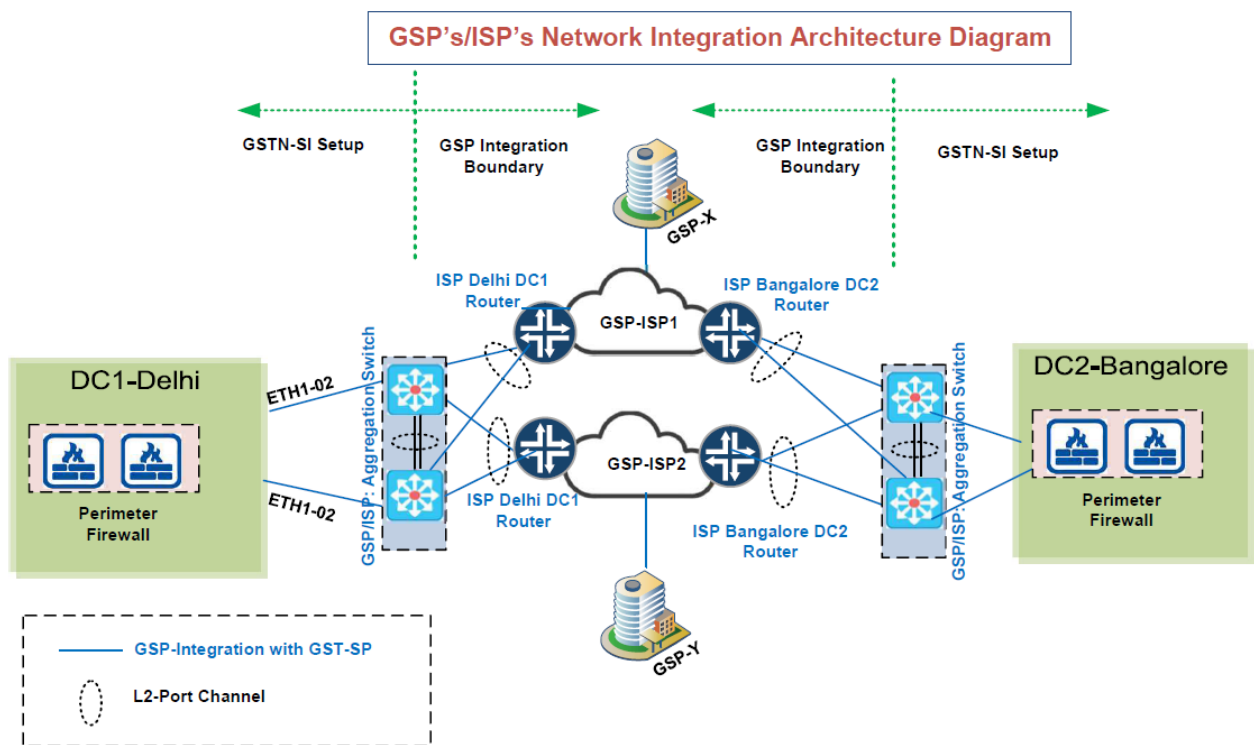
Source: Guidelines & Architecture for GSP/ISP Integration with GST System, www.gstn.org, accessed 25/09/2017

GST is an API (Application Program Interface) - driven software in which the APIs are available for developer community to build Mobile Apps, Portals, Custom Application, etc. It is an open platform for innovation which uses open source technologies, frameworks, and standards. Moreover, it has a service-oriented architecture (SOA) which is a software design where all functionalities are available as services and provided by application components via a communication protocol over a network. An SOA architecture is independent of vendors, products and technologies. A service is can be accessed remotely and acted upon and updated independently, such as retrieving a credit card statement online. It has essentially four properties: (1) It logically represents a business activity with a specified outcome; (2) It is self-contained; (3) It is a black box for its consumers and (4) It may consist of other underlying services also. An SOA architecture integrates a number of distributed, separately-maintained and deployed software components, which can communicate and cooperate over a network, especially an IP network, enabled by specific technologies and standards that facilitate such communication. The architecture is fully secure, reliable and scalable.

Security of the software and its privacy are ensured through symmetric and asymmetric cryptography, use of digital signature and e-sign, secure communication with outside world using MPLSIVPN/SSL and advance SOC (Security Operation Center) with a properly defined security policy. Scalability is ensured through massive scaling using SEDA (Staged Event Driven Architectures), Micro Service Architecture and Messaging System, among others. With usage of advance monitoring tools to provide proactive alerts, the NOC (Network Monitoring Center) connected with monitoring tools enables remote monitoring. The

5

architecture is designed for zero data loss and is fully protected against unauthorized access/modification of data. The architecture provides for Data Driven Decision Making, use of Big Data Technologies to handle and process large amount of data as well as use of Business Intelligence and Analytics to provide better services to stakeholders.

The GSTN has been designed based on layered architecture. Each layer provides an abstraction to the layer below and provides some specific features using principle of loose coupling. GST Core System constitutes its heart; all the business logic and business rules are implemented at this layer, besides implementation for digital signature solution, security of data etc. API Layer is the interface of the GST Core System; it protects the GST core System at the layer above.
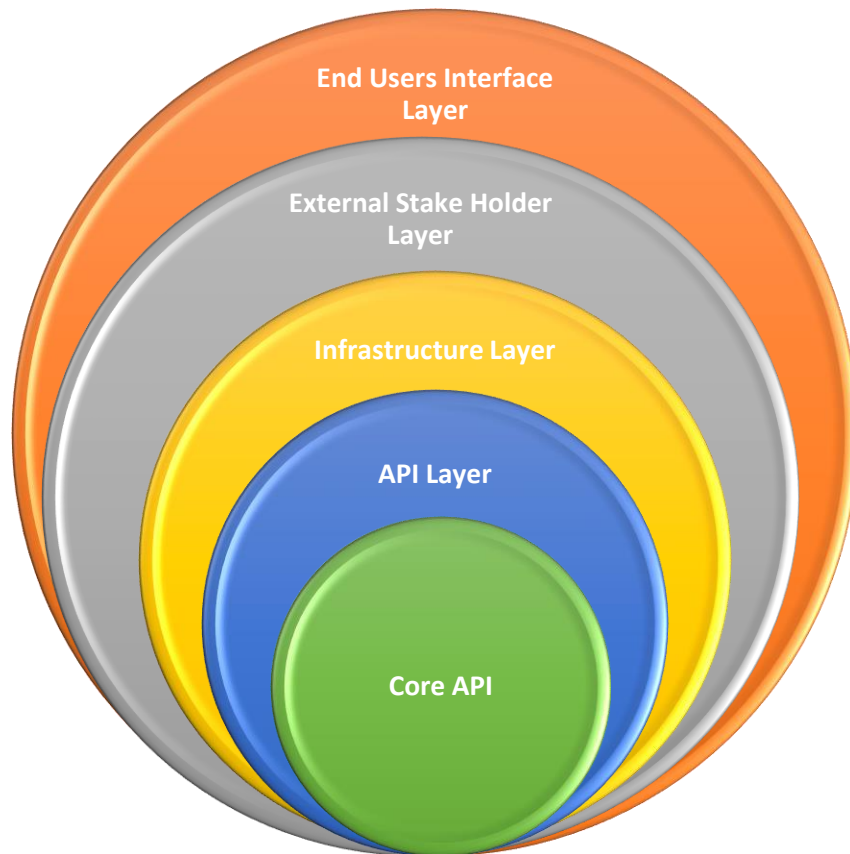
Source: Joshi, Bhuvan, "GST Network, A technical; Introduction", *Aarthika Chrache*, Vol 1 No 2 Jan-Jun 2017, Fiscal Policy Institute, Bengaluru

The Layer-description is given in the table below.

Layer Name	Brief description	Items implemented in the Layer
Application Programme Interface Layer	Protects GST Core System	All security majors like License Key Validation, Authentication and Coarse Grained Authorization; Throttling, metering, auditing, access management etc.
Infrastructure Layer	Backbone of the system which provides infrastructure support for hosting APIs and other applications; provides physical as well as virtualized server along with required API and Application deployment; also provides interface for external stakeholders to connect to GST System.	Deployment infrastructure like Application Server, Web server, Messaging Infrastructure, physical well as virtual Storage Infrastructure etc. All network and communication infrastructure for GST System;
External Stakeholders Layer	Provides all public API's. This will be hosted by the GST partner, i.e. GST Suvidha Provider (GSP).	Access to all public APIs to external stake holders in a controlled and secure manner.
End User Interface Layer	Interface of GST system for the end users like tax payers, tax consultants, tax officials etc.	Applications like Web Portal, Mobile Apps, Mobile-based Web Application etc. GST system will provide some of the applications, like Web Portal, for both Mobile and Desktop. GSP and their partners using public APIs are also free to provide any of above or any other application to end users.

GSTN had previously objected to audit by the Comptroller and Auditor General of India. At the core were issues of access to the GSTN's own books, the GST tax data and the information technology (IT) infrastructure created by the GSTN. However, clearing the air on audit of GSTN, the Union Finance Minister had clarified in June 2017 that the Comptroller and Auditor General of India will audit the Goods and Services Tax Network (GSTN).

It is obvious that any meaningful audit of the GSTN must focus intensively on the Application Programme Interface Layer so as to derive an assurance about the system as a whole. For network auditing, there are the ISACA (Information Systems Audit and Control Association) standards and guidance available (1202 Risk Assessment and Planning, 1205 Audit Evidence, 2208 Audit sampling, 2401 Audit Reporting and 1402 Follow Up Activities). The ICAI Auditing Standards like SA 315 (Standard on Auditing), SAE 3402 (Standard on Assurance Engagements) should also be useful in this context. Audit of End User Interface layer that provides the user interface would also be important from the usability and security angles.

GSTN is expected to simplify the process of tax assessment and appropriation. As could only be expected in implementing such a complex system, there are many teething problems and taxpayers and traders are suffering as a result. Timely refunds is a major issue, because here taxpayers/ traders have to pay tax upfront and claim the input tax credit adjustments/ refunds later. Till they get their r4efunds, their money remains blocked and it adds to the business cost by way of interest and also affects their working capital

flow. A part of the problem arises from the fact that the users are not yet fully conversant with the system and the details entered by the buyers and suppliers do not often match. Till the time the GSTN system stabilizes and develops the necessary robustness, these and other teething problems are likely to continue. The Government and the GST Council are aware of the problems and are talking appropriate decisions from time to time to alleviate the suffering of the traders and dealers as well as consumers, and addressing the implantation glitches as far as possible. But unless there has to be a meaningful convergence on enforcement and compliance between government and business community at large, things will not start running smoothly only through government intervention. The success of GST will obviously depend on the effectiveness of GSTN because all transactions between various stakeholders, including common people, will be accounted for on this platform. Using software as the backbone of GST is also a serious attempt to gradually nudge the informal sector to move into the formal stream.

In the long run- and by 'long run' I don't mean an indefinite period of time but only 2-3 years - GSTN will certainly make the process tax assessment and compliance much simpler and be able to curtail tax evasion and corruption, and to eliminate harassment of ordinary and honest taxpayers by tax inspectors. It alone has the potential of putting an end to the Inspector Raj.