



National Informatics Centre

GOVERNMENT OF INDIA

NIC

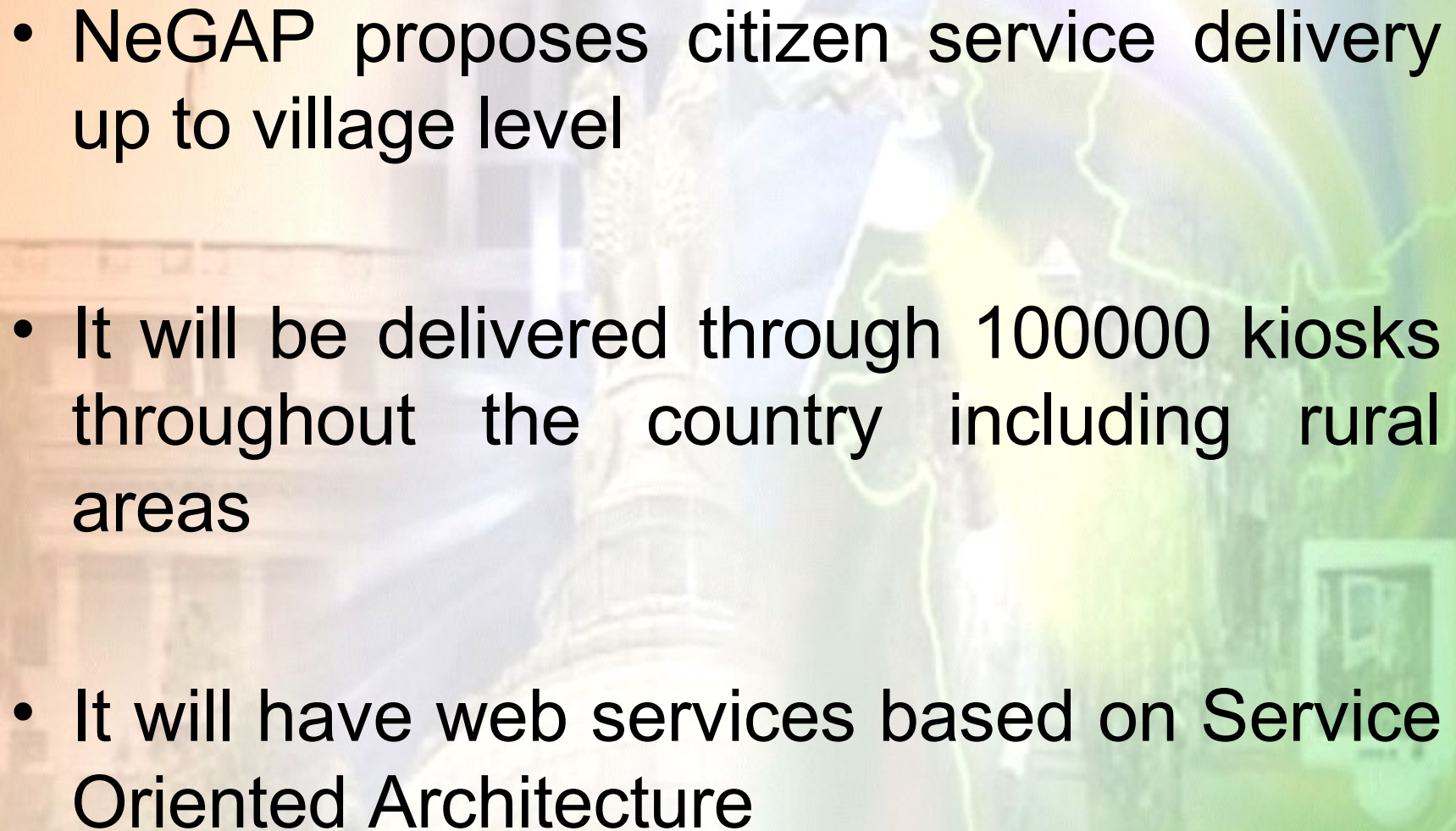
**TOWARDS AN E-GOVERNANCE GRID FOR INDIA(E-GGI)
-AN ARCHITECTURAL FRAMEWORK FOR CITIZEN SERVICES DELIVERY**

BY

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Towards An E-Governance Grid for India (E-GGI)

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- The background of the slide features a composite image. On the left, a person is seen interacting with a public kiosk. On the right, a map of India is overlaid with a network of lines, representing a digital grid or service delivery network. The overall color palette is a mix of light blue, green, and yellow.
- NeGAP proposes citizen service delivery up to village level
 - It will be delivered through 100000 kiosks throughout the country including rural areas
 - It will have web services based on Service Oriented Architecture

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- It requires extensive computing and network infrastructure and resources to meet the requirements of NeGAP
- Grid computing will be used to share resources to minimize the cost by optimizing the utilization of the resources
- Grid computing uses the same concept as consumers draw electric power from the Power Grid

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What is Grid ?

- A type of parallel and distributed system that enables the sharing selection, & aggregation of geographically distributed “autonomous” resources”
 - Computers – PCs workstations, clusters, super computers, laptops, notebooks, mobile deives, PDA, etc.
 - Software – e.g.ASPs renting expensive special purpose applications on demand
 - Catalogued data and databases
 - People/collaborators
- Depending on their availability, capability, cost, and user QoS requirements.

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Type of Services Modern Grids Offer

- **Computational Services – CPU cycles**
 - NASA IPG, WWG, TeraGrid, Set1@Home
 - Data Services
 - Data replication, management, secure access-LHC Grid/Napster
- **Application Services**
 - Access to remote software/libraries and license management - NetSolve
- **Information Services**
 - Extraction and presentation of data with meaning
- **Knowledge Services**
 - The way knowledge is acquired and managed – data mining

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- According to Gartner all computing including e-governance will be completely transformed by using grid enabled services
- In a country like India, where the government administration is structured in a 3 tiers – Central, State and District levels – Web Services Repositories can be launched and operationalized in the same three levels in the Grid.

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- The current grid technology initiatives are based upon OGSA (Open Grid Services Architecture)
- This latest standard evolved by Global Grid Forum (GGF)
- It integrates the conventional grid computing features such as resource allocation and monitoring, mirroring, etc; with web services facility

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- OGSA Supports WSRF (Web Services Reference Framework)
- WSRF provides standard architecture for Stateful Web Services
- Stateful Web Services will be useful for applications that require reference to data of past transactions, for continuity of processing

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GLOBUS TOOLKIT

- Open source, popular & successful middleware software for the grid which evolved out of various experimental grids in the world
- GT4 offers full fledged support for Web services delivery in Java, C & Python
- It has various modules such as Grid Resource Allocation & Monitoring(GRAM), Grid File Transfer Protocol (GridFTP),

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GLOBAL TOOLKIT

Data replication & monitoring (mirroring),
Authentication and Authorization through
PKI etc;

- GT4 has been installed and tested for its functionality in NICNET and can be utilized for any grid application in e-governance domain

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E-GGI

- **With an objective to implement NeGAP, SAN Data Centers & SWANs have been established in all 35 States/UTs through NIC, as part of NICNET or independently by the State Governments**
- **SAN & SWANs are individually connected but there is no concept of grid computing being implemented**

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- They are independently operating without any resource sharing or even without replica/mirroring storage elsewhere (only for Delhi Data Centre a Disaster Recovery Centre is operationalized at Hyderabad)
- By implementation of grid technology, utilizing GT4 software can result in better utilization of the resources, while also providing the backup recovery features along with mirroring and replication services (in the remote sites of the Grid)

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- This will result in overall productivity improvement, in addition to obtaining all the benefits of grid computing

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“Mission Mode” Projects as part of NeGAP

Centre

State

Income Tax

National Citizen Database

Company Affairs

Central Exercise

Passport & Immigration

Pensions

Insurance

Banking

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“Mission Mode” Projects as part of NeGAP

Centre

State

Land Records

Road Transport

Property Registration

Agriculture

Treasuries

Municipalities

Gram Panchayats

Commercial Taxes

Police

Employment Exchanges

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IMPLEMENTATION STRATEGY & METHODOLOGY

- Software development & implementation for all “Mission Mode” Projects all over the country
- All the applications software after implementation are required to be converted to web services based on SOA paradigm

WEB SERVICES

- A Web Service is a collection of functions that are packaged as a single entity and published to the network for use by other programs.
- Web services are building blocks for creating open distributed systems
- Allow organisations and individuals to quickly and cheaply make their digital assets available worldwide.

WEB SERVICES

- One early example is MS Passport, a convenient authentication service hosted by Microsoft.
- Other Examples : A credit checking service that returns the stock price associated with a specified ticker symbol.

WEB SERVICES

- A web service can aggregate other Web services to provide a high-level set of features.
- For example : A web service could provide a set of high-level travel features by orchestrating lower-level web services for car rental, air travel, and hotels.
- Applications for the future will be build from web services that are dynamically selected at runtime based on their cost, quality, and availability.
- Web services are pretty much guaranteed to be at the heart of the next generation of distributed systems.

Why Web Services ?

- Interoperability : Any web service can interact with any other web service.
- Thanks to SOAP, the new standard protocol supported by all of the major vendors (and most of the minor ones too), the agonies of converting between CORBA, DCOM and other protocols should be over.
- And because web services can be written in any language (even COBOL), developers do not need to change their development environments in order to produce or consume web services. Any program can be easily converted into a web service

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Why Web Services ?

- Ubiquity : Web services communicate using HTTP and XML. Therefore any device which supports these technologies can both host and access Web services. Soon web services will be present in mobile phones, cars and anywhere.
- Low barrier to Entry : The concepts behind Web services are easy to understand and free tool kits from vendors like IBM and MS allow developers to quickly create and deploy Web services.

Why Web Services ?

- In addition, some of these tool kits allow pre-existing COM components and Java Beans to be easily exposed as Web services.
- Industry Support : All of the major vendors are supporting SOAP and the surrounding Web services technology.
- For example, the MS .NET platform is based on Web services, thereby making it very easy for components written in VB to be deployed as Web services, and consumed by Web services written using IBM VisualAge, and vice-versa.

Challenges

- » Discovery
- » Reliability
- » Security
- » Transactions
- » Scalability
- » Manageability
- » Accountability
- » Testing

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- **All the Data Centers will have to be integrated with the SWANs into a grid (broadband) which will provide access to Internet/Intranet right from the village level.**
- **The action plan needs to be implemented in a period of five years or less (including all software development & implementation for all web services)**

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- **Interoperability can be achieved using BPEL (Business Process Execution Language) which can enable process orchestration across diverse web services based on SOA**
- **As a pilot attempt in AP State we can integrate property registration (CARD project) and Land records (LRMIS project) with ePanchayat project after converting them into Web Services & using BPEL Interoperability**

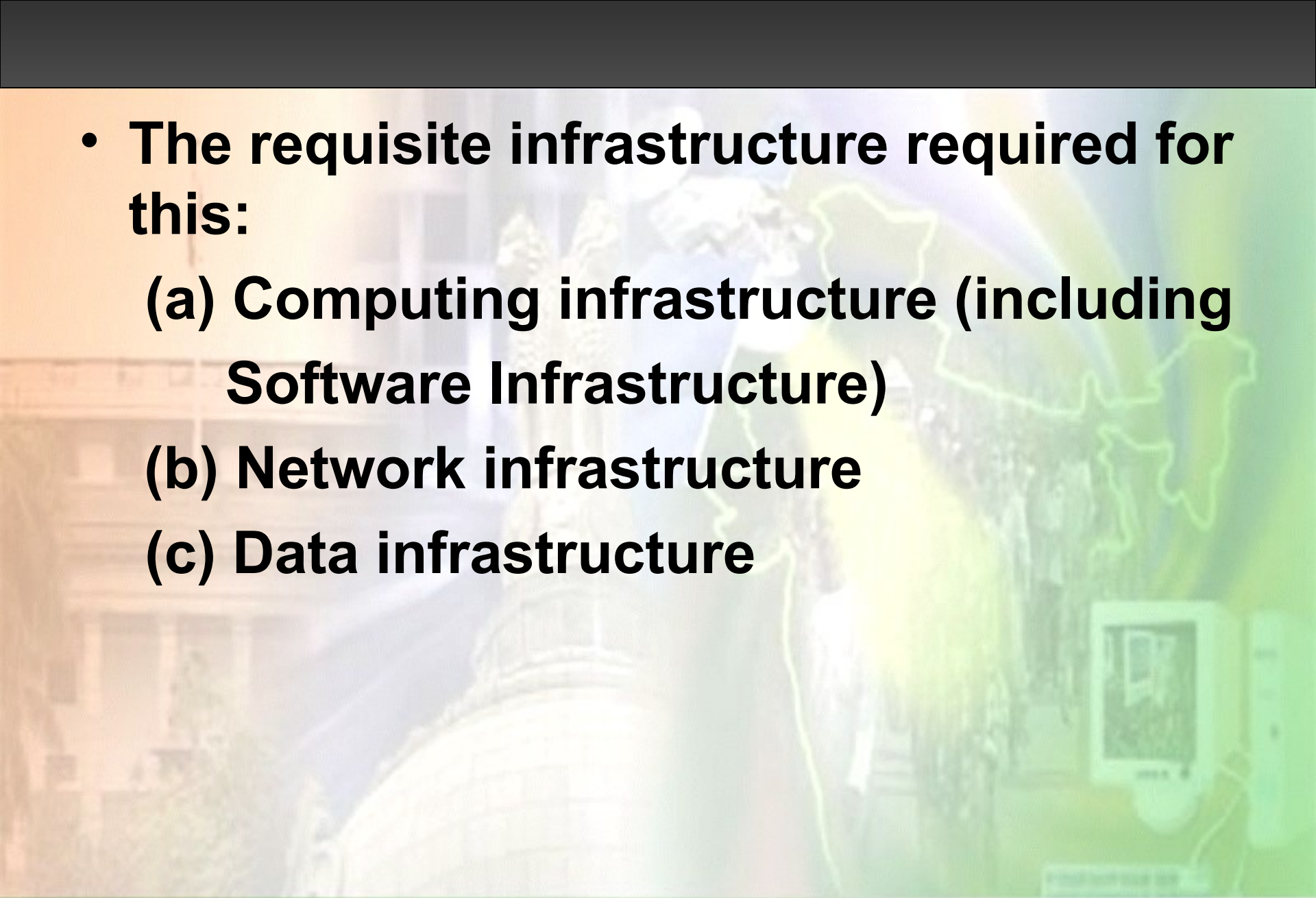
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WEB SERVICES REPOSITORIES

- **National level Web Services Repository (NWSR) for National level e-governance initiatives of NeGAP**
- **State level Web Services Repository (SWSR) for the state level e-governance services**

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- **District (or Sub district) level Web Services Repository (DWSR) at the district for the district and sub-district (taluka or village) level**

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- **The requisite infrastructure required for this:**
 - (a) Computing infrastructure (including Software Infrastructure)**
 - (b) Network infrastructure**
 - (c) Data infrastructure**

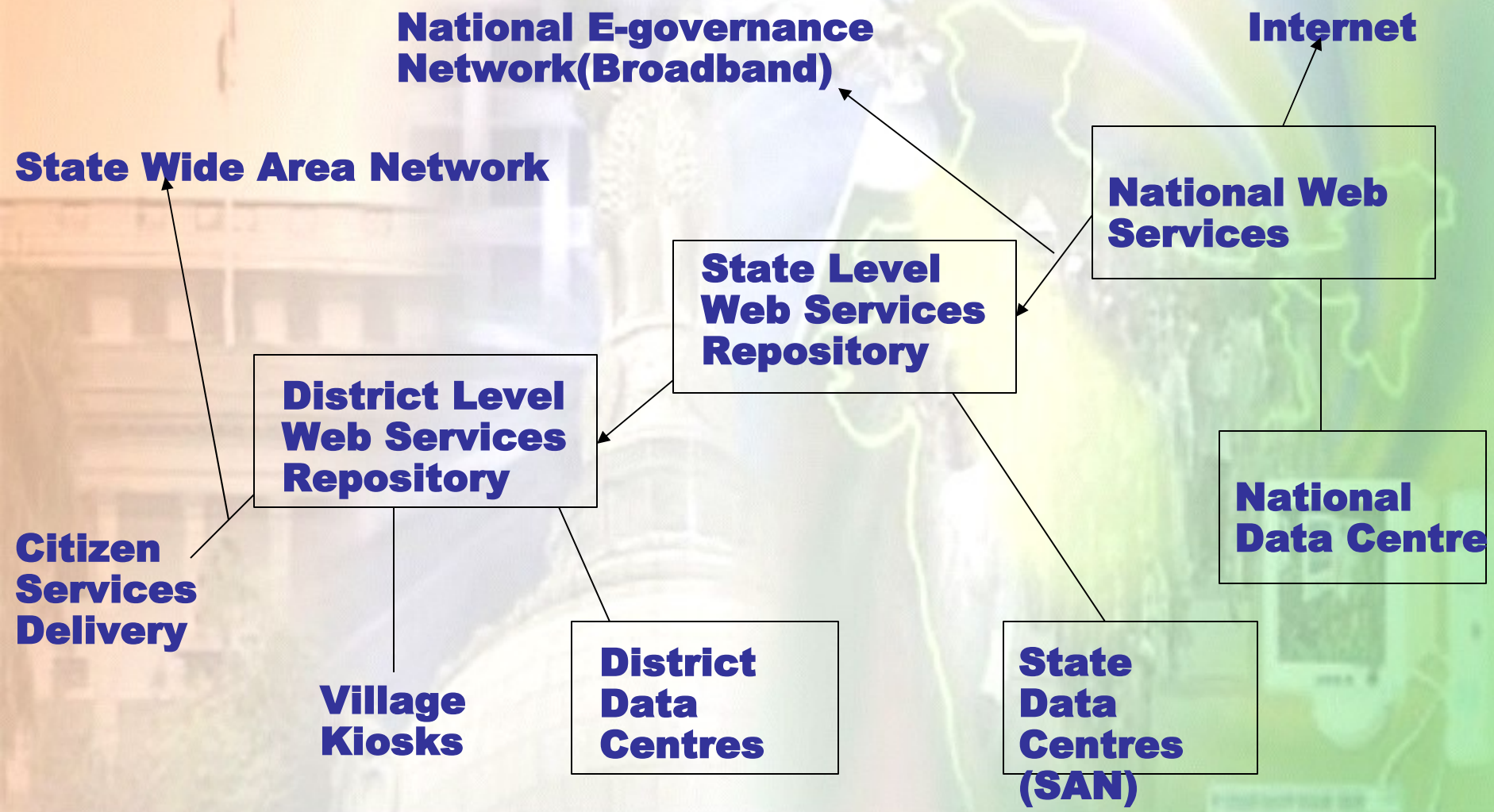
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PRE-REQUISITES FOR NATIONAL E-GOVERNANCE ARCHITECTURAL FRAMEWORK

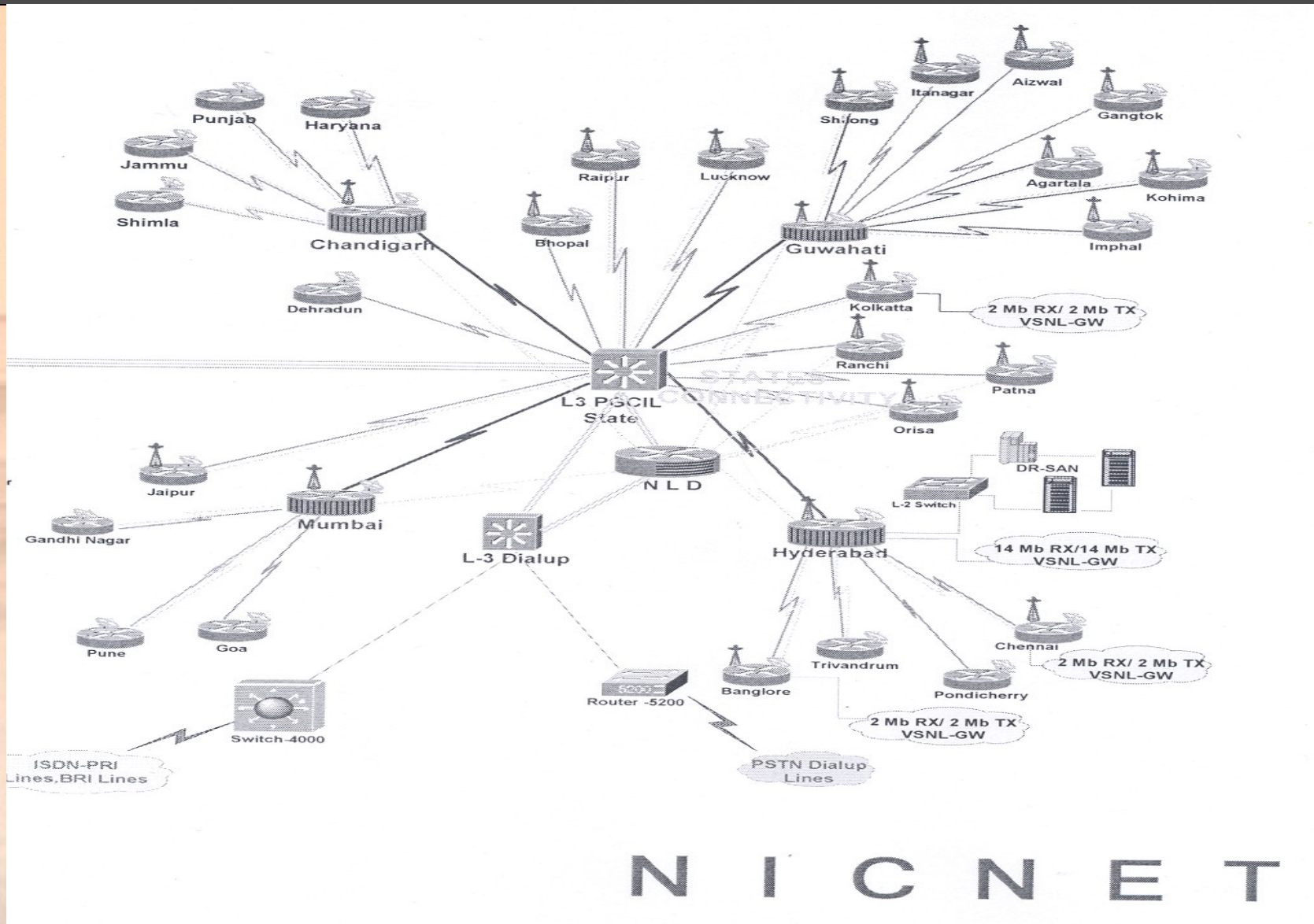
- Establishment of nation-wide broadband IP network, right upto village level (by taking care of all the requirements such as power and bandwidth to form a National e-governance Grid of India)
- A nation-wide unique citizen identification mechanism (using the latest technology such as Iris identification and smart cards)

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Web Services Repositories on E-Government Grid of India (E-GCI)



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