

JL  
86  
C6  
P524  
1989

COMMUNICATIONS  
CANADA

Planning and Development  
of  
Government Telecommunications

---

---

Government Telecommunications Agency

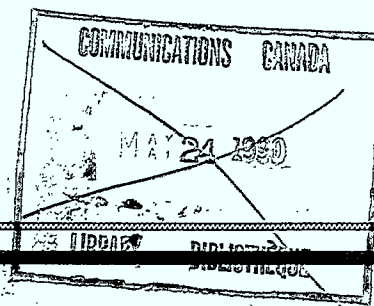




COMMUNICATIONS  
CANADA

1/4  
Planning and Development  
of  
Government Telecommunications

Industry Canada  
Library Queen  
JUL 07 1998  
Industrie Canada  
Bibliothèque Queen



Government Telecommunications Agency



JL  
86  
C 6  
P524  
1989

Queen



Planning and Development  
of  
Government Telecommunications

Division of Development & Engineering  
Government Telecommunications Agency  
November 1989

# AGENDA

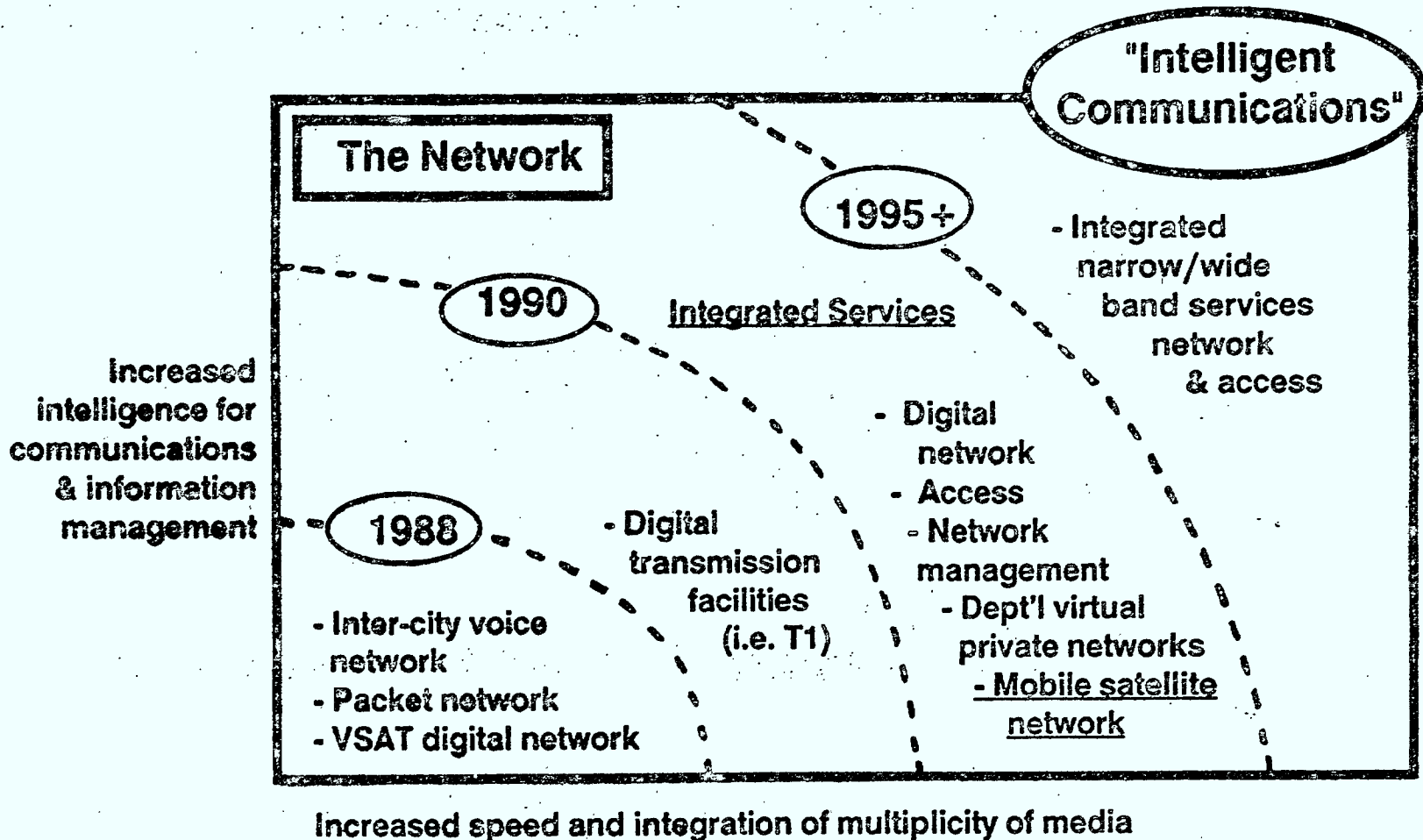
## I. Introduction

- Update on GTA New Network/Enhanced Services
- Changing Environment
  - Auditor General 1989 Report
  - Function of Government-wide Network Architect

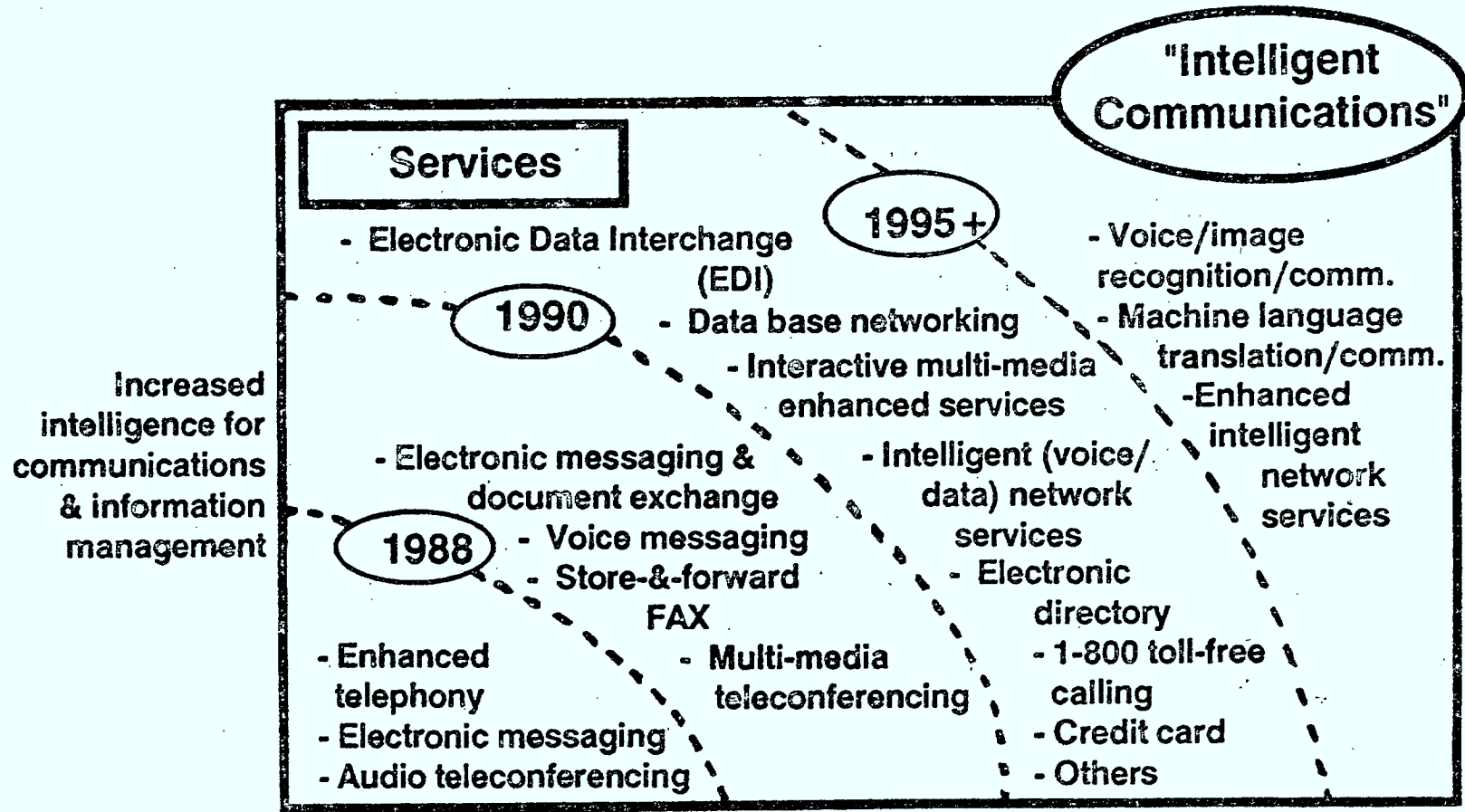
## II. Government-Wide Enterprise Networking

- GTN-2000
  - Intercity Intelligent Backbone Network
  - Metropolitan Area Network for NCR
- Internetworking
- Mobile Communications

# Evolution of Government Telecommunication Towards "Intelligent Communications"



## Evolution of Government Telecommunication Towards "Intelligent Communications"



Increased speed and integration of multiplicity of media

## CHANGES IN THE ENVIRONMENT

- Increased competitiveness in the market place.
  - Regulatory/tariff changes.
  - Changing user requirements on data/computer/office communications.
  - Continuing government-wide restraint and increased pressure on common approach.
  - Opportunities due to new technologies and services.
- 
- Auditor General's 1989 report on government telecommunications.
  - Function of government corporate telecommunications network architect.

## AUDITOR GENERAL REPORT (1989) ON GOVERNMENT TELECOMMUNICATIONS

- Savings from economies of scale by coordinating and combining voice and data communications not being pursued by the government.
- Estimated potential savings (government-wide) are 20-30% for data communications (short term) and additional 15% for voice services due to the integration of voice and data on government-wide networks.
- A central focus required for both voice and data communications through a responsive body such as a common service agency, held accountable for government-wide efficiency.
- Clear leadership required to position the government to take advantage of existing opportunities or upcoming technical innovations.





# GTN-2000 UPDATE

DIVISION OF DEVELOPMENT & ENGINEERING  
GOVERNMENT TELECOMMUNICATIONS AGENCY  
NOVEMBER, 1989

# GOVERNMENT-WIDE ENTERPRISE NETWORKING

## ELEMENT

## EXAMPLES

USER APPLICATIONS

PERSONNEL, RECORDS MANAGEMENT ETC.

COMMON ENHANCED SERVICES

MESSAGING SERVICES, EDI, DIRECTORY ETC.

LOGICAL NETWORK

ARCHITECTURE & SERVICES

- TELEPHONY NETWORK
- SNA
- DECNET
- INTERNETWORKING (TCP/IP OR OSI)

PHYSICAL NETWORK

ARCHITECTURE & SERVICES

- CIRCUIT-SWITCHED SERVICE
- PACKET-SWITCHED SERVICE
- SWITCHED INTEGRATED SERVICE
- DIGITAL CHANNEL SERVICE

# GTA'S ROLE IN GOVERNMENT-WIDE ENTERPRISE NETWORKING

## ELEMENT

## GOV'T TELECOM ARCHITECT & COMMON SERVICE PROVIDER

USER APPLICATIONS

COMMON ENHANCED SERVICES

EDI, DOCUMENT CONVERSION, EFT ETC.

GEMDES, GVMS, GFACS, DIRECTORY, FTAM  
(X.400) (X.500)

LOGICAL NETWORK  
ARCHITECTURE & SERVICES

- PLANNING & COORDINATION
- INTERNETWORKING SERVICE
- MIGRATION TO OSI

PHYSICAL NETWORK  
ARCHITECTURE & SERVICES

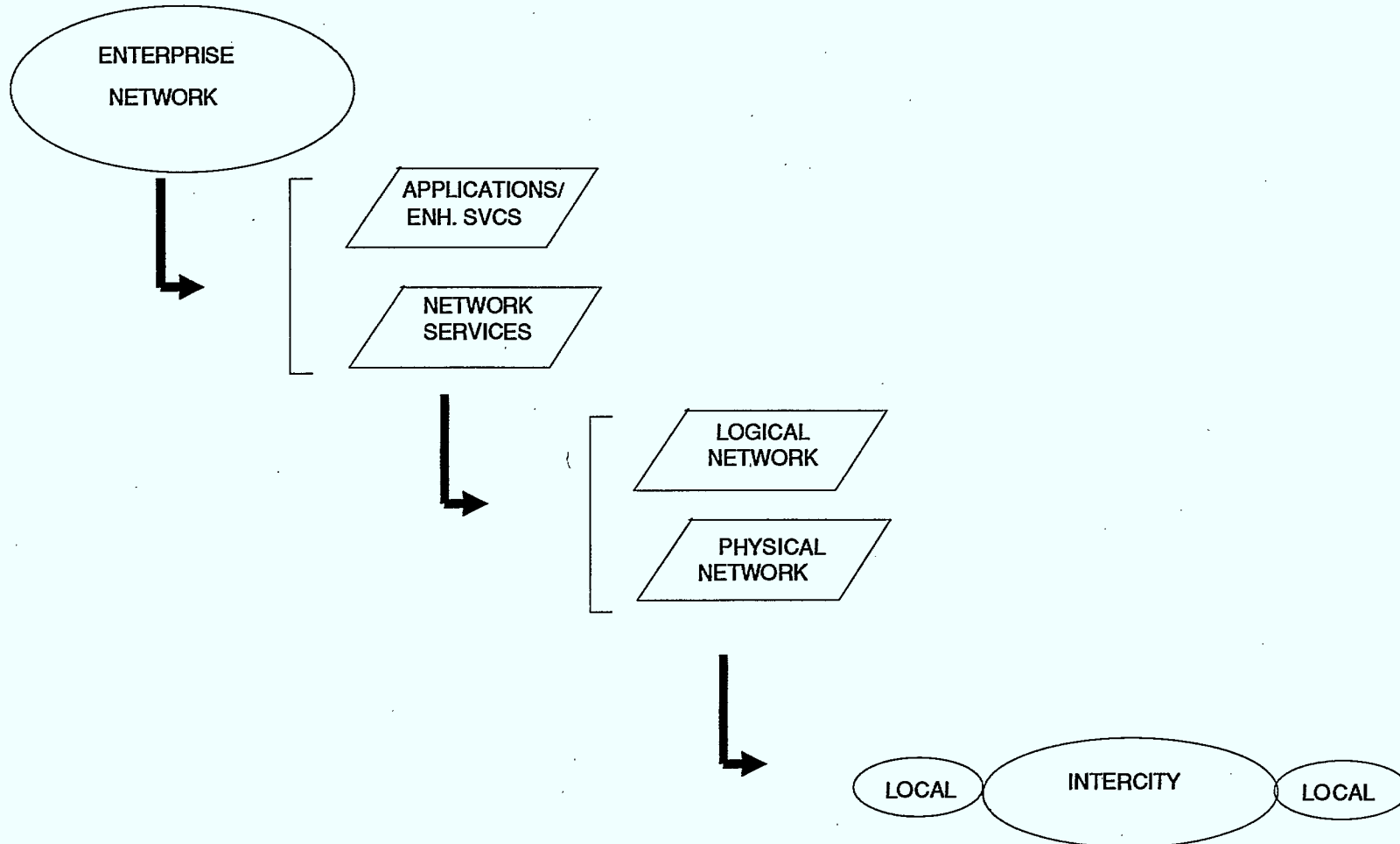
- PROVIDER OF EXISTING SERVICES (VOICE, GPN, GSN, ETC)
- GTN-2000 - ARCHITECTURE & PHYSICAL NETWORK SERVICES
  - INTELLIGENT NETWORK SERVICES (1-800, NACD ETC.)
  - DIGITAL CHANNEL SERVICE
- CMS

## GTN-2000 PLANNING STRATEGY

For planning and acquisition purposes, use a "layered" modular approach to:

- Unbundle network services from enhanced services,
- Distinguish network architecture and services as those of the logical network and the physical network,
- Separate, within the physical network, transmission from network intelligence,
- Delineate the local (intracity) from the intercity network services,
- Adopt open, standard interfaces where feasible for multi-vendor implementation.

# GTN-2000 PLANNING STRATEGY



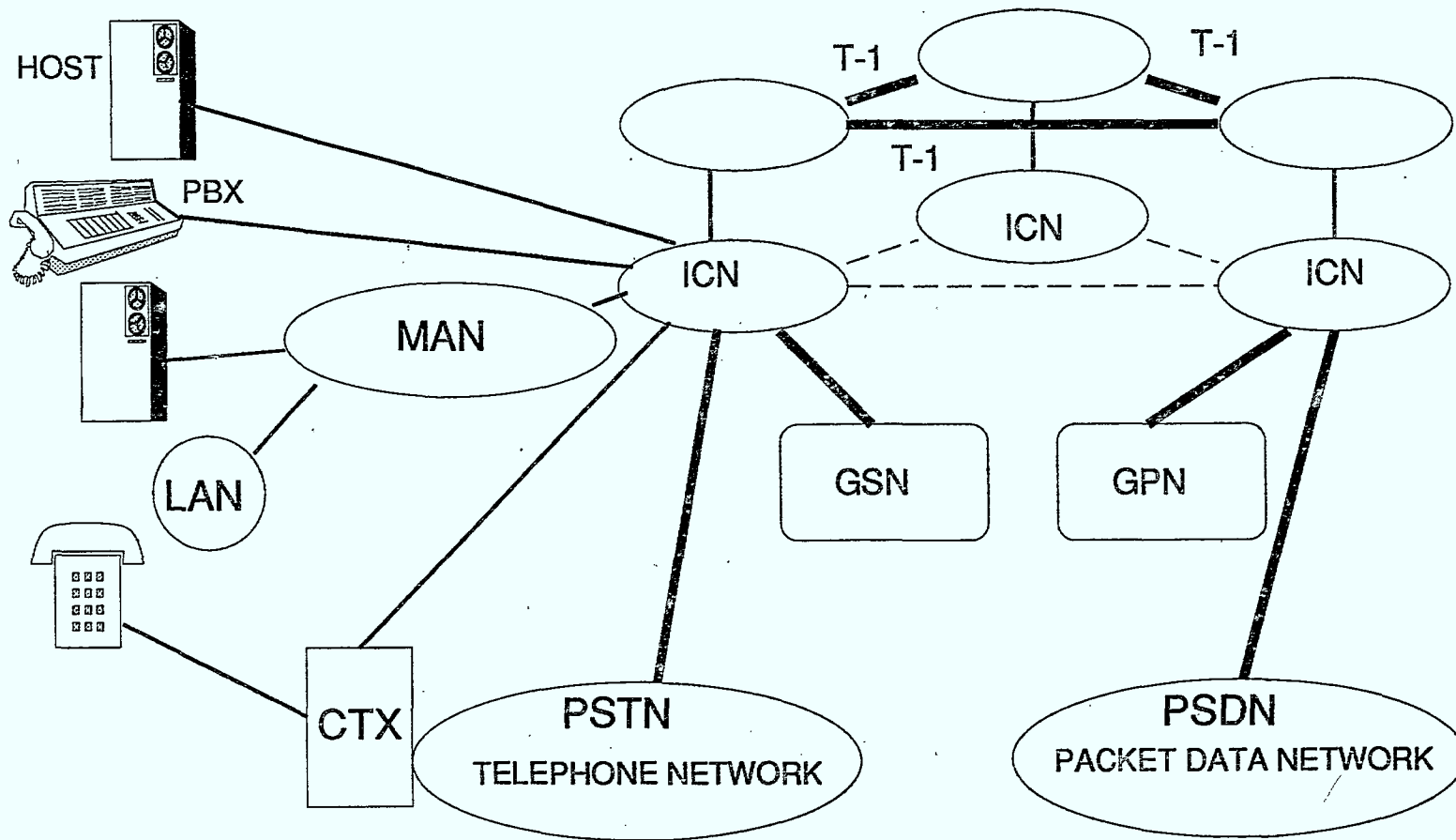
# GTN-2000 - The Network Architecture

## Hierarchical and Transmission (Connectivity) Architecture

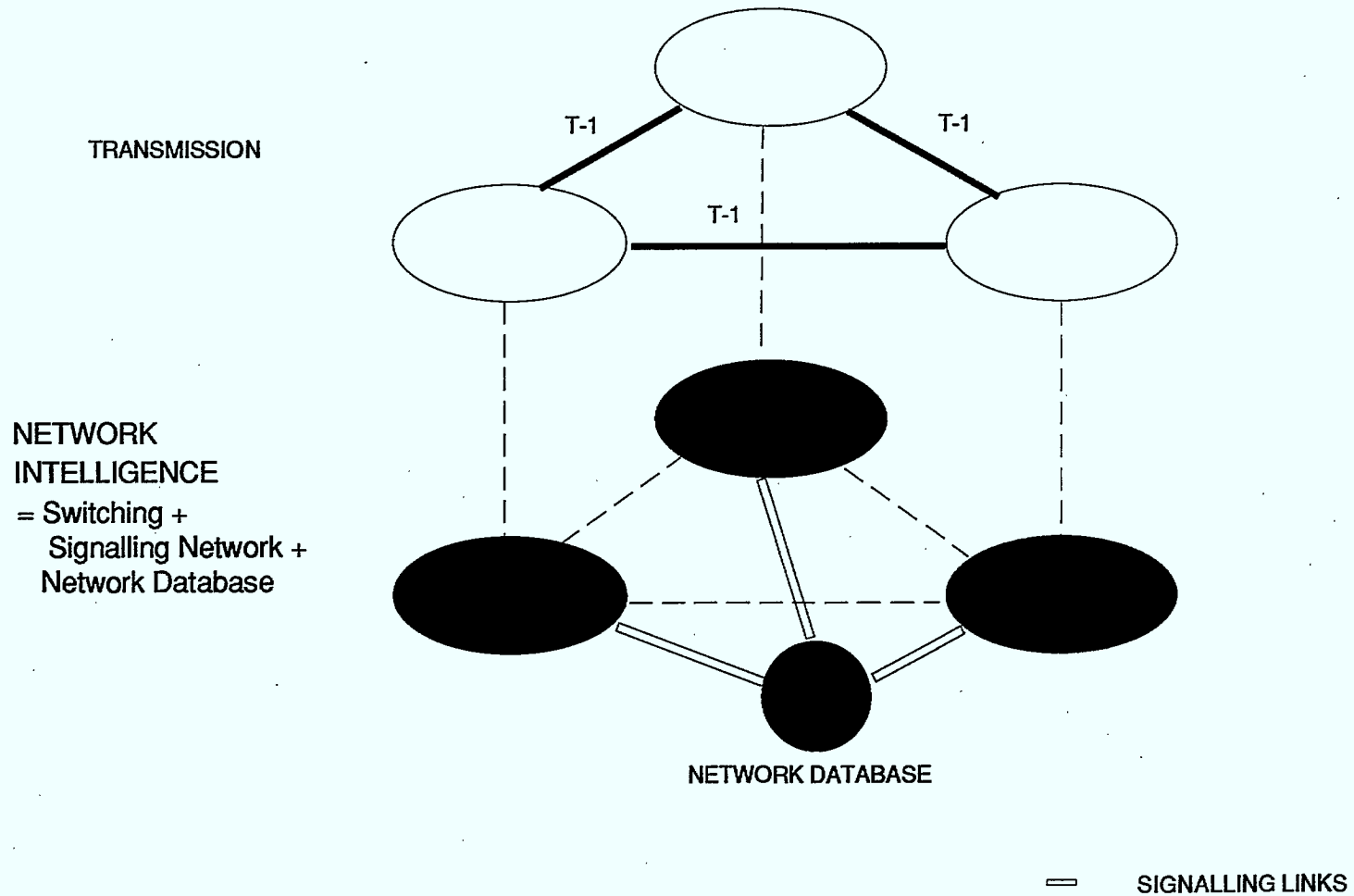
USER PREMISE

INTRACITY

INTERCITY BACKBONE NETWORK



# GTN-2000 INTERCITY NETWORK ARCHITECTURE



## GTN-2000 - PLANNING & DEVELOPMENT

- Network Architecture, Technology and Service Feasibility.
  - Federal Government ISDN Trial 87/89
  - GTA RFI on GTN-2000 88/89
- User Requirements, Economics and Business Case.
  - Empirical analysis and case studies
- Development and Acquisition
  - Requirement specifications & validation.
  - Pilot services on embryo network.
  - Competitive procurement.



## CONCLUSIONS FROM RFI RESPONSES

- GTN-2000's functional network architecture in line with industry's trend.
- GTN-2000's planned network services feasible in 1990-1995.
- Services defined for the embryo network available in 1990 with different implementation approaches.
- The embryo network services will:
  - address the strategic and common service requirements.
  - provide cost and performance improvements.

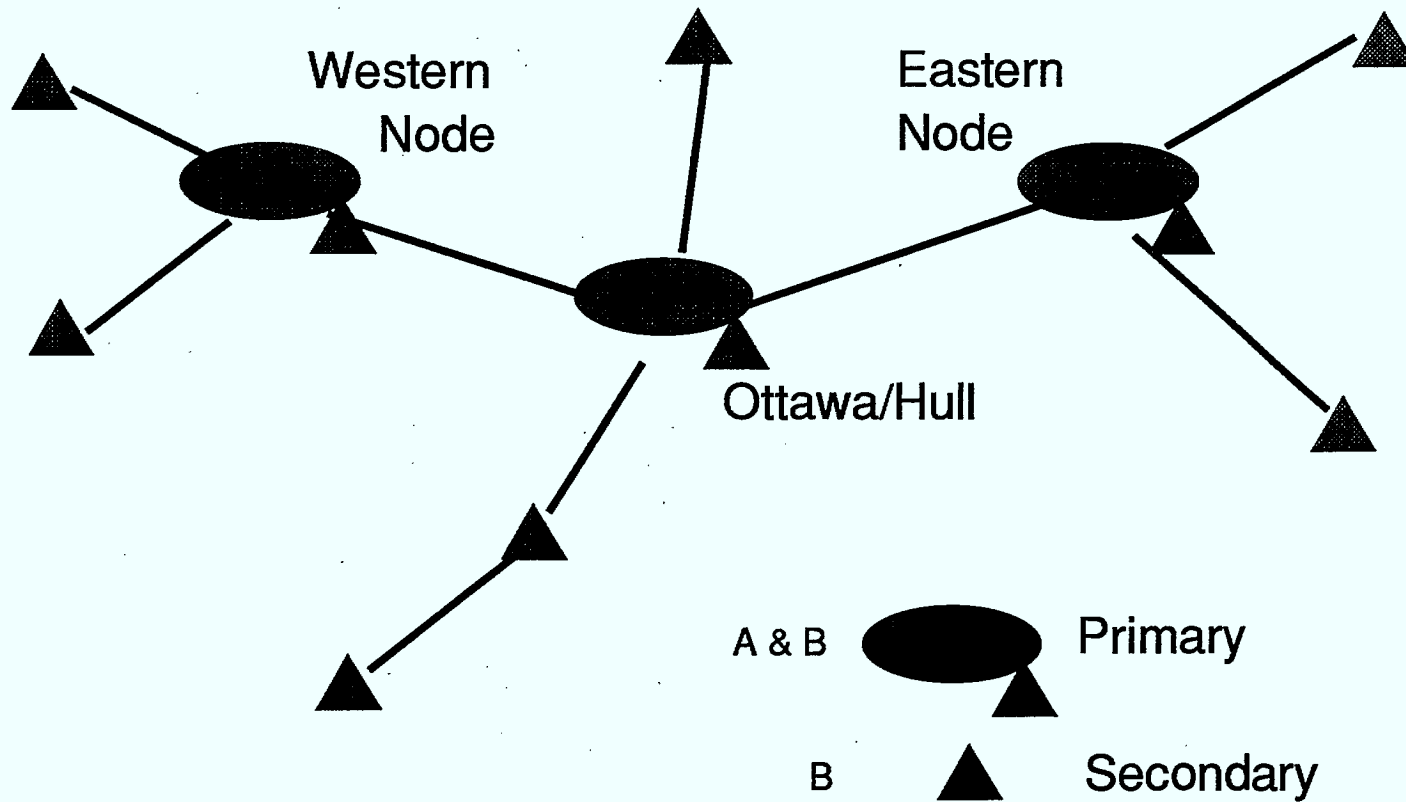
## GTN-2000 DEVELOPMENT PHASES

- Intelligent Digital Backbone Network (Phase I) 1990-1992
  - Embryo Network for:
    - Digital Channel Service
    - Intelligent Switched Services (Evaluation of applications based on ISDN and CCS-7)
  - Competitive Procurement (RFP) of the Above
- Full ISDN Phase (Phase II) 1992-1995
- Broadband ISDN Phase (Phase III) 1995+
- Development and Acquisition of Metropolitan Area Network in NCR 1990-1992

## PHASE I SERVICES PORTFOLIO

- Set A: Digital Channel Service with User Network Management
  
- Set B: Intelligent Switched Services
  - Circuit-switched Services
  - CCS-7 based Services
  - Initial ISDN Applications

# GTN-2000 INTELLIGENT DIGITAL BACKBONE NETWORK TOPOLOGY



# GTN-2000 - Network Nodal Functions

- Primary Node (Intelligent Communications Node)
  - Standard voice line interfaces
  - ISDN BRA and PRA
  - Circuit switching for voice and data
  - Packet switching access
  - CCS7 signalling
  - Interface to network server (processor or database)
  - Network management capabilities (e.g. billing, routing)
  - All the functions of a secondary node

# GTN-2000 - Network Nodal Functions

- Secondary Node (Channel Services Serving Node)
  - Standard data line interfaces, analog and digital voice trunk interfaces (64 kbs and 32 Kbs)
  - n x 64 Kbs cross-connect and routing
  - efficient multiplexing
  - interface to user network mgmt system (e.g. Netview)
  - Network management functions (e.g. reconfiguration, problem detection and resolution etc.)

## GOVERNMENT MAN IN NCR

### Functions

- Connectivity among government departments' buildings
- Base for intracity internet service and broadband services
- Access to local switched service (Centrex).
- Access to intercity network services.

### Applications

- Host Access
- LAN/LAN Interconnection
- Broadband applications (video, special events)
- Intracity network survivability via route diversification

### Technologies

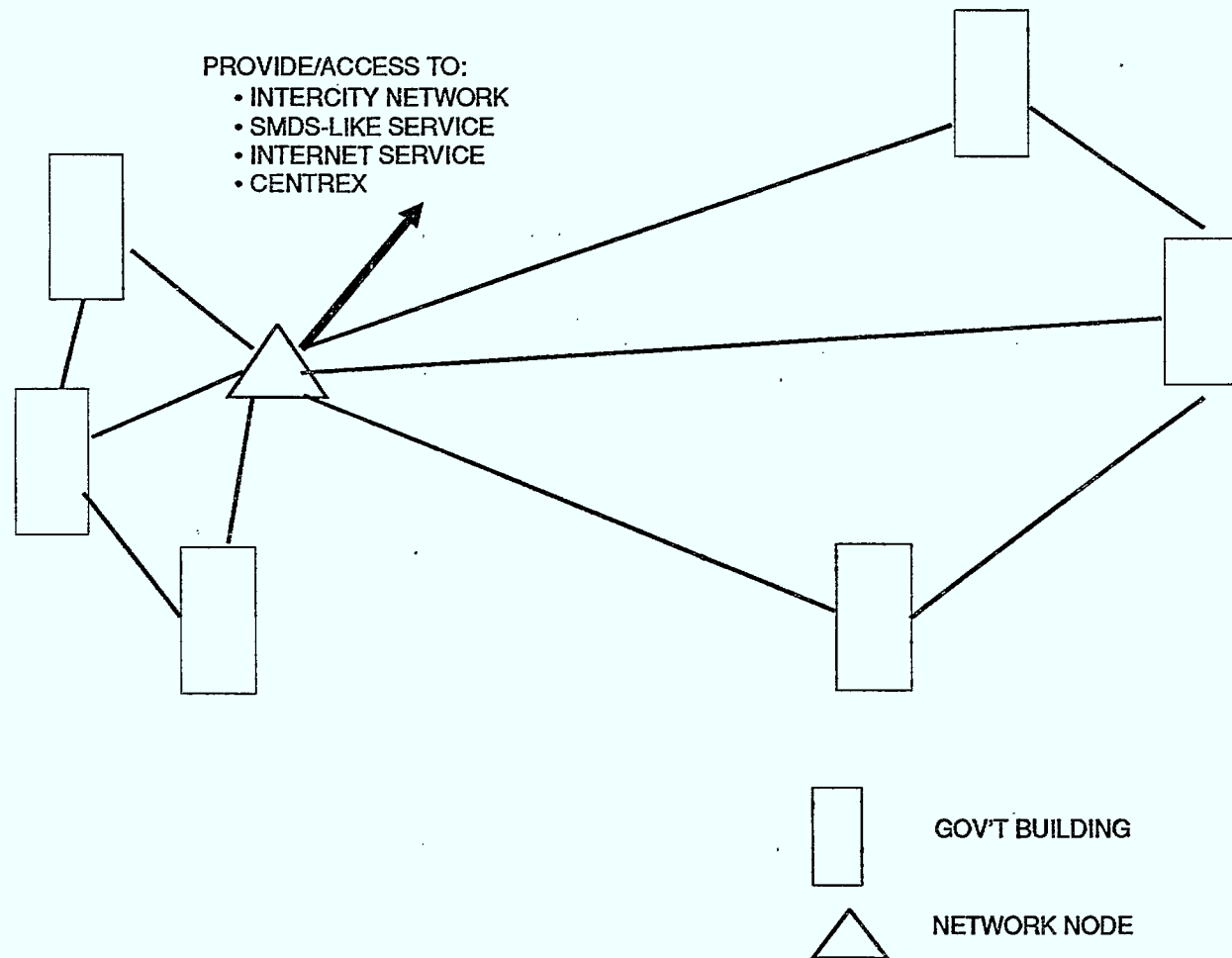
- Fiber systems compatible with SONET.
- Supports IEEE LAN, FDDI, and DBDQ standards.
- Broadband switching (ATM) for shared service.

# GTA NCR METROPOLITAN AREA NETWORK (MAN) Preliminary Requirements

- Provides:
  - Dedicated access facilities,
  - N x DS-1 (N x 1.544 Mbps) access first, N x DS-3 (N x 45 Mbps) access later,
- Fiber facilities will be SONET-compatible,
- Supports all major computer network architectures (e.g. SNA, DECnet, IEEE LAN standards, FDDI),
- Supports IEEE 803.6 MAN standard
- Provides virtual private networks with high degree of security and privacy.
- Compatible with transmission hierarchy for interfacing to Intercity Backbone Network.
- Billing according to bandwidth required ("subscription class") and actual usage.
- Incorporates network management functions for service provisioning, quality-of-service monitoring, problem resolution, and billing.
- User management will be available for limited functions.



# GTA NCR MAN TOPOLOGY - A SCENARIO



## ENTERPRISE NETWORKING

- LAN/LAN communication
- LAN/WAN/intercity network
- TCP/IP to OSI migration
- Proprietary network architecture to OSI migration
- Internetworking based on bridges/routers/gateways.

## GOVERNMENT MOBILE COMMUNICATIONS

- Cellular
- Second generation of cellular communication
- Pre-MSAT and MSAT services.
- Personal Communications