Dynamic IP Address Support for GSM SIM Server Interworking
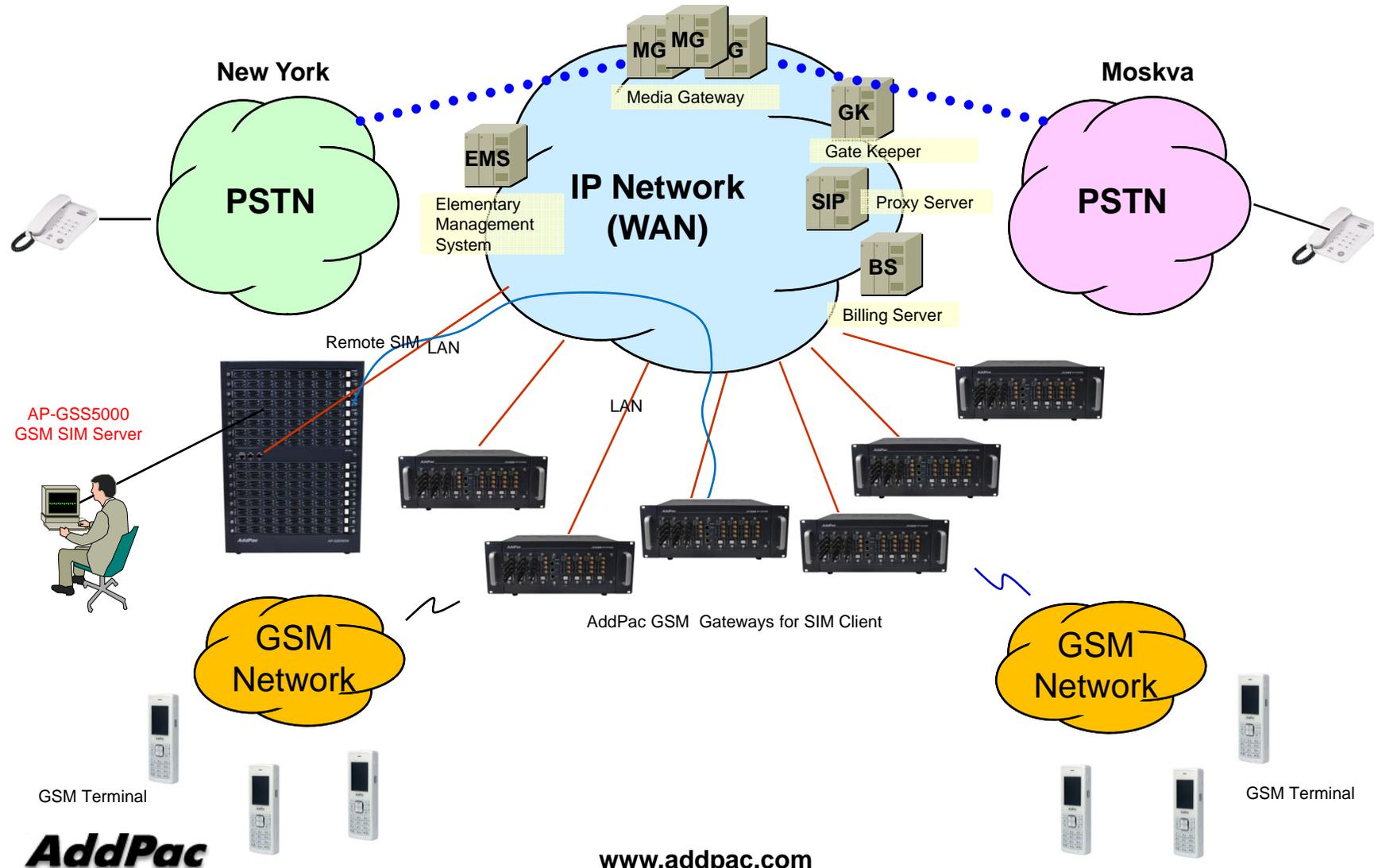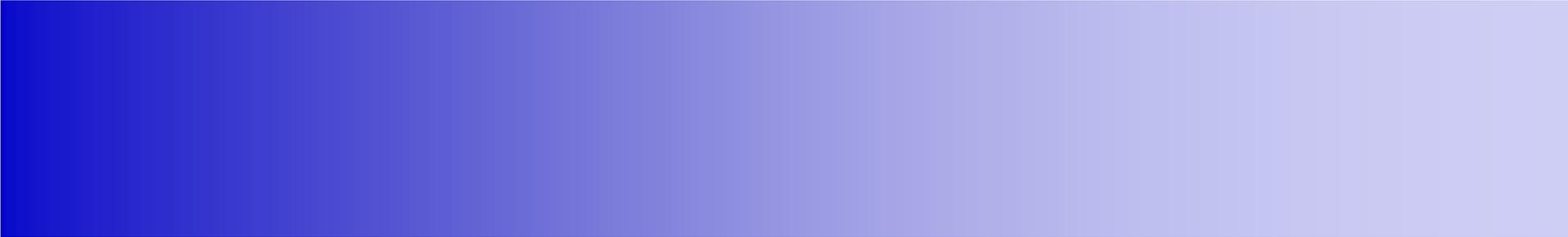
AddPac Technology

2013, Sales and Marketing

Contents

- General GSM SIM Server Service Diagram
- Network Issues for Remote SIM Application
- Dynamic IP Address Network Environment
- Detailed Network Configuration
- Remote SIM Service Procedure
- Technical Remote SIM Service Issues
- Local IP Address Change Recognition

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General GSM SIM Server Service Diagram

New York

Moskva

PSTN

PSTN

IP Network (WAN)

MG MG G
Media Gateway

GK
Gate Keeper

SIP Proxy Server

EMS
Elementary Management System

BS
Billing Server

Remote SIM LAN

AP-GSS5000 GSM SIM Server

LAN

AddPac GSM Gateways for SIM Client

GSM Network

GSM Network

GSM Terminal

GSM Terminal
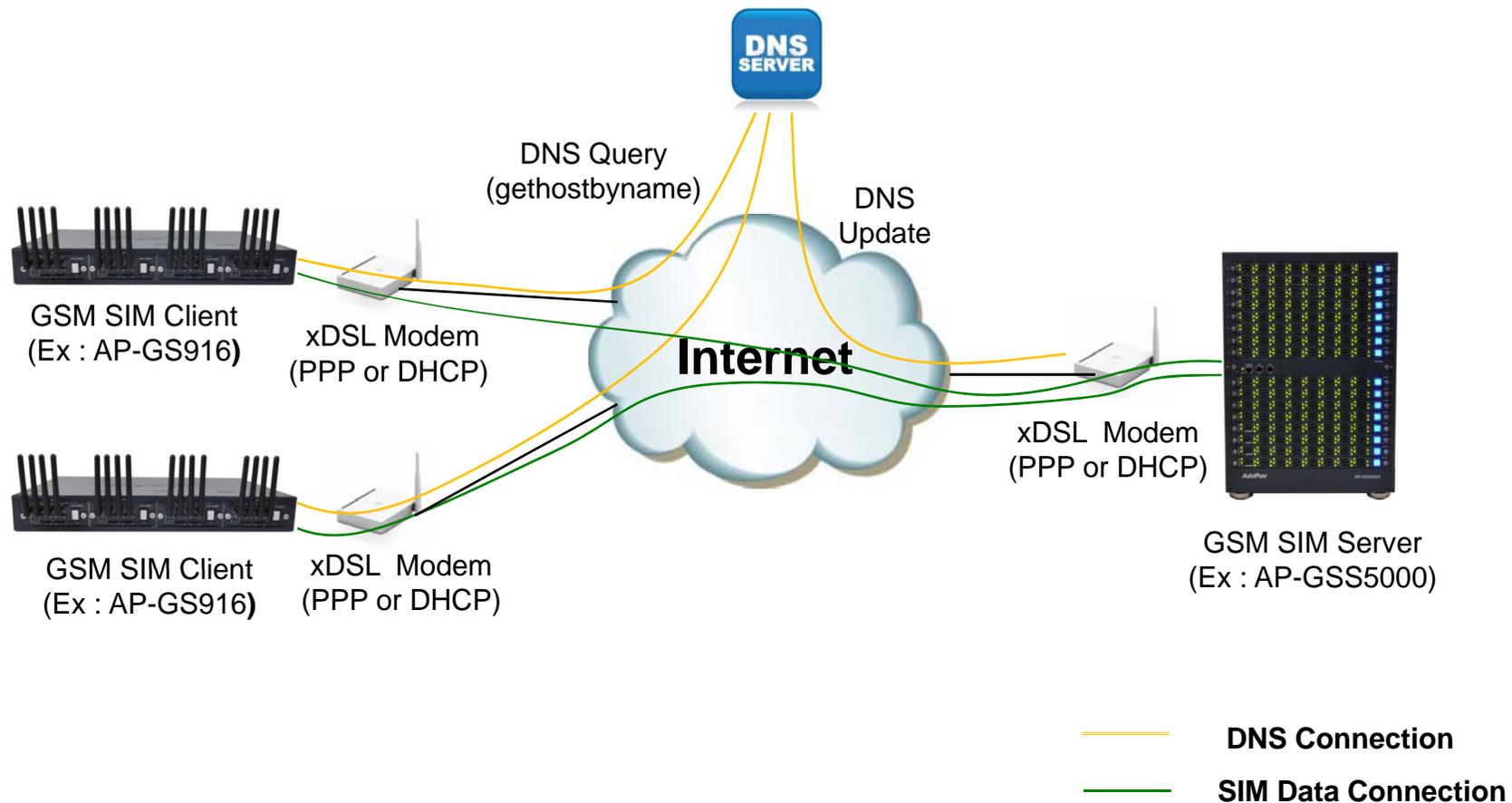
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Dynamic IP Address Support

Overall Network Issues for Remote SIM App.

- ## IP Address Environment
  - IP Address Insufficient Problem -> Dynamic IP Address
  - Fixed IP Address is very expensive (Ex : Leased Line)
  - Remote SIM Server Side (Dynamic IP Address) : use the xDSL Modem
  - SIM Client Side (Dynamic IP Address) : use the xDSL or Wireless Modem

- ## Access Network Environment for SIM Client
  - 3G Data, WiMAX, etc Wireless Modem
  - "GSM VoIP Service + SIM Data Exchange" is occurred concurrently
  - Characteristic : High Delay, Frequent Packet Loss,
    Frequent Packet Sequence Change,
    Best Effort QoS,
    Abrupt IP Address Change,
    Unstable Power Supply
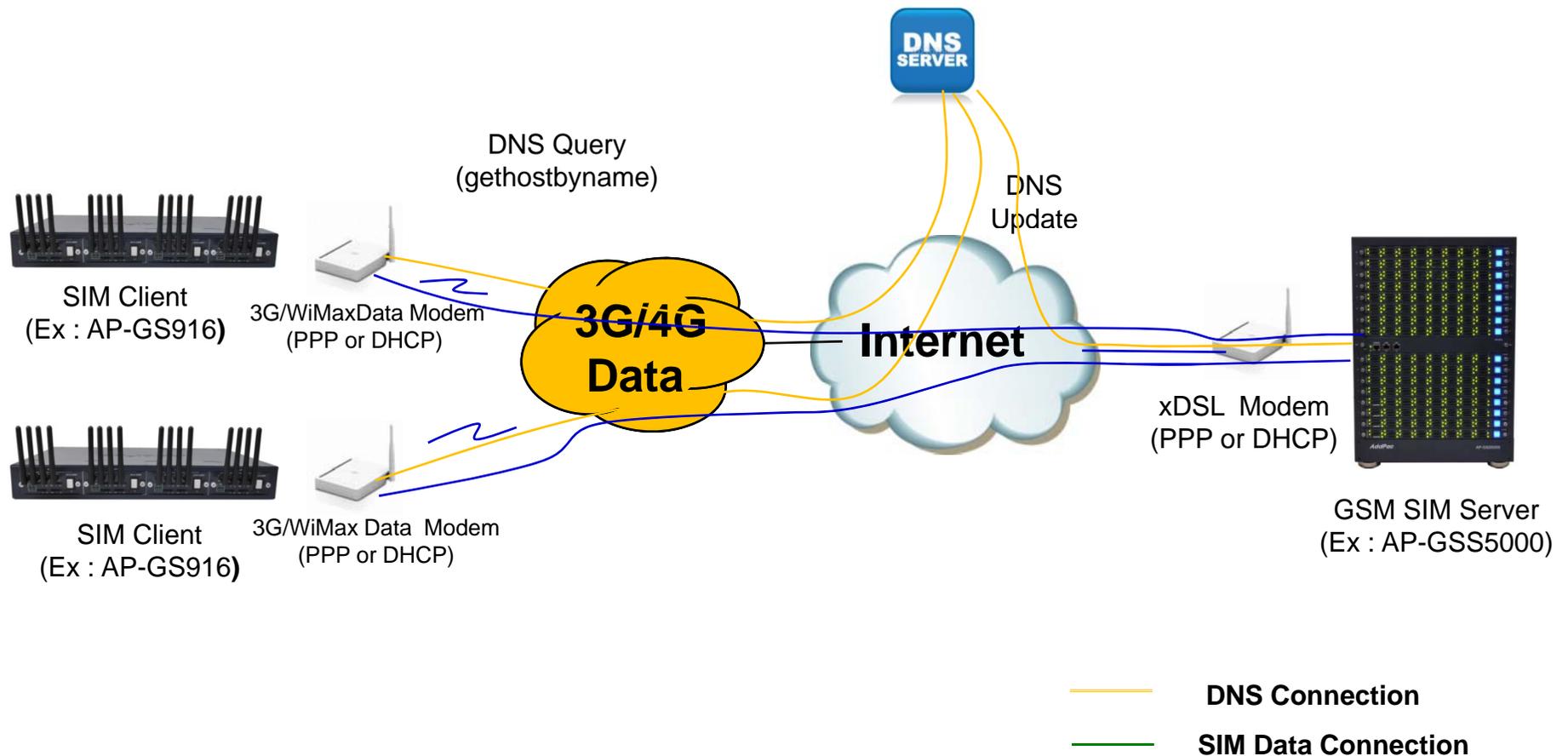 - High Performance & Reliable Data Link Protocol must be used

Dynamic IP Address Environment
(SIM Client : Wired Access Network)

Dynamic DNS

DNS Query
(gethostbyname)

DNS
Update

Internet

GSM SIM Client
(Ex : AP-GS916**)**

xDSL Modem
(PPP or DHCP)

GSM SIM Client
(Ex : AP-GS916**)**

xDSL Modem
(PPP or DHCP)

xDSL Modem
(PPP or DHCP)

GSM SIM Server
(Ex : AP-GSS5000)

——— **DNS Connection**

——— **SIM Data Connection**

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Dynamic IP Address Environment
(SIM Client : Wireless Access Network)

Dynamic DNS

DNS Query
(gethostbyname)

DNS
Update

SIM Client
(Ex : AP-GS916)

3G/WiMaxData Modem
(PPP or DHCP)

3G/4G Data

Internet

xDSL Modem
(PPP or DHCP)

SIM Client
(Ex : AP-GS916)

3G/WiMax Data Modem
(PPP or DHCP)

GSM SIM Server
(Ex : AP-GSS5000)

DNS Connection

SIM Data Connection

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Network Configuration Detail (1/2)

- ## With NAT Router Mode

Public IP   Private IP

DMZ

Internet

PPP/DHCP

Modem

NAT Router

Local

GSM SIM Server

Modem with NAT Router Function
(One System)

- ## Without NAT Router Mode

Public IP   Private IP
(192.168.0.x)

Internet

PPP/DHCP

TWIN IP

DHCP

Modem

GSM SIM Server

NAT Router

Local

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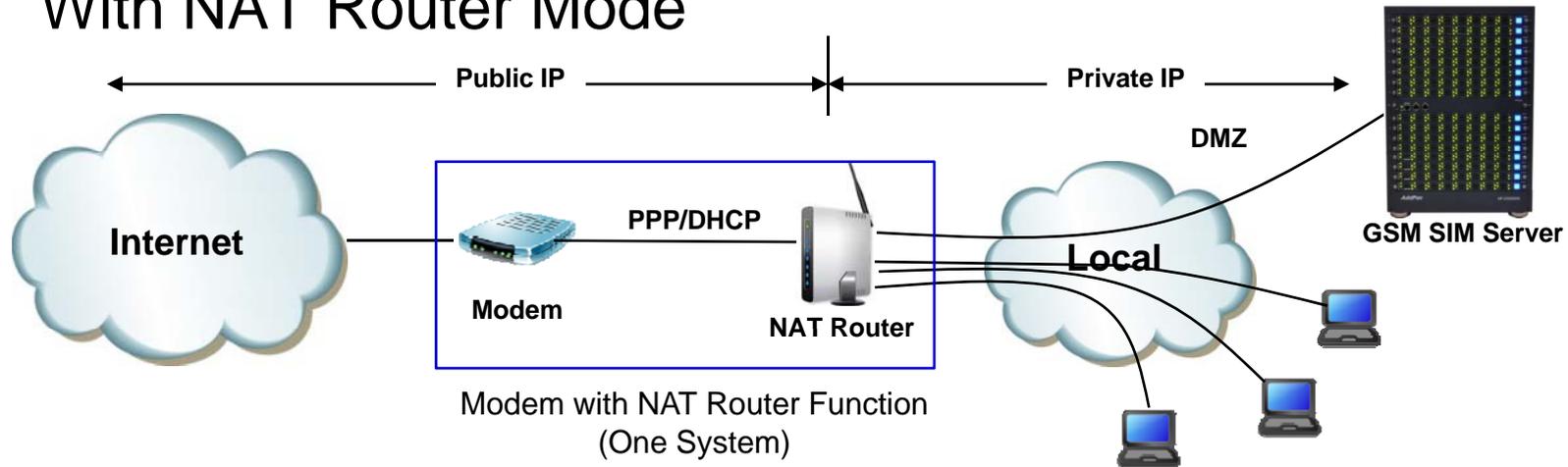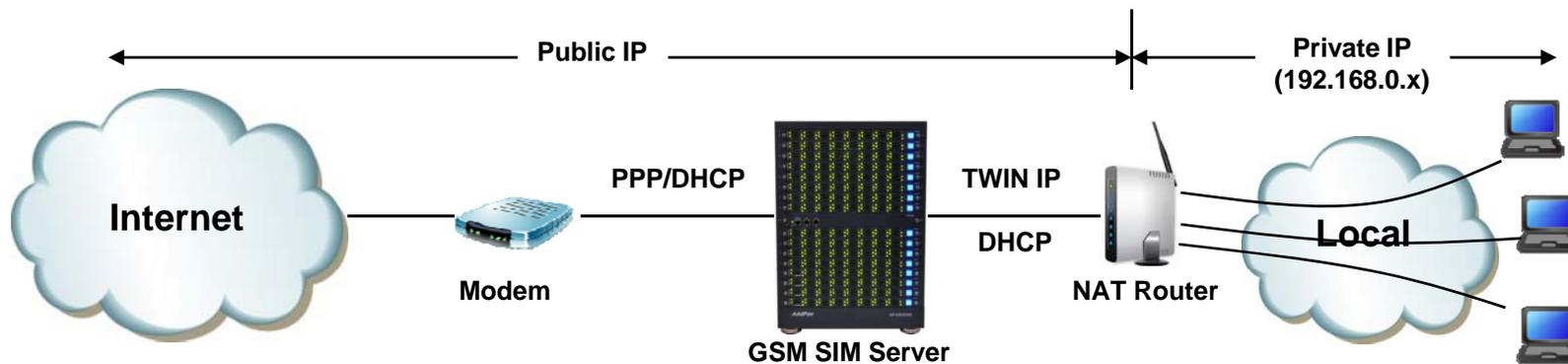
Network Configuration Detail (2/2)

- ## With NAT Router Mode
  - NAT Router is Public Address
  - SIM Server/Client is Private Address (Static Address)
  - Set DMZ for SIM Server/Client (or Port forwarding)
  - NAT Router Role
    - Recognition Local Address Change and
    - Dynamic DNS update (for SIM Server Connection)

- ## Without NAT Router Mode *(Recommend)*
  - SIM Server/Client is Public Address (PPP, DHCP or Static)
  - NAT Router is connected with FastEthernet0/1 via DHCP(optional)
    - Use IP-Connect mode for NAT router (TWIN IP, Public IP Relay)
  - SIM Server/Client Role
    - Recognition Local Address Change and
    - Dynamic DNS update (SIM Server only)

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Remote SIM Service Procedure

- **GSM SIM Sever**
  - Get Network IP Address (Public or Private address)
  - Update Dynamic DNS information (SIM Server or Modem)
  - Wait SIM Client Connection
  - Data Exchange with Client

- **GSM SIM Client (Ex : GSM VoIP Gateway)**
  - Get Network IP Address (Public or Private address)
  - Get SIM Server Public Address using DNS Query (gethostbyname)
  - Connection with SIM Server
  - Data Exchange with Server

Technical Remote SIM Service Issues

- ## GSM SIM Server Side
  - Fast Recognition for Network Address Change
  - Notify Local Address Change
  - Maintain SIM Client Connection when Local or Peer Address is changed

- ## GSM SIM Client Side (Ex:GSM VoIP Gateway)
  - Setup SIM Server Address using Domain-name not IP address
  - Fast Recognition for Network Address Change
  - Notify Local Address Change
  - Fast Recognition for Server Address Change

SIM Service Connection (1/2)

GSM SIM Client

GSM SIM Server

Queue

Queue

Logical Connection

Network Connection

Modem
(PPP or DHCP)

Modem
(PPP or DHCP)
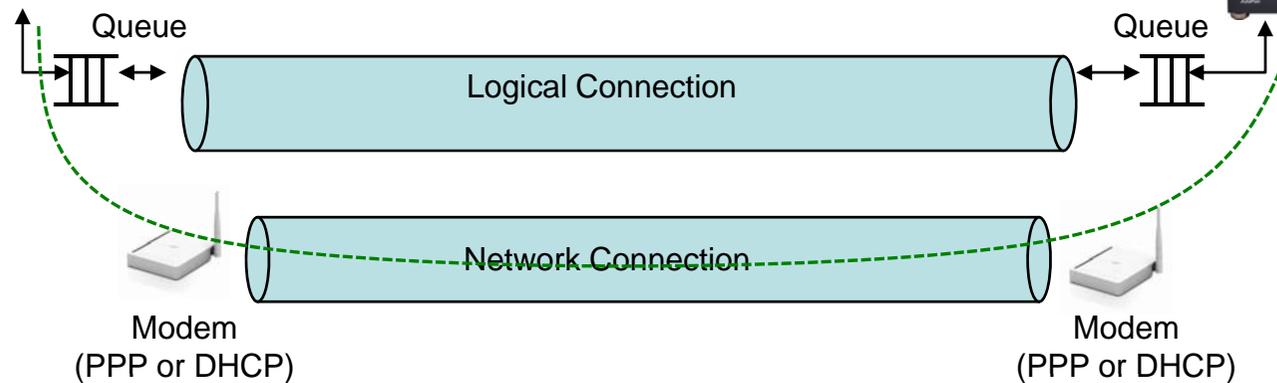
------- Physical Connection

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SIM Service Connection (2/2)

- **Logical Connection**
  - Establish Logical Connection
  - Transmit and Receive User SIM Data
  - Logical Connection Keep Alive (Detect Logical Link Down)
  - Flow Control, Retransmit (Selective Retransmission)

- **Network Connection**
  - Establish Network Connection
  - Transmit and Receive Logical Connection Data
  - Monitoring Local Address Change
    - Update Dynamic DNS Server (SIM Server only)
    - Notify Address Change using Logical Link Keep Alive Message
  - Monitoring SIM Server Address Change (SIM Client only)
    - Adjust DNS Query interval
    - Send DNS Query Immediately, when No Response received for Logical Connection Keep Alive

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Local IP Address Change Recognition

- ## PPP/PPPoE
  - ### Using LCP Echo Request
    - Send LCP Echo Request packet for given interval and time
    - For Fast Detection, Reduce the value
    - No Response, LCP Link Down and Restart PPP Session
  - ### Using ICMP Echo Request : (described below)

- ## DHCP
  - ### Reduce DHCP Lease Time if possible (manual configuration)
  - ### Using ICMP Echo Request
    - Send ICMP Echo Request(PING) Packet to default router for given interval and time
    - No Response, Send DHCP RELEASE and DISCOVER Packet
    - Reduce DHCP DISCOVER packet interval for Fast Reconnection
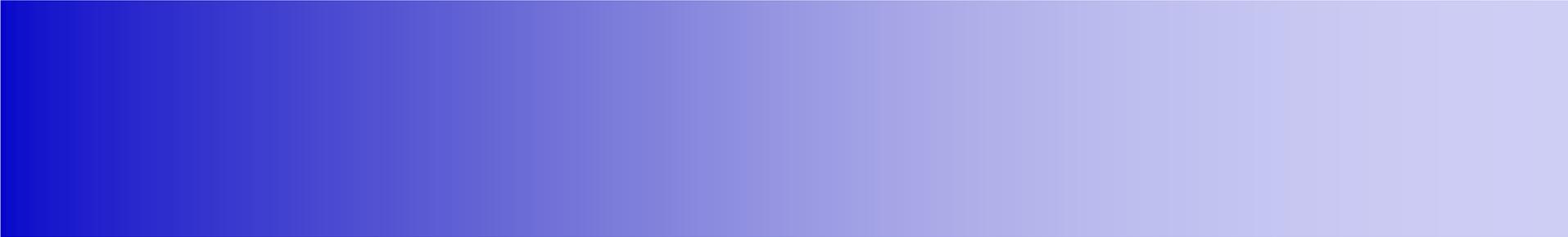
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Thank you!

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