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International Telecommunication Union

NGN Case in Indonesia: Solution for rural/remote telecommunication and strategy of TDM evolution

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Indonesia: A Country with Thousands of Islands

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What is the Situation

- TELKOM is the dominant telecom carrier
- TELKOM is the incumbent in the Indonesia's open market
- Operating in whole country
- More than 8 M of fixed wireline
- Nearly 3 M fixed wireless
- Owns satelite since 1976
- Population ~ 230 M

TELKOM customers

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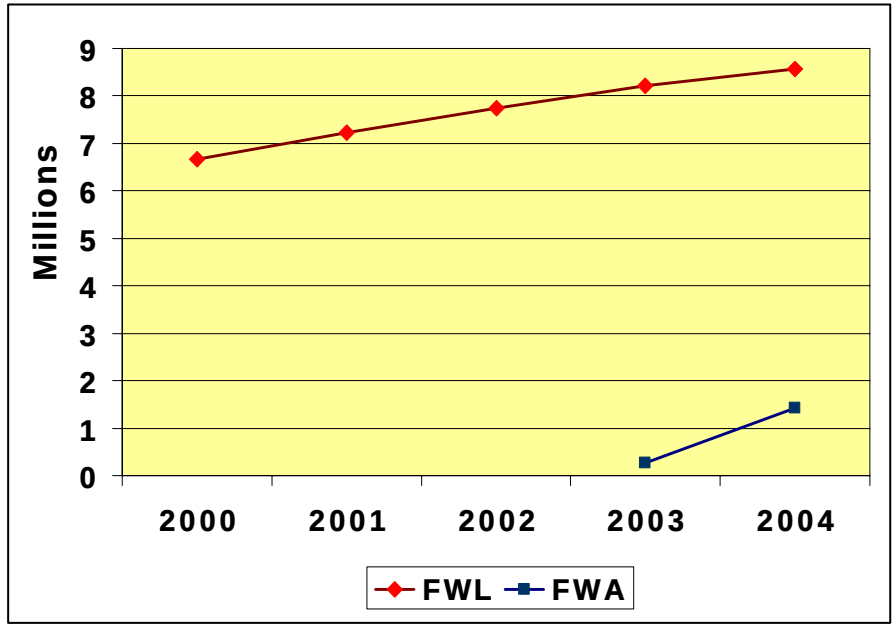
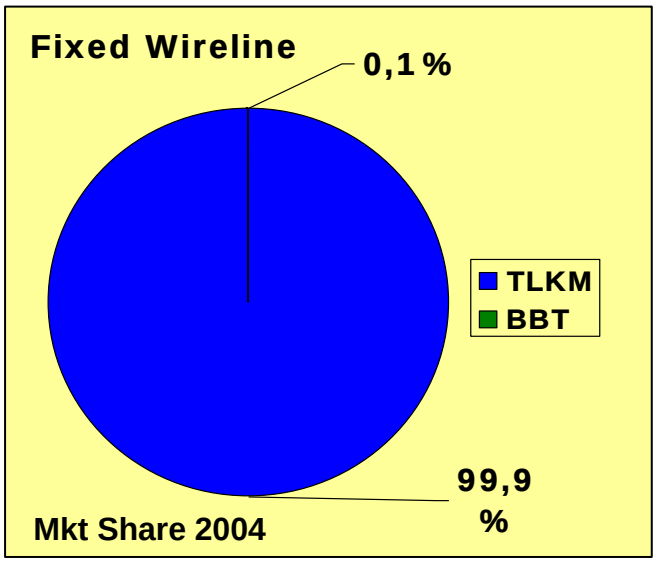
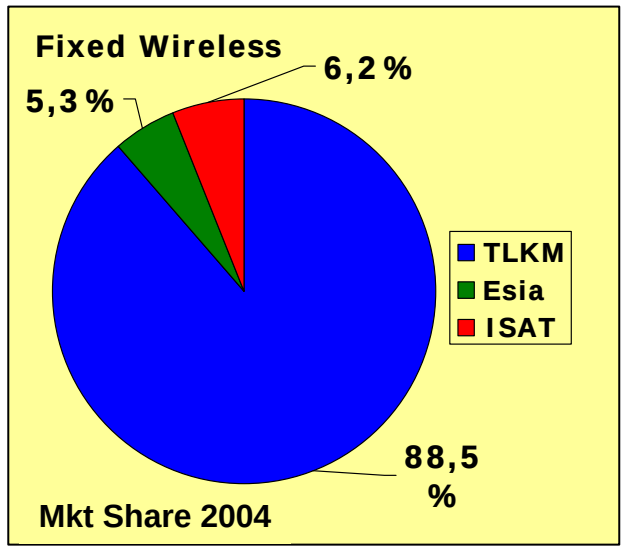
- During 2000 – 2004 the growth (CAGR) of TELKOM's Customers
  - FWL: 6%,
  - FWA: n.a,
- Market share of TELKOM at the end of 2004
  - FWL: 99%,
  - FWA: 88.5%,
- TELKOM maintains its position as market leader in fixed wireline and fixed wireless at the end of 2004







Source : CDB

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Challenge for being Incumbent

- Legacy of technologies and equipments, eg:
  - Software version of switches
  - Most of transport is TDM based
- Extent of network coverage
- Typical image of provider of public utility
- Expected to provide inexpensive service
- Customers become more demanding
- New telecom operators with new and efficient technology (eg: VoIP)

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Why change the Networks

- Replace equipments with new technologies
- Deployment of CAPEX and OPEX efficient technology
- Prepare new service offering
- Target for high ARPU service
- Respons to competitors, especially new entrants

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Objective of Change

- Revitalise existing network
- Capitalise on technology advance
- Leverage on extent of coverage
- Improve business relationship (customers, partners)
- New investment with efficient CAPEX
- New technology with less OPEX
- Equipment with global open standard
- Obtain economy of scale

NGN promises the long term solution

NGN in TELKOM

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TELKOM Development Strategies on NGN

- No further expansion of TDM switches.
- The Fixed Wireline is positioned as an infrastructure for Broad band/bundling services in high End Market:
  - Business district
  - Industrial Estates
  - Exclusive Residential Areas
- Fixed Wireless Access is positioned to fill the need for additional line on Voice services and data access.
- The future transport media will be based on Fiber Optic and IP packet network technologies solutions.
- Softswitch System Technology & Architecture will be the central control of TELKOM Next generation Network (NGN)

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Objective of NGN Implementation

- To obtain efficient CAPEX Per Line Unit followed by increase in ARPU (Capex Productivity)
- To prepare a development platform of potential new services (VAS and service bundling)
- To fulfill demand of additional line unit (ALU) and trunk circuit
- To fulfill demand of corporate VPN (voice & data, non leased line service)
- To accommodate requirement for connection /interconnection with other licences providers
- To improve competitive edge in corporate segment (fight back the competitors)

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NGN: Side Information

- "Software heavy" technology
- Open standard
- Continuously in progress

Possible domestic/national participation !!

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Rural/Remote Telecom: Target

- Serving the existing customer
- Reach for the lucrative remote
- Deploy the capability of new technology
- Grab new opportunity
- Fulfill the Universal Service Obligation
- Some number:
  - Teledensity: 0.2%
  - 43.022 villages (64.4 % of 66.778 total)

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Rural/Remote Telecom: Challenges

- Dispersed location (community with small members)
- Scattered users (Radius of service of around 50 km)
- Equipments with obsolete technology
- Choice of suitable technology
- Appropriate service: voice, fax, low speed data
- Relatively low income population
- Need more investment fund for area with no facility
- Finding business model

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NGN as solution for Rural

- Distributed architecture:
  - Provide the possibility of small capacity access
  - Can provide basic and advance service
- Interoperate with legacy:
  - Accommodate older protocol/signalling

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The Start of NGN in TELKOM

- **Initiative to study the NGN started in 2002 with a Lab trial involving Cisco and TKD (a local company)**
- **The lab trial studied:**
  - **Function test**
  - **Integration test**
  - **Performance test**
- **Field trial followed (with TKD equipments) in June – October 2003:**
  - **to observe, analyze and test its performance and capability in supporting the Class-5 services such as data and voice**
  - **conducted in Batam and Palembang in Sumatra island.**

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Small Implementation

- In 2003, a limited Softswitch procurement and trunk gateway to fulfill trunk circuit demand (Class 4 function)
- Sofswitches/call controller was to be located in Jakarta and Surabaya (dual homing) whereas the trunk gateways in Cikupa, Bandung, Semarang and Surabaya.
- The planned Class-4 Softswitch system is in operation since 2004, the system (supplied by Santera/Tekelec) has been interconnected to the TDM local switches and other licenced operators include mobiles, serving thousands of trunk circuits.

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Involving Local Capability (1/2)

- In 2004, a Class-5 Softswitch System Field Trial in colaboration with PESONA (a national consortium of supplier, consisting of five local companies) was carried out in four cities.
- The softswitches was in Jakarta and the access gateways were in Bandung, Semarang and Malang. The services tested were voice, internet and video conference, Softphone.
- The trialed system was also interconnected to the legacy PSTN

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Involving Local Capability (2/2)

- Aspects of field trial:
  - All of the NGN system (call control, access gateways, signalling gateway, NMS) was using the PESONA products
  - The interoperability between the class-4 softswitch (Santera) and the PESONA Class-5 softswitch was also tested using SIP-T protocol
  - The interoperability between the PESONA call controller/softswitch and other global vendor access gateways were tested.
  - There were six access gateway vendors involved.

Field Trial Configuration & Location

PESONA Softswitch Interoperability with Multi Vendor Access Gateway

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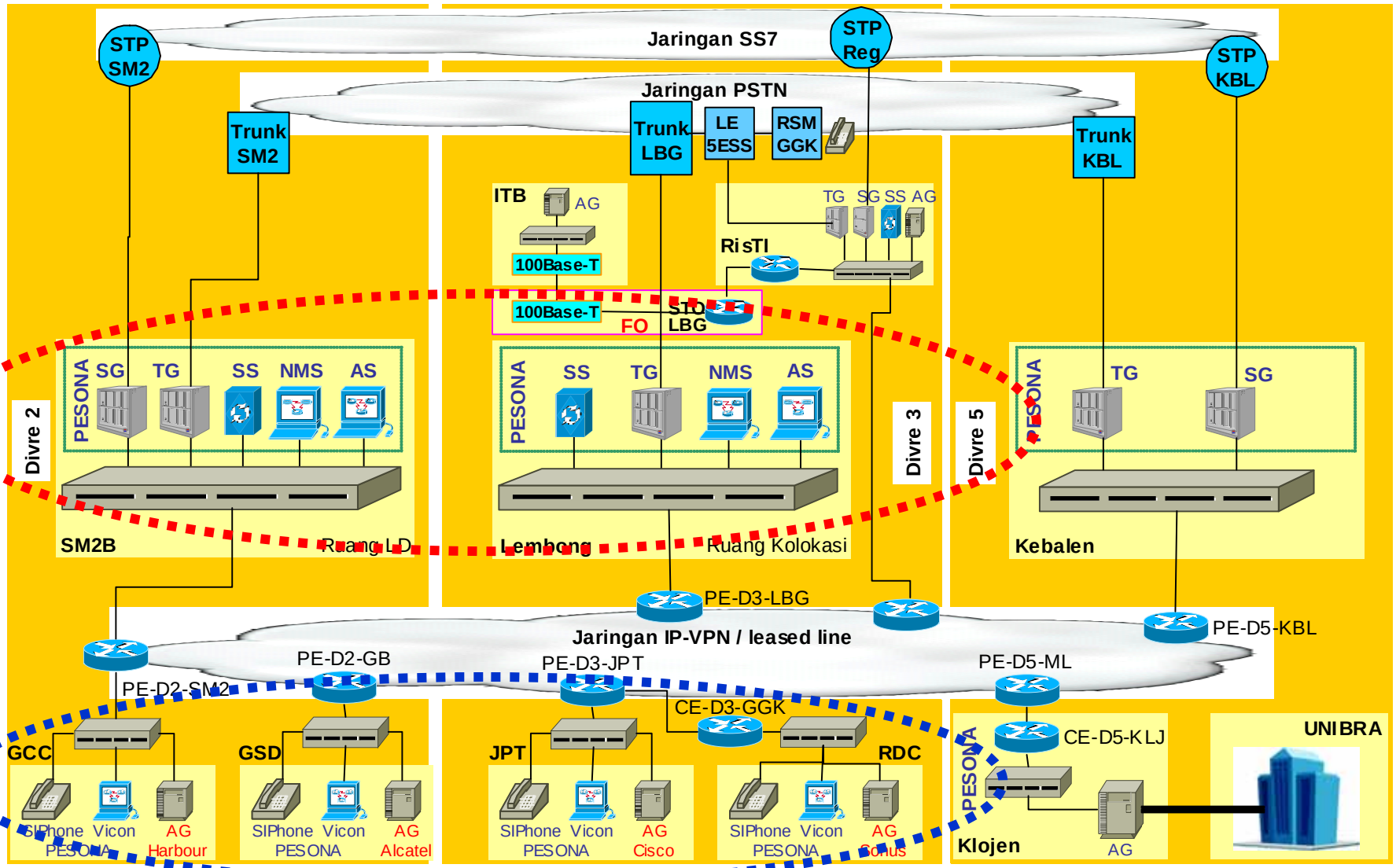

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Commercial Operation of NGN

- Since 2004, similar Class-5 softswitch platform has been operated to the real customers serving remote areas (access gateway with small capacity) in Pematang Siantar, Padang and Langsa.
- Currently, a preparation for operating softswitch system with CDMA20001x IP RAN access gateways is in progress, still with local company.
- A more cost effective solution system is expected, especially for serving the green field areas and rural.

Where is NGN Implemented

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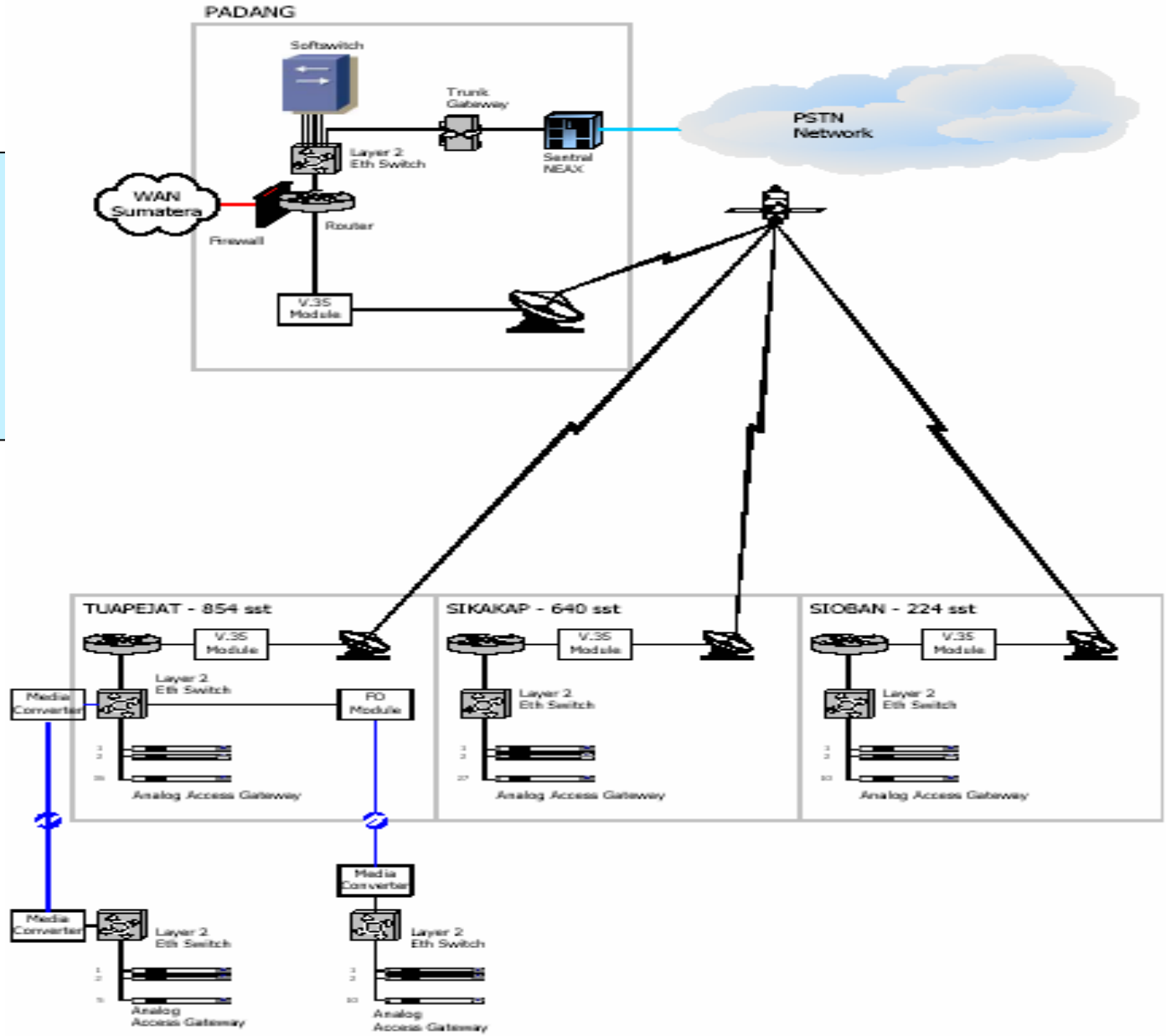
New technology for a specific solution: NGN in Island of Mentawai



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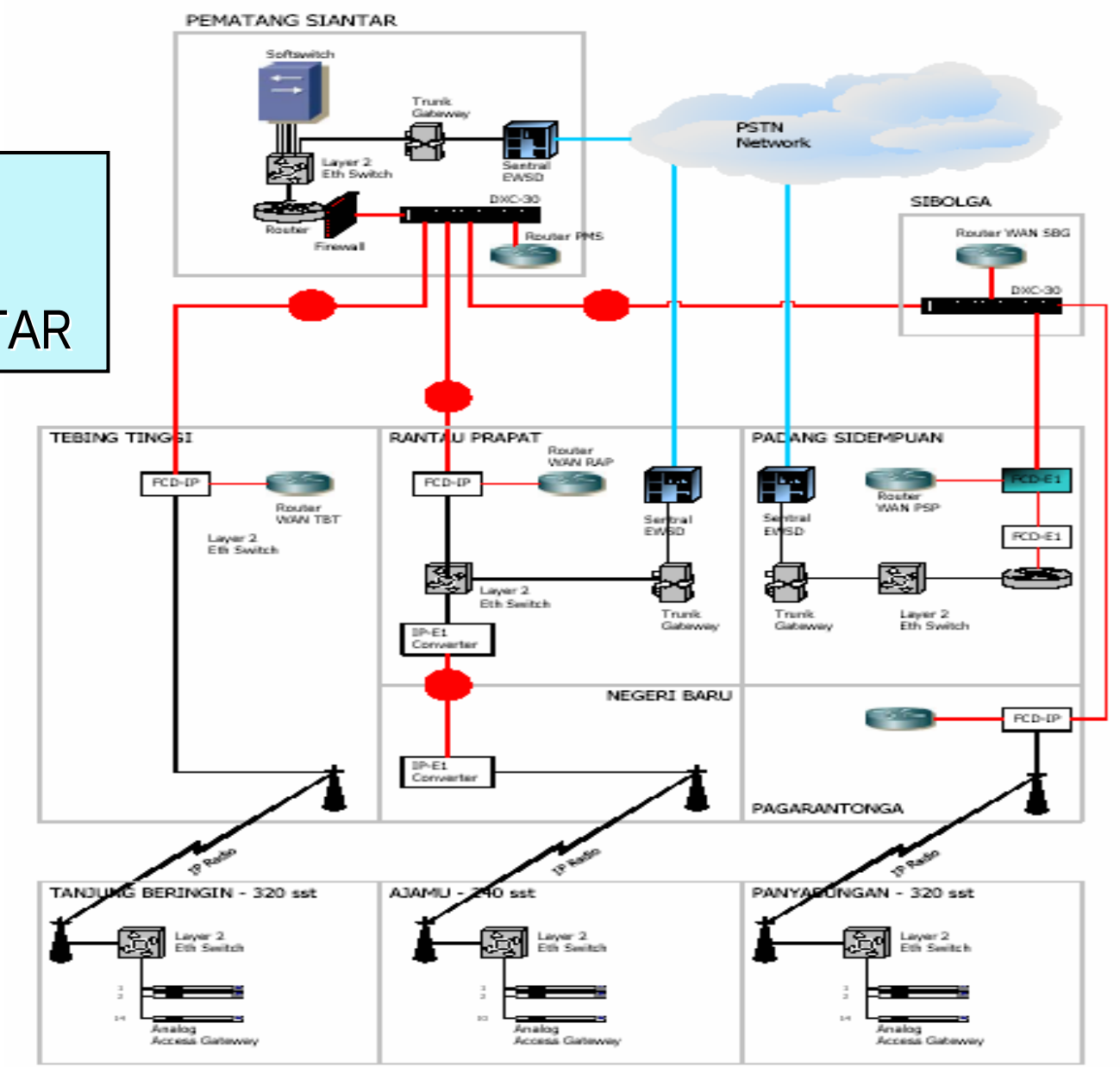
Softswitch Configuration: PEMATANG SIANTAR



LEGEND

- WAN Sumatera
- Trunk/PSTN

From Legacy toward NGN

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Why Migrate?

- Technical aspects:
  - limited capability in service offer
  - Impossible to extend
  - Discontinuous support
- Business aspects:
  - Customer requirements and demand
  - Opportunity offered by new service
  - Threat from new service providers with advantage
- What if not migrate?:
  - Risk of less service offering
  - Cost of extending life time maintenance
  - Risk of no support

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How to migrate

- Scenarios for migration:
  - Evolution
  - Direct replacement
  - Overlay network
- Process of migration
  - Procurement model based on scenarios
  - Timing of change

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What to expect

- Business consequences:
  - Expected incremental revenue and cost
  - Consequences to total revenue and investment
- Technical consequences:
  - Taken into account roadmap of technology advancement ie. NGN/IMS/MMD
  - Configuration in relation with remaining network

Technical Analysis

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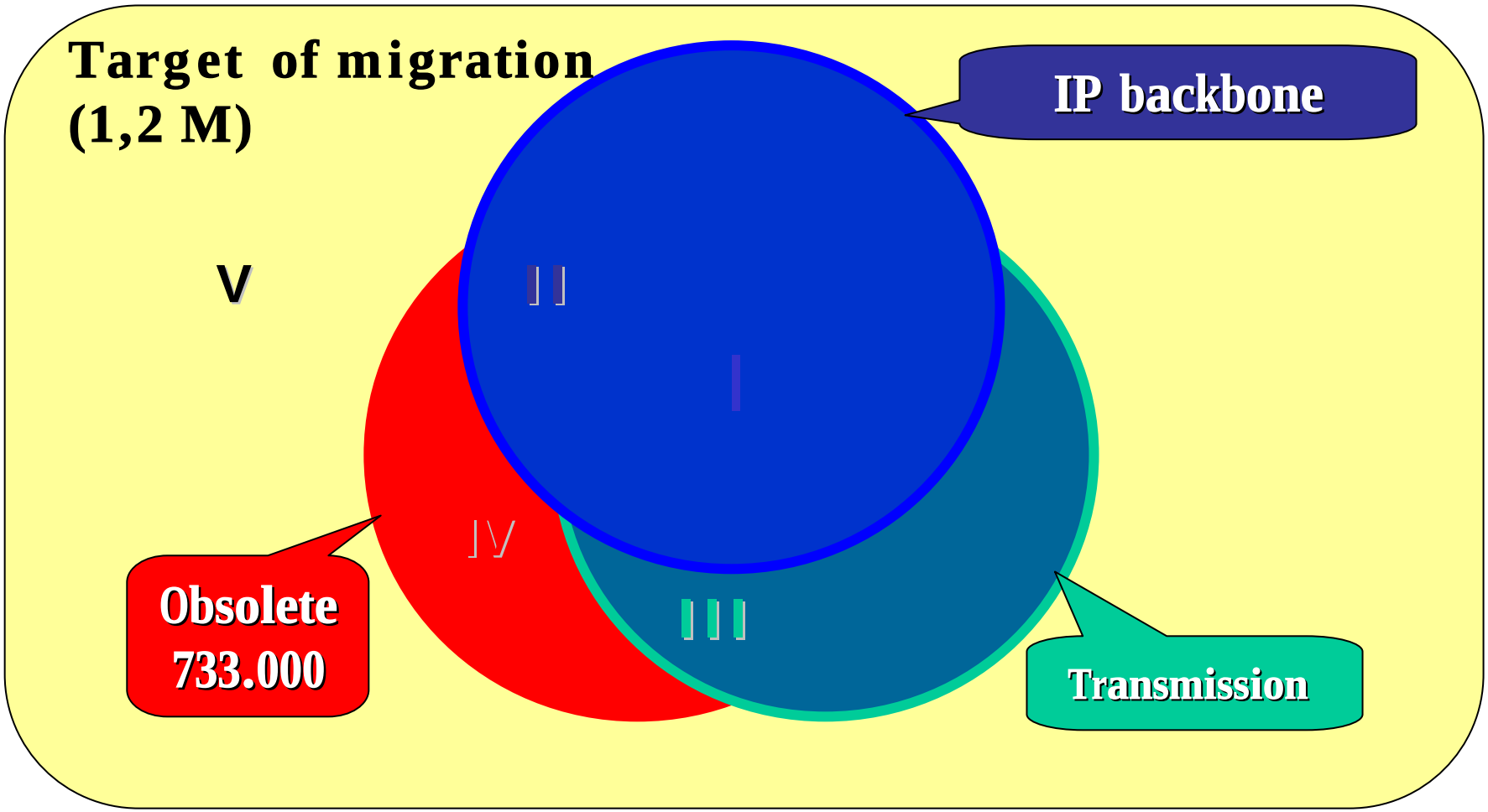
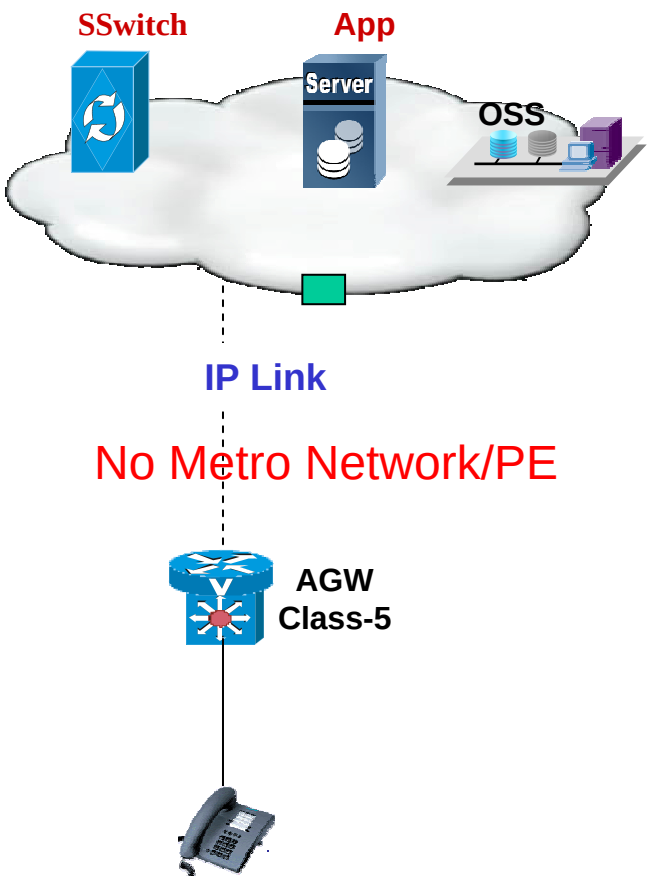
Step to migrate

- List of obsolete switch
- Identifying criteria of possibility to migrate:
  - Availability of Metro Access
  - IP Backbone
  - Transmission
- Classifying Area based on criteria of possibility
- Collecting demand information
- Creating solution model
- Creating policy
- Implementation schedule

Mapping of Replacement Location



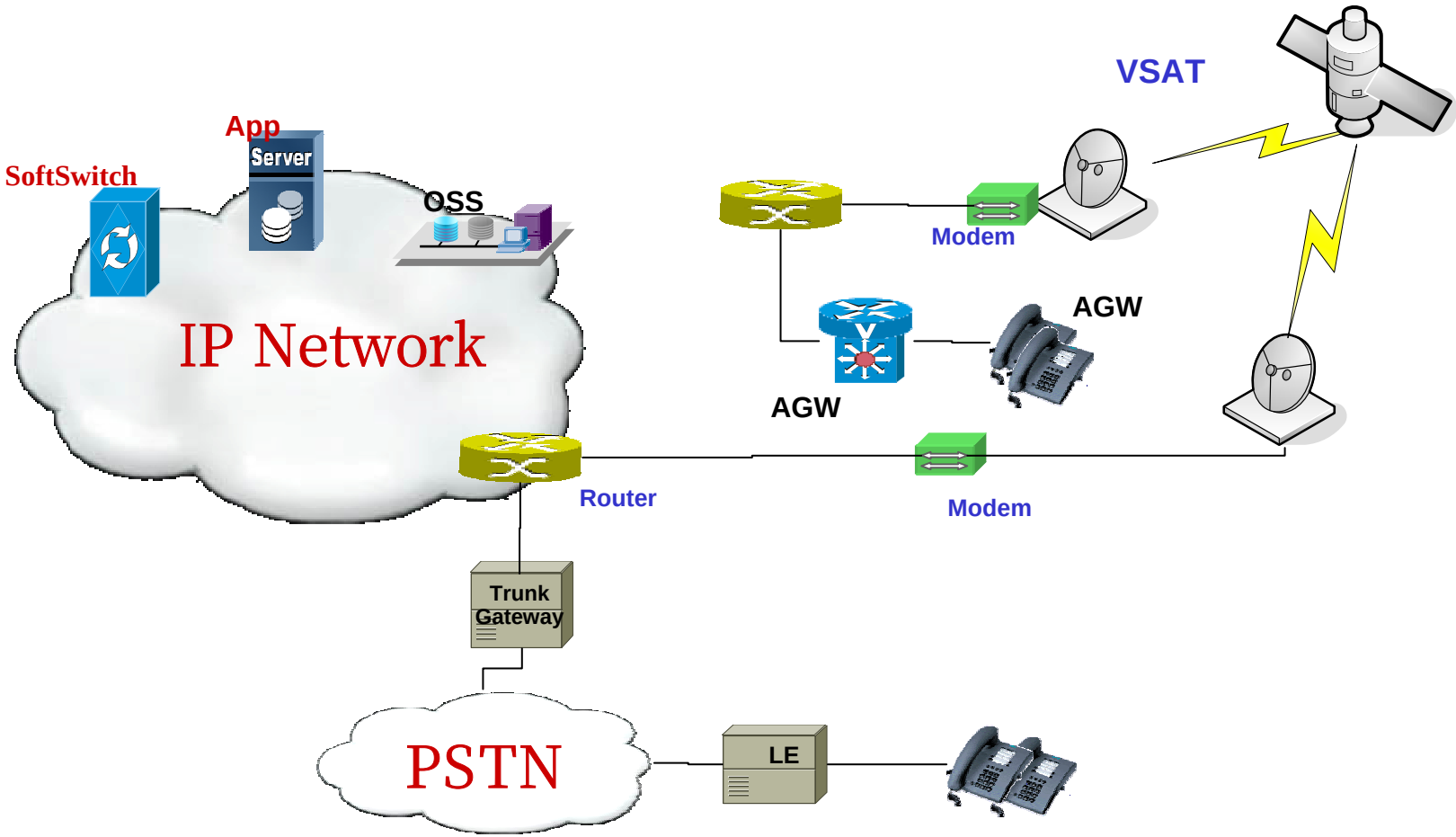
Implementation Model
Model-2: Metro/PE Not Ready



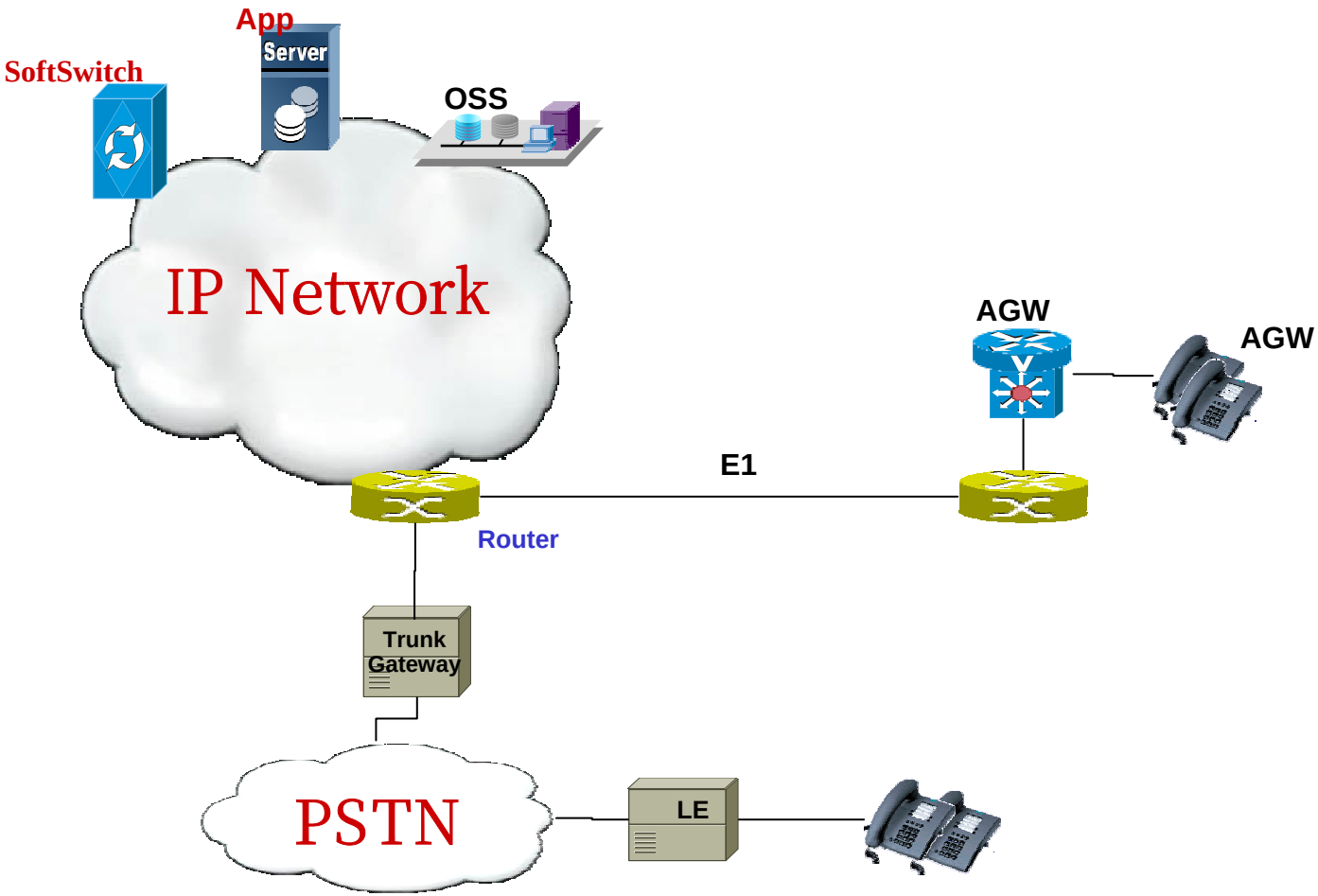
- Voice only service, growing demand
- Metro/PE not ready
- Remote Area, Scattered and Small Capacity
- Need Variation of IP Approach Link
- This Model can be implemented in Sumatra, Kalimantan and Eastern Area

Implementation Model

Model-2A: VSAT Access



Implementation Model
Model-2C: Link E1



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Implementation Policy

- Fit and consistent to the implementation objective
- Readiness of the existing network (PSTN, IP BB, Access Network and Billing System), paralel with NGN Implementation
- Minimum network integration and interoperability problem with the existing network
- The excellence of the procurement process:
  - Technology Risk Management
  - Good vendor relationship
  - Quality Assurance

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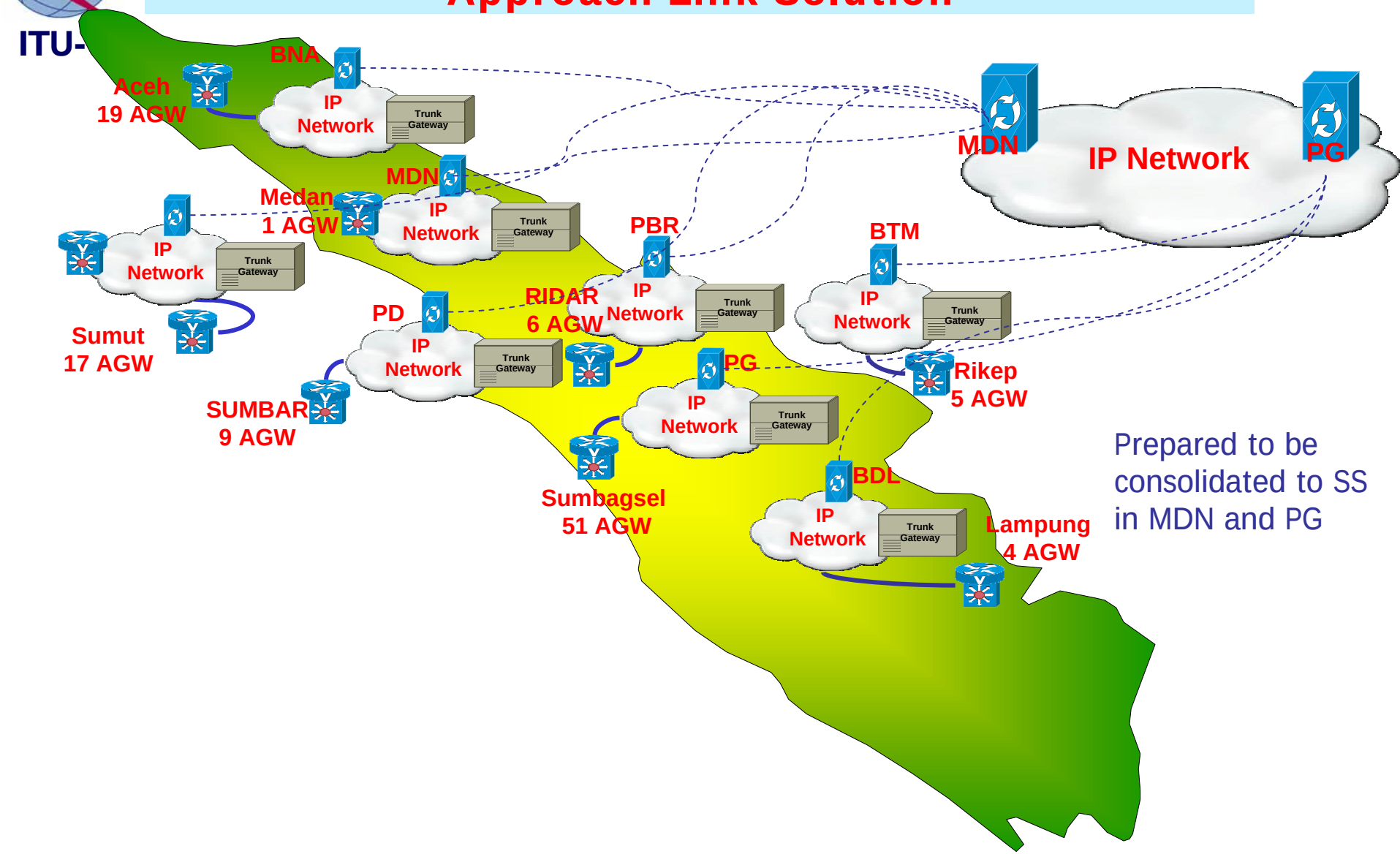
Service Requirements

- Line unit requirement for telephony includes:
  - Major city (business dan HEM)
  - Residential and community center (hotel and apartement)
  - Rural dan isolated area (300-3000 sst) → *Approach Link IP*
- Requirement for telephony dan data → *Metro IP*
  - Major city (business dan HEM)
  - Residential and community center (hotel and apartement)
- *The current analysis does not accommodate non telephony service*
- Micro demand survey for HEM, especially for some potential enhanced service can be delivered:
  - Voice VPN
  - Centrex (Virtual PBX)
  - Prepaid Services
  - Web Based Services
  - Unified Messaging Service (UMS)
  - Multimedia Conferencing

Basic configuration Sumatra (2006)

Approach Link Solution



Business Analysis

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Scope of Analysis

- Financial analysis, by quantifying and comparing economic impact of:
  - Alternative 1: keeping TDM switch for a certain period
  - Alternative 2: improving network capability by introducing softswitch based network

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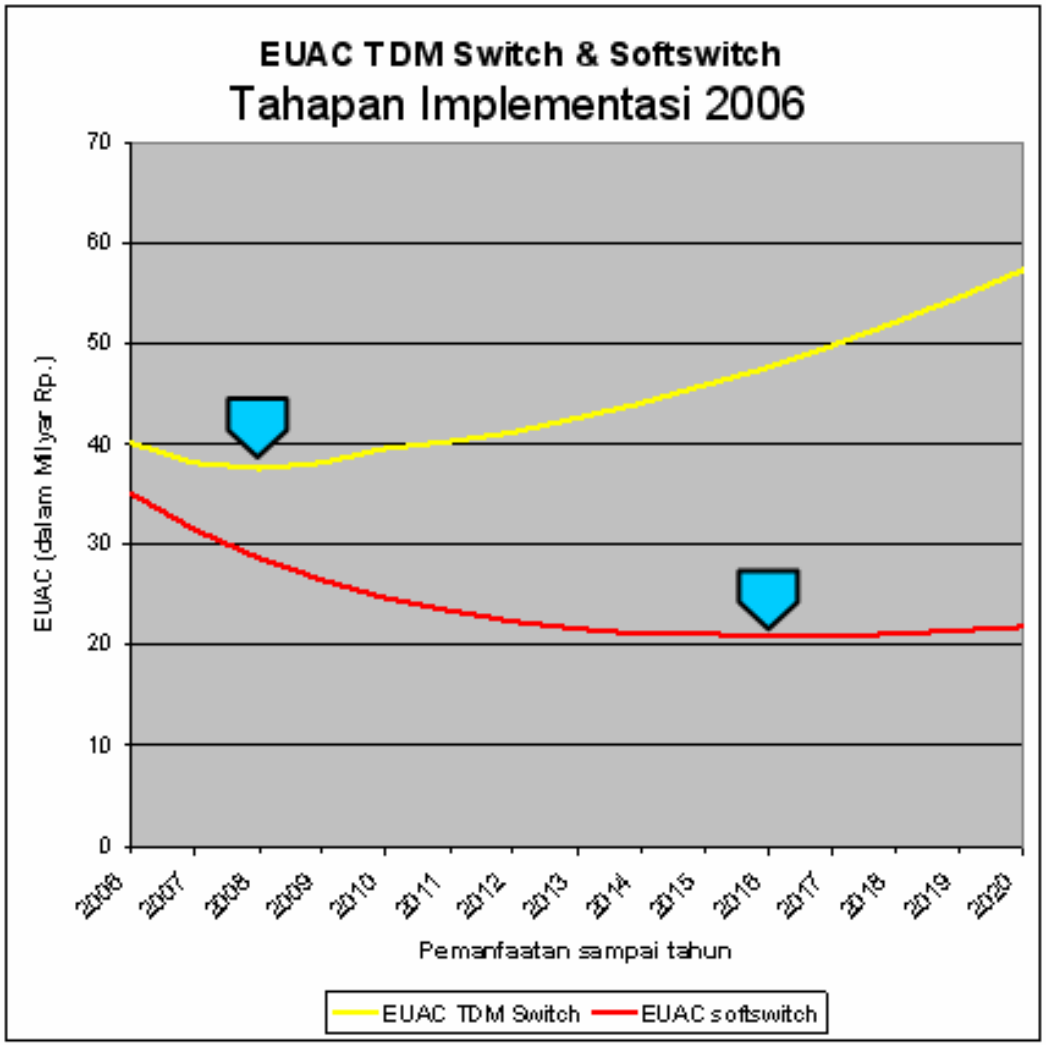
Required Data

- Yearly TDM switch replacement Program
- Book value of TDM switch
- Operational, maintenance and energy consumption
- Requirement of E1 link for TDM switch
- Cost E1 link usage
- Investment cost and economic lifetime of softswitch
- Cost reduction for operational, maintenance, energy consumption for softswitch compared with TDM switch (*Ovum Report*)

Methode of Analysis

- Replacement Analysis by Engineering Economics
- Approach:
  - Alternative evaluation criteria: **Minimize costs** (since information on demand for potential enhanced services is not available)
  - Cost components taken into acount are among others: investment, operational, maintenance, energy, cost for link E1 usage
  - Calculation Methode: **EUAC** (Equivalent Uniform Annual Cost). Replacement of TDM switch will financially be viable if EUAC value of softswitch is less than that of TDM switch
  - Treatment to previous investment decision: **Sunk Cost** (ignored)
  - **After-tax-basis** (taken into account tax influence on cash flow)
  - Consider **tax-saving on loss/gain on disposal** of equipments raised due to difference of TDM switch book value and market value

Example of Calculation Replacement Plan of 2006 (1/2)



Example of Calculation Replacement Plan of 2006 (2/2)

- For all targeted nodes for replacement in 2006, the cost required to procure and operate softswitch is less than the cost to maintain and operate TDM switch, even if softswitch is to be used for 1 year only
- Recomendation: replace the nodes of TDM switch by softswitch system

Further Study

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Introduction of IP-CDMA

- TELKOM has decided to expand most of access using fixed wireless (CDMA-2000)
- Implementation of IP-CDMA controlled by Softswitch is intended to prepare for future direction (all IP network)
- Fixed wireless can also solve problem in rural area, maintaining a uniform/integrated network

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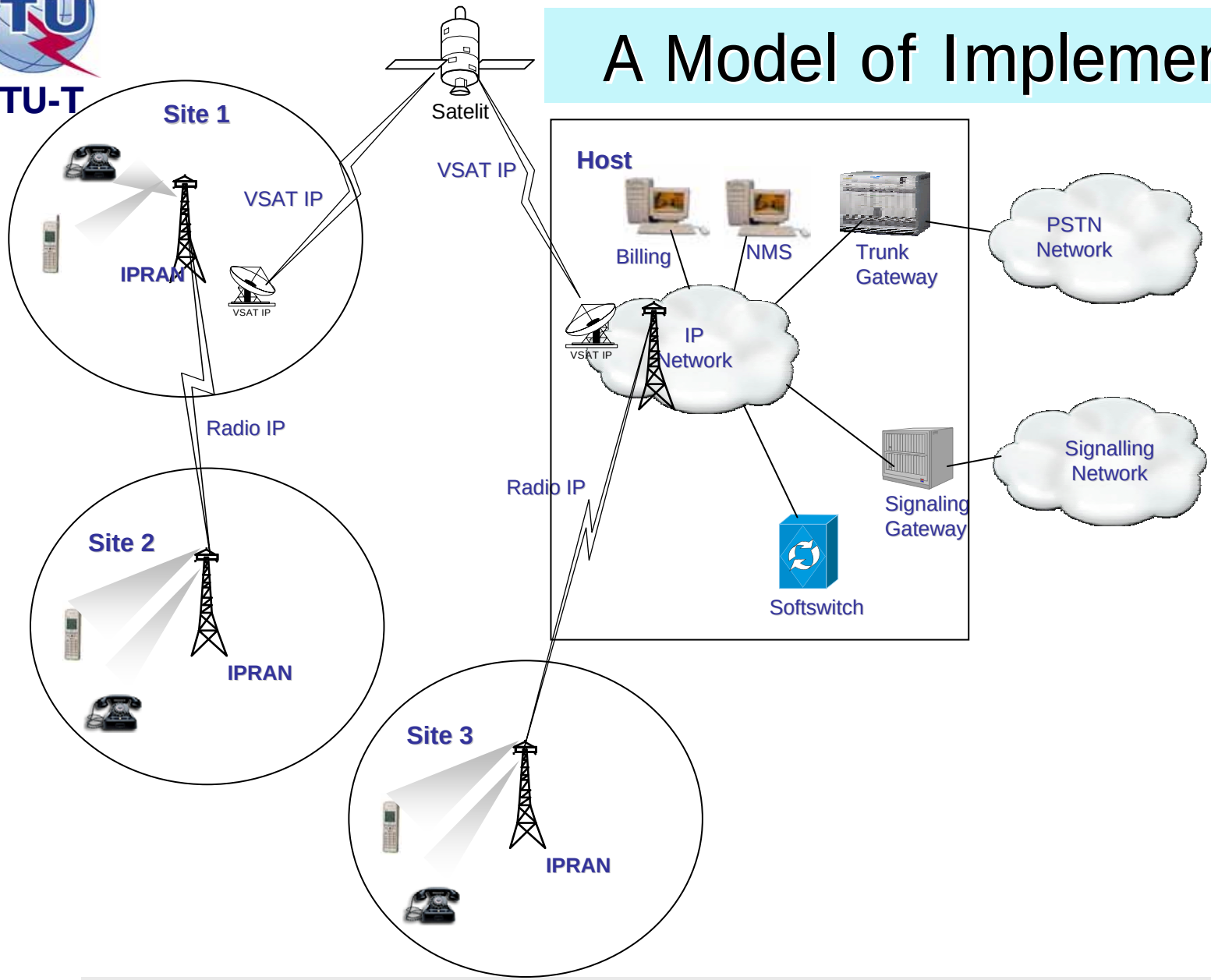
Description of IP-CDMA

- CDMA with IP based infrastructure (IP RAN/IOS 4.2, Softswitch, Radio IP, VSAT IP)
- Multi services with standard quality
- Technology enabling deployment of an efficient, scalable and cost effective network, for scattered customer

A Model of Implementation



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Lesson Learnt (1/2)

- NGN is ready to be deployed and interconnected to the legacy PSTN and Mobile network.
- Despite the 'advance technology and service' promised by NGN, it offers an efficient solution for remote location problem of infrastructure construction, for 'today simple service' namely telephony
- Solution for inter-vendors interoperability issues is within the compliance to the standards
- The open interface standard defined in NGN, can be a good tool for regulators in controlling the licensing process by insisting on interoperability.

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Lesson Learnt (2/2)

- Certain degree of independence from vendor of equipments in service creation is a prospect for efficient operation
- 3rd party service provisioning needs regulator's attention
- "Software heavy" of NGN nature, opens the possibility to domestic participation

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Concluding Remarks

- NGN is the technology offering solution for new operators as well as for incumbents
- NGN with future service can also provide solution for rural area
- The role of software in NGN, has opened the opportunity for domestic potential to participate in the development of network
- Migration (evolution) of current network to NGN, needs to consider not only technical aspect but financial and regulatory

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Thank you