



# PTCL POI Planning Solution

PTCL-Huawei Network Planning Team  
March 2006

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- ➔ **Current PTCL PSTN POI Setting**
- ➔ **General POI Deployment Solution**
- ➔ **PTCL POI Deployment Suggestion**



## 👉 Current Telecom Region Partition:

- ⌘ there are **16** Telecom Regions in Pakistan, there are at least more than **100,000** subs in every region ;
- ⌘ there are **7** regions which have more than **500,000** subs; and **5** regions subs are less than **200,000** subs
- ⌘ there are several Telecom regions in developed city, eg.Karachi and Lahore
- ⌘ One Telecom region covers large area in west province Balochistan and North-west area

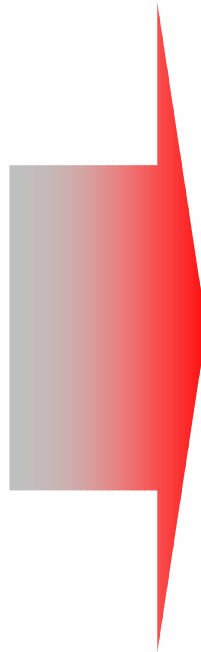
## 👉 New Telecom Region Partition and Advice:

- ⌘ there are **14** Telecom Regions in Pakistan (planning), LTR-N and LTR-S merged into LTR,STR-II and STR-III merged into KTR.
- ⌘ services and subs forecast will be based on the new partition.
- ⌘ best to unify NWD call tariff; or divide the NWD call tariff into 2 level: intra-Telecom region (inter district in one Telecom region) and inter-Telecom region



# Telecom Region Adjustment

| Region       | L.U              |
|--------------|------------------|
| CTR          | 278,588          |
| FTR          | 534,002          |
| GTR          | 569,139          |
| HTR          | 114,238          |
| ITR          | 347,160          |
| LTR-N        | 329,048          |
| LTR-S        | 505,990          |
| MTR          | 478,230          |
| NTR-1        | 434,235          |
| NTR-2        | 143,033          |
| RTR          | 237,030          |
| STR-1        | 197,633          |
| STR-2        | 524,536          |
| STR-3        | 607,294          |
| STR-5        | 162,716          |
| WTR          | 163,902          |
| <b>Total</b> | <b>5,626,774</b> |



| New Region   | Rural Subs       | Urban subs       | Urban Rate  | Proportion    |
|--------------|------------------|------------------|-------------|---------------|
| CTR          | 170,695          | 107,893          | 39%         | 4.95%         |
| FTR          | 220,784          | 313,218          | 59%         | 9.49%         |
| GTR          | 322,804          | 246,335          | 43%         | 10.11%        |
| HTR          | 85,829           | 28,409           | 25%         | 2.03%         |
| ITR          | 79,026           | 268,134          | 77%         | 6.17%         |
| <b>LTR</b>   | <b>0</b>         | <b>835,038</b>   | <b>100%</b> | <b>14.84%</b> |
| MTR          | 226,468          | 251,762          | 53%         | 8.50%         |
| NTR-1        | 265,395          | 168,840          | 39%         | 7.72%         |
| NTR-2        | 102,245          | 40,788           | 29%         | 2.54%         |
| RTR          | 157,196          | 79,834           | 34%         | 4.21%         |
| STR-1        | 89,142           | 108,491          | 55%         | 3.51%         |
| <b>KTR</b>   | <b>75,198</b>    | <b>1,056,632</b> | <b>93%</b>  | <b>20.12%</b> |
| STR-5        | 90,864           | 71,852           | 44%         | 2.89%         |
| WTR          | 67,268           | 96,634           | 59%         | 2.91%         |
| <b>Total</b> | <b>1,952,914</b> | <b>3,673,860</b> | <b>65%</b>  | <b>100%</b>   |



## ☞ Consolidate **109** districts to **99** based on area code:

- ☞ one district means a local telecom network;
- ☞ after optimization of area code, *10 districts will share same area code with other 10 districts,*
- ☞ only one district in metropolitan ITR/KTR/LTR region
- ☞ in case of POI configuration and subscriber forecast, we can regard the sharing same area code districts as one district ;

## ☞ Subs scale appear polarization trend after district optimization:

- ☞ high-density area: there are **11** districts with more **0.1M** subs, Karachi is the largest one with more than **1.1M** subs.
- ☞ low-density area: there only several hundreds or thousands subs in most of districts of west and northwest province.

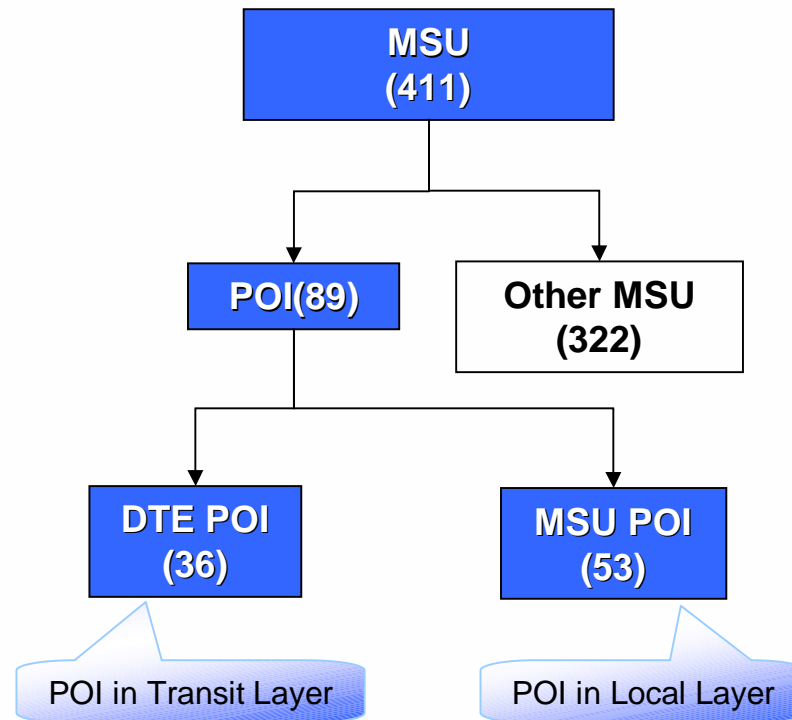
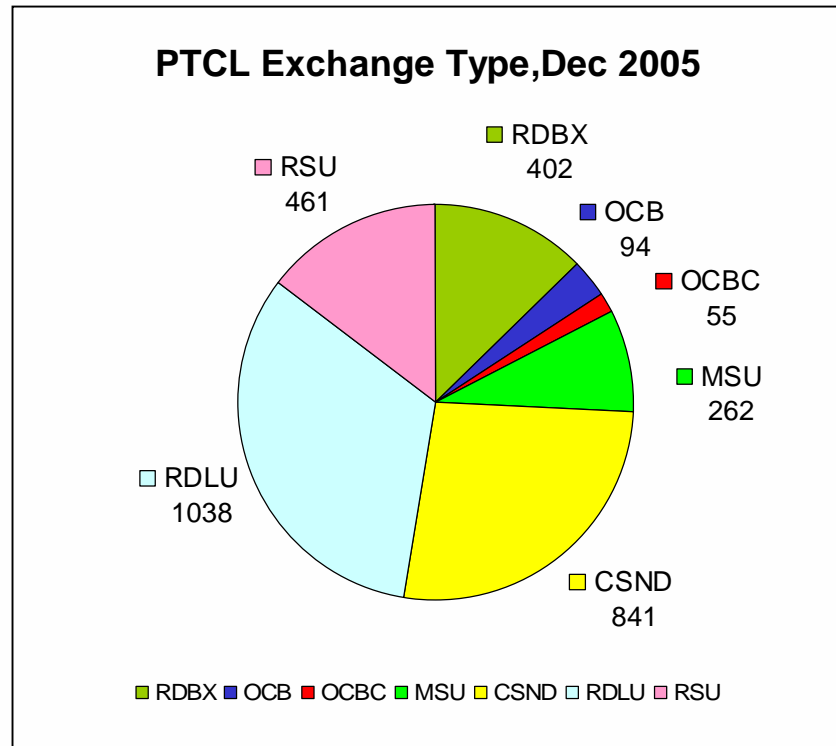
## ☞ Area Code :

- ☞ a 2-digit Area Code for heavily populated areas plus a 7-digit Subscriber Number
- ☞ a 3-digit Area Code for less populated areas plus a 6-digit Subscriber Number; making a total of 9-digits in both cases.



## Telecom District Adjustment : Area Code Share

| Region | District                 | Area code |
|--------|--------------------------|-----------|
| HTR    | MANSEHRA / Btagram       | 987       |
| ITR    | ISLAMABAD / RAWALPINDI   | 51        |
| NTR-I  | KHYBER AGY / MOHMAND AGY | 924       |
| NTR-I  | PESHAWAR / CHARSADDA     | 91        |
| NTR-II | BANNU / N.W.AGY          | 928       |
| NTR-II | HANGU / ORAKZAI AGY      | 925       |
| WTR    | BARKHAN / Kohlu          | 829       |
| WTR    | JAFARABAD / NASIRABAD    | 838       |
| WTR    | Q.ABDULLAH / Pishin      | 826       |
| WTR    | SIBI / Ziarat            | 833       |

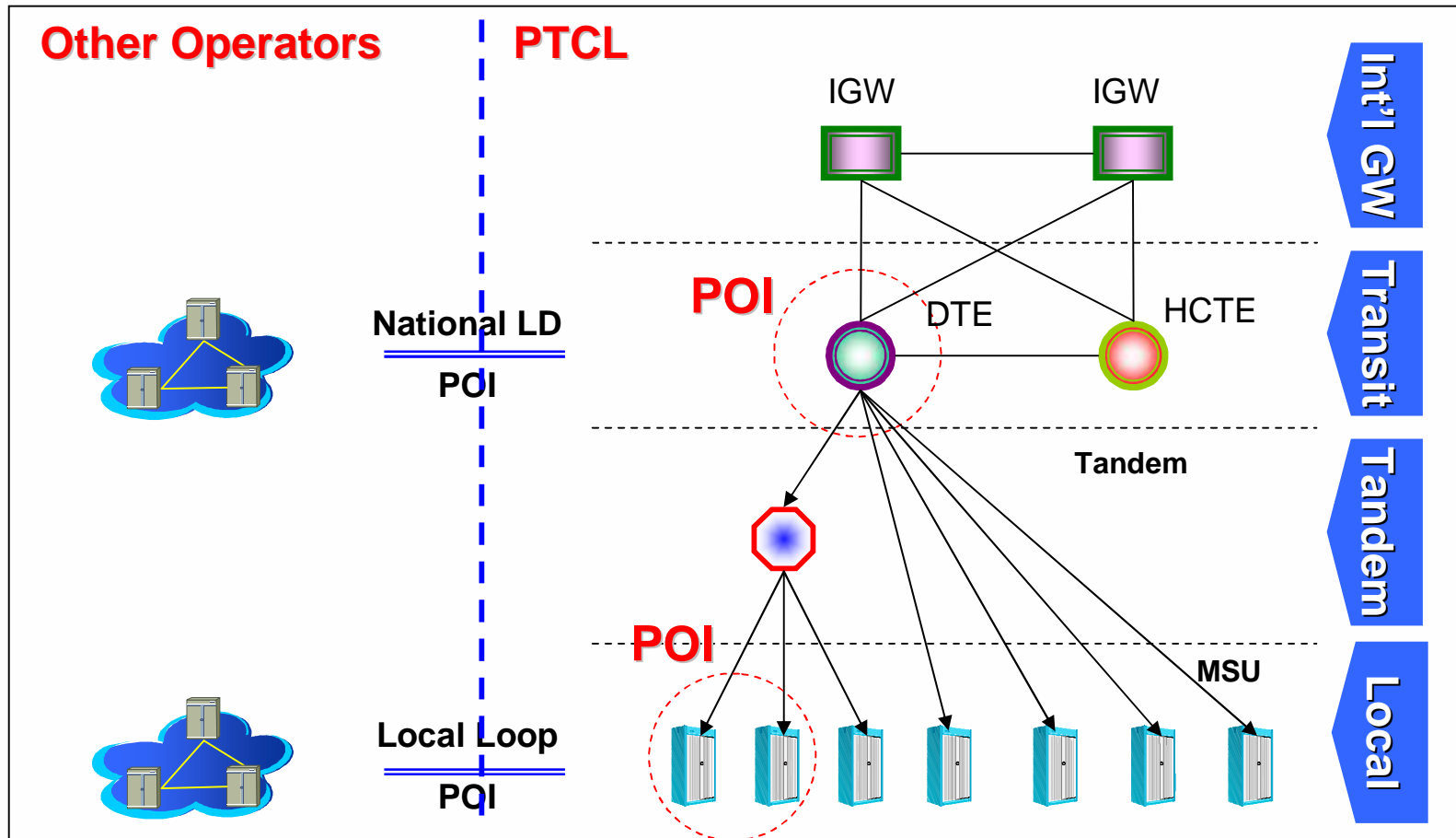


☞ Basically, PTCL POIs can be divided into three types :

- ☞ International interconnection
- ☞ National long distance interconnection
- ☞ Local interconnection

☞ All **36** DTEs are **long distance POIs** to other operators.

☞ Other **53** POIs are made of combined MSUs



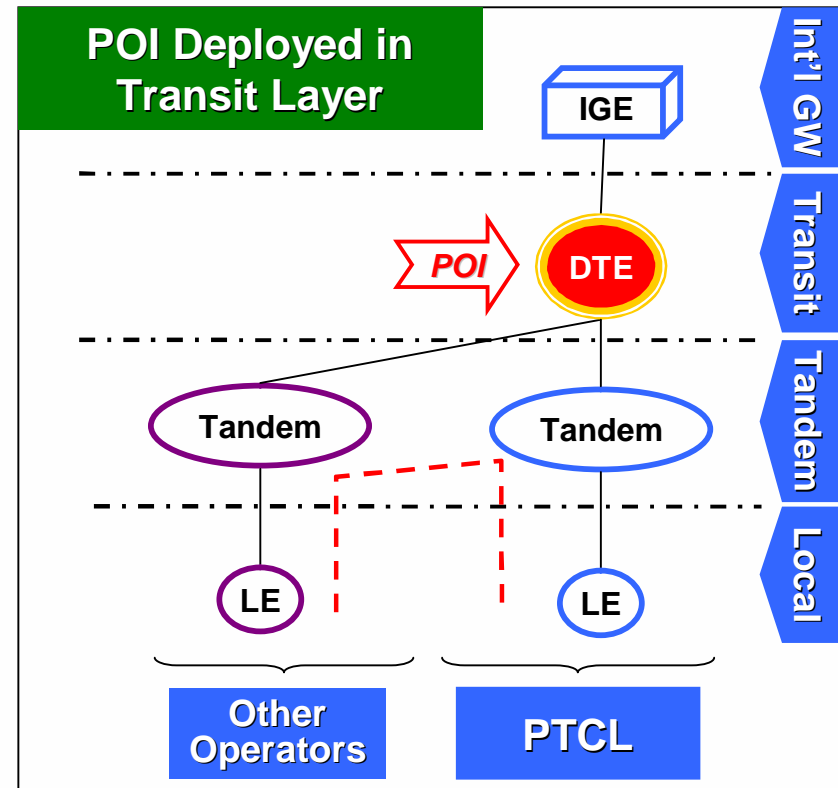
- ☞ Today PTCL POIs locate in Int'l GW/Transit/Local layer.
- ☞ There will be at least one local POI in each local telecom region



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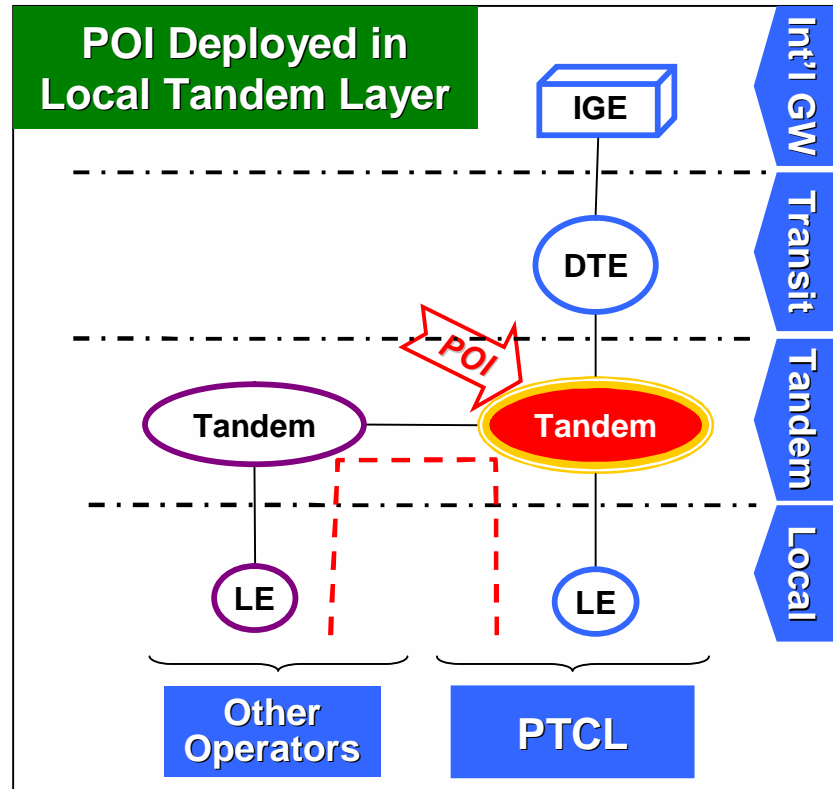
- ➔ Current PTCL PSTN POI Setting
- ➔ **General POI Deployment Solution**
- ➔ PTCL POI Deployment Suggestion

- 👉 **Description:** All traffic to other operators will be transferred in long distance transit layer
- 👉 **Disadvantage :** There will exist *detour route* between local calls of different operators in same telecom district.
- 👉 **Application Scope:** Local telecom network with low interconnection traffic.
- 👉 **PTCL Status:** All DTEs have POI functions



**Evolution Direction : Standalone POI construction with interconnection traffic increasing.**

## Gateway Deployment II : Tandem Acts As POI



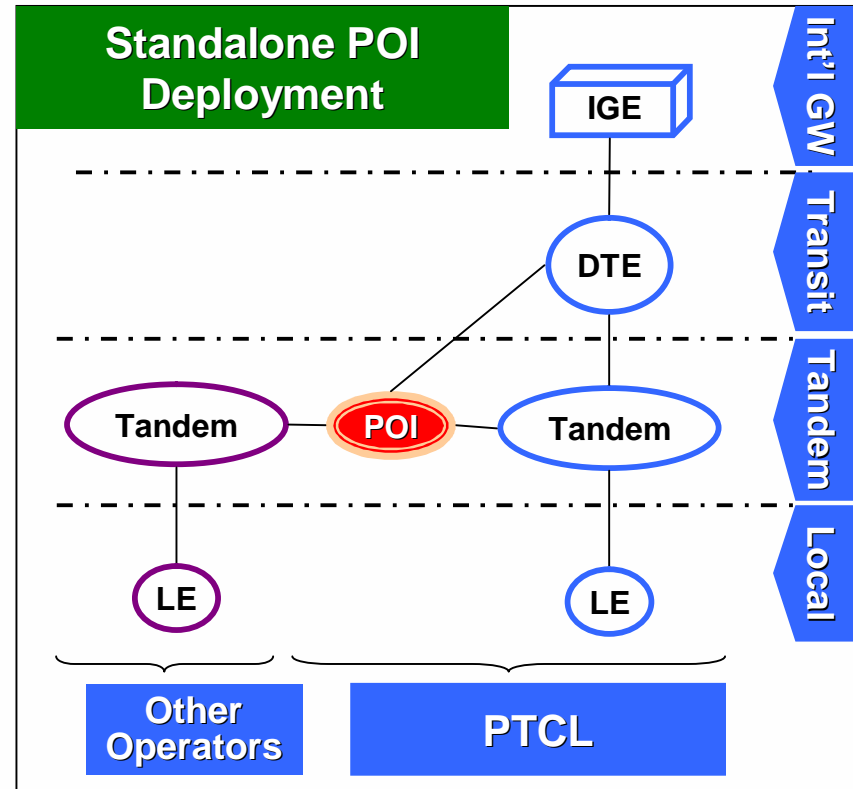
- 👉 **Description:** All traffic to other operators will be transferred in local tandem exchange of each telecom district
- 👉 **Application Scope:** Local telecom network with low interconnection traffic.
- 👉 **PTCL Status:** because only three big cities have tandem exchange, No application
- 👉 **Other Countries:** applied widely in low/middle interconnection traffic regions

**Evolution Direction : Standalone POI construction with interconnection traffic increasing.**

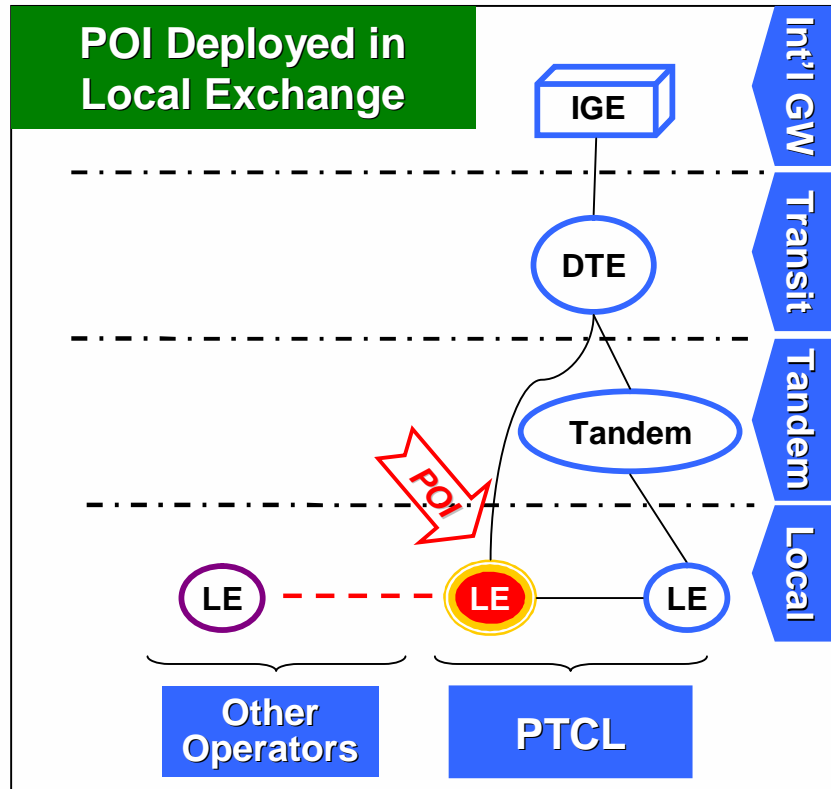


# Gateway Deployment III : Standalone POI

- Description:** All traffic to other operators will be transferred with standalone POI in each telecom district
- Application Scope:** Local telecom network with heavy interconnection traffic.
- Other Countries:** applied widely
- PTCL Status:** No application



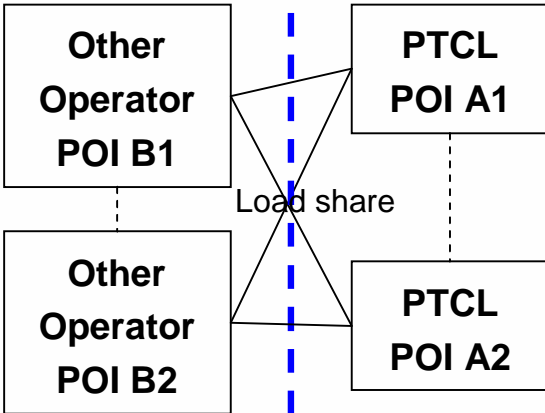
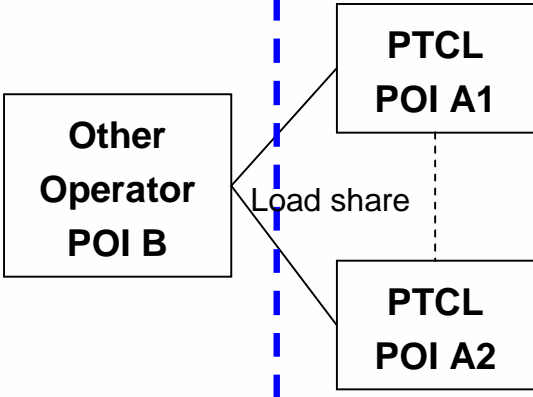
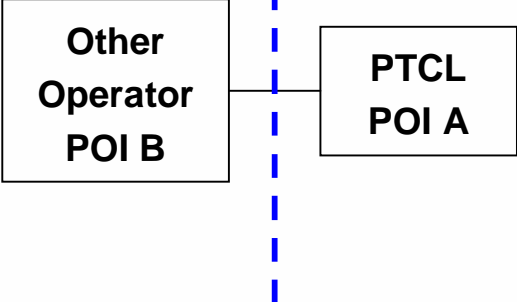





Widely applied in high interconnect traffic telecom district



- 👉 **Description:** In each telecom district, one LE will act as POI to transfer interconnection traffic in same telecom district
- 👉 **PTCL Status:** because there exists interconnect requirement from other operators and no tandem exists, It will be the future POI target network. Up to now, there are 53 mixed POI/LEs.

**Evolution Direction : Standalone POI construction with interconnection traffic increasing.**

Target Structure




| Multiple-Multiple                                                                                                                                                                                                                                                                     | Single-Multiple                                                                                                                                                                  | Single-Single                                                                                                                                                                                                                                                                       |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p><b>Other Operators</b>      <b>PTCL</b></p>                                                                                                                                                      | <p><b>Other Operators</b>      <b>PTCL</b></p>                                                | <p><b>Other Operators</b>      <b>PTCL</b></p>                                                                                                                                                  |
| <ul style="list-style-type: none"> <li> Mesh interconnection between POIs</li> <li> High Reliability</li> </ul> | <ul style="list-style-type: none"> <li> POI B has direct link to POI A1 and POI A2</li> </ul> | <ul style="list-style-type: none"> <li> Single link between POIs</li> <li> Low cost, High risk</li> </ul> |

Consider dual (Multiple) POI to connect other operators when interconnection trunk exceeds 400




# CONTENT

- ➔ Current PTCL PSTN POI Setting
- ➔ General POI Deployment Solution
- ➔ **PTCL POI Deployment Suggestion**

## Ideal POI setting:

-  Each telecom district deploys one POI at least
-  New deploying POI can evolve smoothly to NGN
-  Dual standalone POIs should be deployed if possible
  - Consider dual POI (standalone or combined) to connect other operators when interconnection trunk exceeds 400

## POI Setting Model in one telecom district:

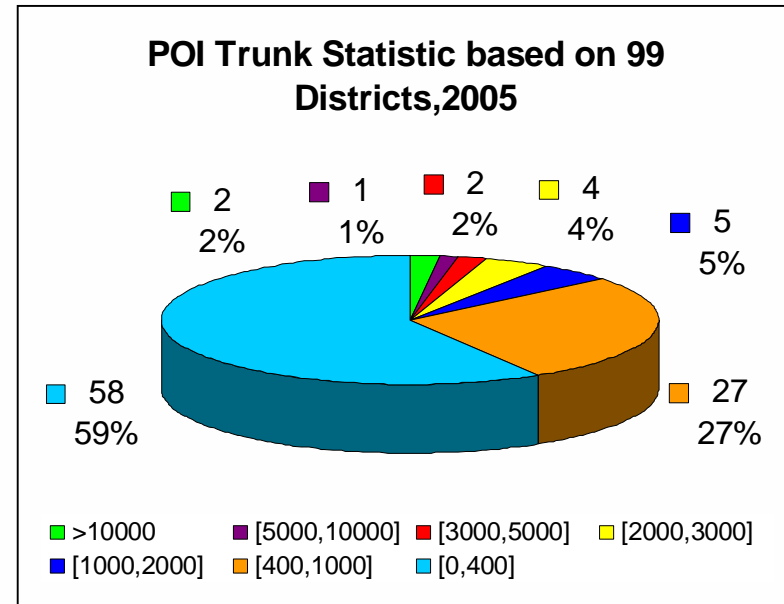
-  M1: Standalone POI
  - Interconnection trunk capacity is over 10K
  - POI trunk capacity is less 10k, but will reach 20k in next 3 years
-  M2: Combined exchange with POI function
-  M3: Exist M1 & M2 in same telecom district





# PTCL POI Requirement Analysis

| Item                                    | Unit   | Parameter  |
|-----------------------------------------|--------|------------|
| Intra-office traffic                    |        | 20%        |
| Inter-office traffic                    |        | 46%        |
| Service traffic                         |        | 7%         |
| National/Int'l traffic                  |        | 15%        |
| <b>Traffic to other operators</b>       |        | <b>12%</b> |
| Average traffic Load Per PSTN Subs      | Erlang | 0.10       |
| Average Call Holding Time Per PSTN Subs | Second | <b>70</b>  |
| Traffic per Trunk                       | Erlang | 0.70       |
| Fixed line Occupied Ratio               |        | 95%        |



Note : There are total 99 telecom districts, three districts' home is unclear in NTR-I, STR-I, WTR who's GW trunk is less than 10

- Based on 2005 PTCL fixed subscribers and traffic parameters above, we get detail trunk number to other operators in **99** districts
- 58** POIs' gateway trunk capacity is less than 400.
- Only POI trunk capacity of Karachi and Lahore exceeds **10000**.



## POI Distribution in Region

| Region       | District  | GW Trunk >10000 | GW Trunk = [5000, 10000] | GW Trunk = [3000, 5000] | GW Trunk = [2000, 3000] | GW Trunk = [1000, 2000] | GW Trunk = [400, 1000] | GW Trunk = [0, 400] |
|--------------|-----------|-----------------|--------------------------|-------------------------|-------------------------|-------------------------|------------------------|---------------------|
| CTR          | 5         |                 |                          |                         |                         | 1                       | 3                      | 1                   |
| FTR          | 7         |                 |                          | 1                       |                         | 1                       | 2                      | 3                   |
| GTR          | 6         |                 |                          | 1                       | 2                       |                         | 1                      | 2                   |
| HTR          | 5         |                 |                          |                         |                         |                         | 3                      | 2                   |
| ITR          | 1         |                 | 1                        |                         |                         |                         |                        |                     |
| KTR          | 1         | 1               |                          |                         |                         |                         |                        |                     |
| LTR          | 1         | 1               |                          |                         |                         |                         |                        |                     |
| MTR          | 11        |                 |                          |                         | 1                       | 1                       | 6                      | 3                   |
| NTR-I        | 11        |                 |                          |                         | 1                       |                         | 4                      | 6                   |
| NTR-II       | 9         |                 |                          |                         |                         |                         | 3                      | 6                   |
| RTR          | 3         |                 |                          |                         |                         |                         | 3                      |                     |
| STR-I        | 8         |                 |                          |                         |                         | 1                       |                        | 7                   |
| STR-V        | 8         |                 |                          |                         |                         |                         | 2                      | 6                   |
| WTR          | 23        |                 |                          |                         |                         | 1                       |                        | 22                  |
| <b>Total</b> | <b>99</b> | <b>2</b>        | <b>1</b>                 | <b>2</b>                | <b>4</b>                | <b>5</b>                | <b>27</b>              | <b>58</b>           |

Planning POI based on districts and GW trunk Requirement



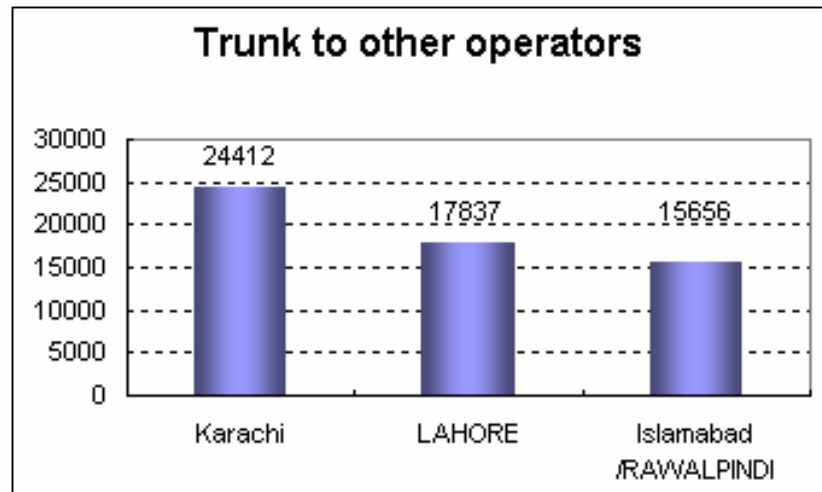
# Dual Standalone POIs Deployment in Metropolis

**Deployment:** a pair of standalone TG POI will be used to interconnect with other operators.

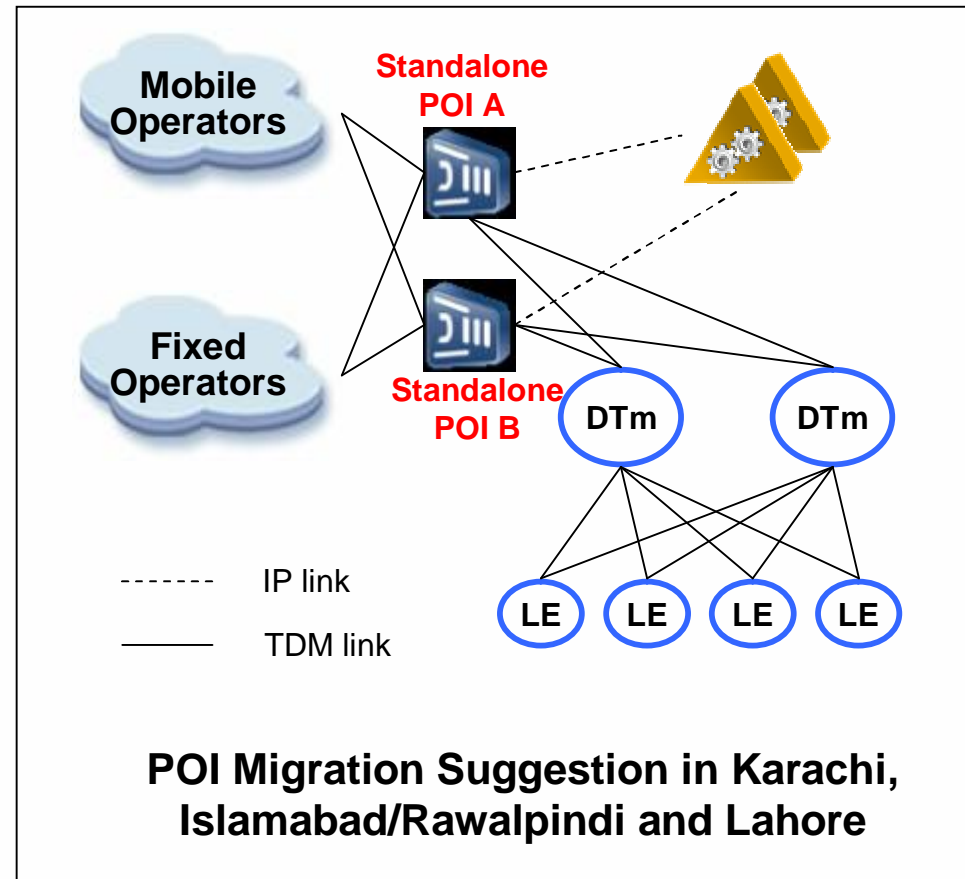
**Application Scope:**

Trunk : 10K-50K requirement for current or next 2 year capacity

Metropolis : KARACHI, Islamabad/RAWALPINDI, LAHORE



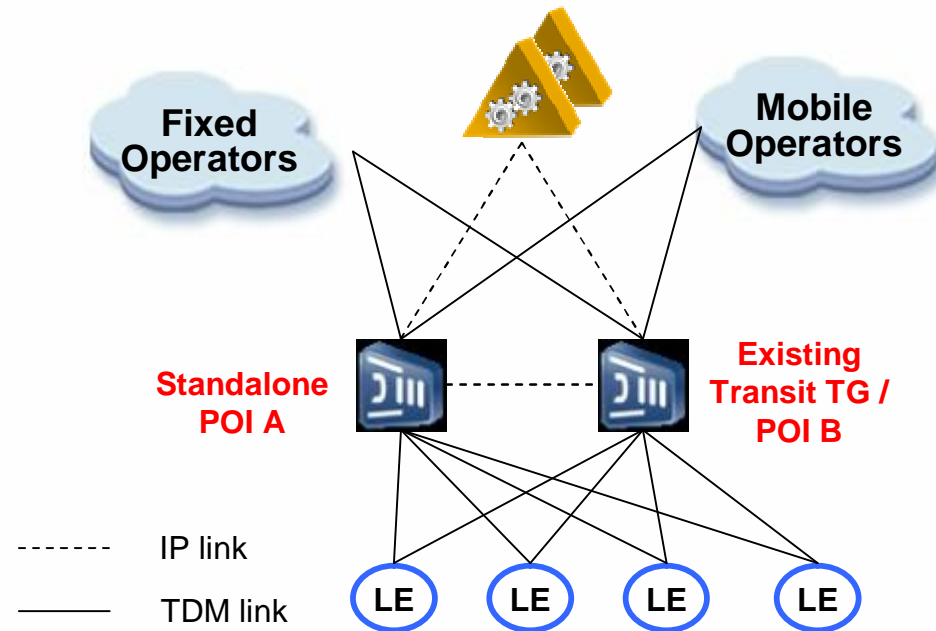
Note : Trunk to other operators statistics based on DTE



Reference : standalone Gateways with 70K-80K trunk capacity are used in fixed network in most of chinese provinces

**Future-Oriented NGN devices will be used to construct new POIs**

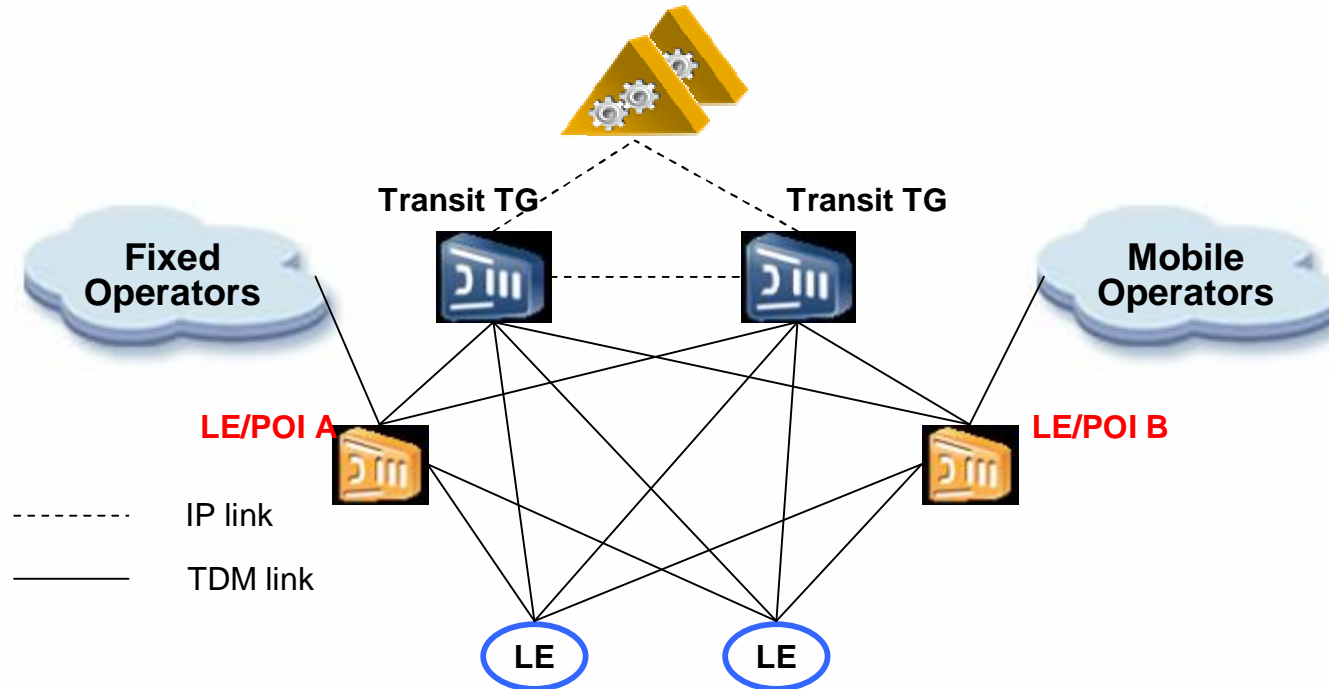
| Region     | District              | trunk to other operators |
|------------|-----------------------|--------------------------|
| FTR        | FAISALABAD            | 4320                     |
| FTR        | SARGODHA              | 1456                     |
| <b>CTR</b> | <b>Sheikhupura</b>    | <b>1200</b>              |
| GTR        | GUJRANWALA            | 3030                     |
| GTR        | GUJRAT                | 2116                     |
| GTR        | SIALKOT               | 2588                     |
| MTR        | MULTAN                | 2058                     |
| <b>MTR</b> | <b>Rahim Yar Khan</b> | <b>1133</b>              |
| NTR-I      | PESHAWAR / CHARSADDA  | 2592                     |
| STR-I      | HYDERABAD             | 1426                     |
| WTR        | QUETTA                | 1059                     |





**Deployment: Future-Oriented NGN devices will be used to construct new POIs**

- one standalone TG POI will be deployed to interconnect with other operators.
- Existing transit TG will add POI functions (For district Sheikhupura & Rahim Yar Khan, if no transit TG, add new TG as POI)

**Application Scope: 1K-5K Trunk**



## Deployment:

-  Select two PSTN LE to migrate to NGN
-  Two new TG will act as LE and POI at the same time

## Application Scope: 400-1000 Trunk

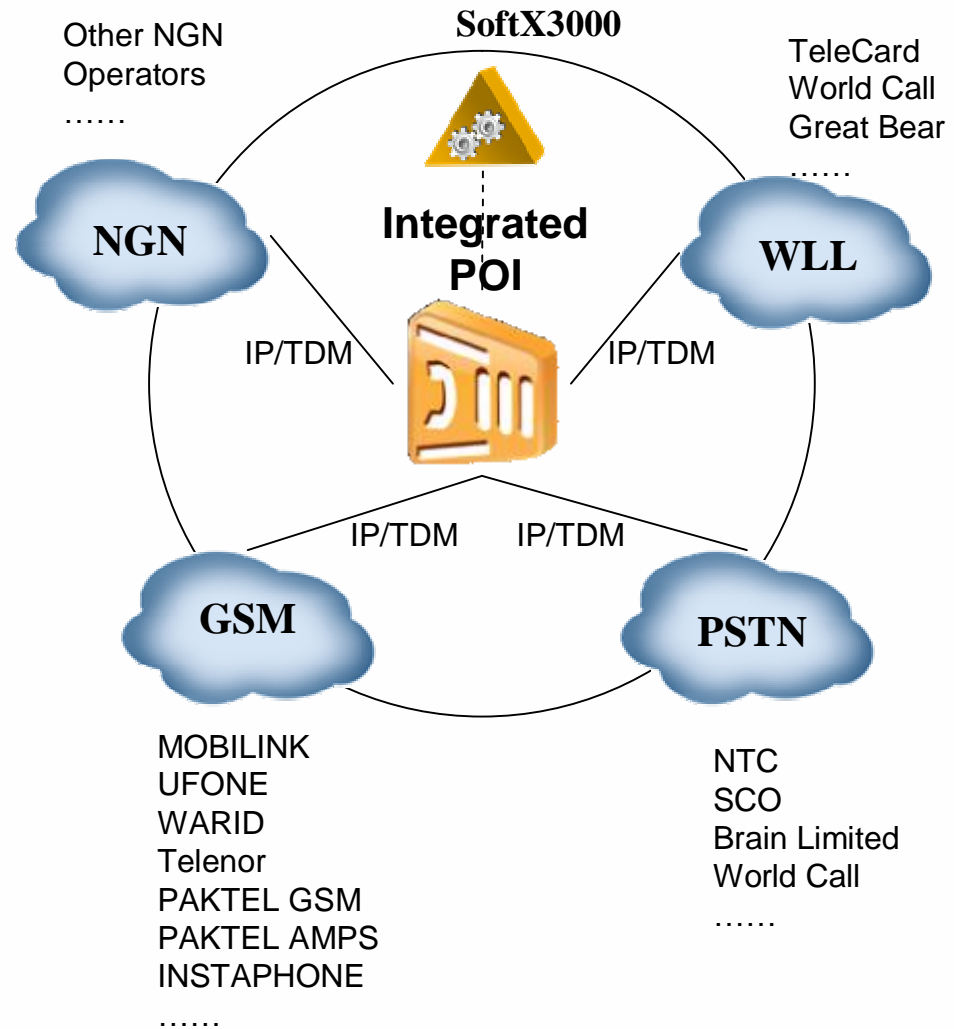


## *POI Deployment in <400 Trunk District*

- ☞ Same Deployment Strategy will adopt as 400-1000 trunk district
- ☞ Only one NGN local exchange (TG) will act as POI
- ☞ With interconnection traffic increase, dual POIs will be constructed.

## POI Performance Demand

- ☞ Powerful charging / Authentication capability between different network
- ☞ Trunk Interface:
  - ☞ FE, GE,
  - ☞ STM-1/STM-4 POS
  - ☞ STM-1 IPoATM
  - ☞ E1/T1, STM-1 SDH
  - ☞ ISDN PRI/BRI
- ☞ Signaling Protocol:
  - ☞ M2UA, V5UA, IUA,
  - ☞ SS7, R2, No.5, DSS1
  - ☞ H.248
- ☞ Multiple Signaling Point Address and Support 2M signaling link





## *Two Big Benefits of New POI Solution*

1. Can satisfy other operator's interconnect requirement because there is one POI at least in each district
2. It is easy to maintain and charge because all POIs are NGN-oriented devices and charging is implemented in Softswitch.





# Thank You



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