Case Study
Small Macro cell Sync Solution

Speakers

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Orange – Egypt (i.e. Mobinil)

- 1st and biggest Mobile Operator in Egypt
- 2G/3G/4G/LTE mobile operator
- Entity of Orange Group since 2012 → 100% shares
OSA & ORANGE : Long-Term Relationship!

- OSA & Orange met in 1997 thanks to NEC
- OSA Products deployed in Orange Network:
  - Cesium
  - SSU : OSA 5548C with PTP cards
  - GNSS receivers : OSA 5240, OSA 5210
  - PTP Grand Masters : OSA 5421 (recently)
  - Probing solution
  - Network Management systems: Sync View+ and FSP NM
- Network Design Services and Others
Heading towards Carrier Ethernet Networks!

- Rapid deployment of Small-cells solutions that is compatible only with IP Backhauling
- Existing plan to Shift all existing RAN to IP with accordance to IP-2020 Program.
- In accordance with the above plan, Transport Network deployments moves from legacy SDH, PDH towards IP-MPLS Network deployment
- Existing TDM synchronisation using legacy PRC/SSU architecture was not suitable any more!
Network Restrictions & explored solutions

- Backhauling capability to handle such Small cell deployment is only through 3rd party HDSL (i.e. Telecom Egypt).
- Part of IP-MPLS cloud is also 3rd Party with unknown PDV performance
- Network is PTP UNaware Network (brown field Network)

Which Solution for best sync performances: SyncE vs PTP?

- SyncE → Not suitable for such Small Cell deployment over HDSL, can only be used for Macro Site Deployment
- PTP 1588-V2 → Suitable for Small Cell deployment but with Unknown Performance over PTP unaware Network/3rd Party leased lines
Adopted Sync Solution

“Proof Of Concept” is necessary to validate achieved Sync. performance over each Scenario
PTP 1588 -V2 Tests & results

**Test 1:** Macro Node-B Through MW link chain with ITUT G.82651 (Frequency Synchronization)

**Test 2:** Huawei ATOM Cell Through HDSL 3rd party (TE) with ITUT G.82671 (Phase Synchronization)
Conclusion

• Successful testing and best approach determined & approved

• Adopted product is **OSA 5421**
  - **PTP Delivery** (Freq. & phase with 512 slaves capacity) with latest ITU-T standards
  - 16X **BITS** outputs
  - **Probing** or real-time monitoring included
  - **NTP** server capabilities

• Solution currently under deployment (phases-based)

• Ongoing 4G design & OSA 5421 may be massively deployed in future **ISA**

Orange Egypt is satisfied with OSA solutions as “USUAL” 😊
Thank you for your attention

Any Questions?

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PTP 1588 - V2 Tests & results (2)

PTP Master Clock (SSU)

RNC

IP/MPLS Router(P/PE)

Core Site

IP/MPLS Cloud (SDH/Cloud)

PTP BC/Probe (5410)

Aggregation Site

MW

GE/FE

Node-B (Full IP)

PTP Slave

PTP Master Chain

PTP Probe/BC Chain

PTP Slave Chain
PTP 1588 -V2 Tests & results (3)

**Core Site**

- RNC
- IP/MPLS Router(P/PE)
- GE
- IP/MPLS Cloud

**Aggregation/Node-B Site**

- PTP Master Clock (SSU)
- GE
- Modem
- GE/FE

- PTP BC/Probe
- GE/FE
- Modem
- GE/FE

- PTP Slave
- Atom Cell

PTP Master Chain

PTP Probe/BC/Slave Chain