CYANCONNODE

Omni IoT

Smart Metering Communication Backbone – Selection and Myth on Total Cost of Ownership

Communication Technology for Smart Metering

- Reliability and robustness
- Performance to meet SLA targets
- Cost – Capex and Opex
- Security, data protection and privacy
- Longevity of solution
- Implementation experience
- Future proof for additional use cases and applications post deployment
- Conformance with published government standards

Reliability and Robustness

RF Network

- A multi-hop mesh network does not require all meters to be within range of a gateway
- Self-forming and self-healing features of a mesh network provide additional resiliency that cellular only solutions cannot provide
- **End-to-end IP based link**. The end device is directly discoverable and addressable by the host computer
- Fix and forget – minimal maintenance system is self-healing and configuring
- Long range to cover large rural area at a lower cost
- Deploy pocket wise to attack the high losses areas to reduce overall state AT&C losses
- Supports an efficient installation process for tens of millions of smart meters – **self-forming, auto registration and device management over the dedicated NMS** of the RF mesh. Roll outs with GPRS will require a centralized SIM management system.

Reliability and Robustness

- A mesh network offers redundancy - when one node can no longer operate the rest of the nodes can still communicate with each other, directly or through one or more nodes
- Choice, convenience, conservation and efficiency
- The prime consideration for choice of communication technology is cost per point. Though GPRS has become relatively cheaper, it is still expensive for mass rollouts and not viable in terms of channel capacity of network operators as well as restricted to scattered customer base
- RF mesh technologies are much cost effective in dense urban deployments than GPRS by a factor of 1.5 to 2. In addition, RF mesh has much lower running costs
- RF technology provides improved data throughput capability – enabling time critical applications (DSM/Load Control/Outage), which require quick transfer of low volume of data through the network
- Use of public network (GPRS/3G) poses the risks of availability and security

RF Network – Coverage & Capacity

CYANCONNODE

External system

CyanConnode Server

IPv6/v4

WAN network (Cellular or Fixed)

D

Sparsely populated Area (Rural & Tea Garden)
D = 400m: Min10 nodes, average distance: 168m
D = 1000m: Min 20 nodes, average distance: 153m

Urban Area : Recommended 200 nodes in mesh network

Performance to meet SLA targets

- **Low success rate** – experience of GPRS-based metering point deployments in India have shown the data collection efficiency is typically 70 – 80% for meter readings on frequent poll basis. Furthermore, this drops down to 50% on 30 minute basis
- **QoS issues** - To optimise the network bandwidth GPRS connections are not kept in context (PPP), they periodically connect with APN and each time connection to HES requires authentication from core GPRS servers which takes minimum 50-60 seconds
- **Self-healing** - in the case of RF, data collection does not stop even in the event of cellular outages. The ability for the network to self-heal and self-form allows smart meters to join another mesh network where backhaul network is available

Standards

- GPRS network in India is IPv4 and not IPv6
- 3G/LTE is IPv6
- RF mesh technology meets IS16444 (Part 1 and Part 2) and IS15959 standards (Part 2 and Part 3) for smart meters and smart meter communications in India, which have evolved over last two to three years
- Narrowband RF mesh technology provides IPv6 6LoWPAN and various Routing Protocol for Low Power Network standards and is fully compliant with all requirements of published standards

Security

CYANCONNODE

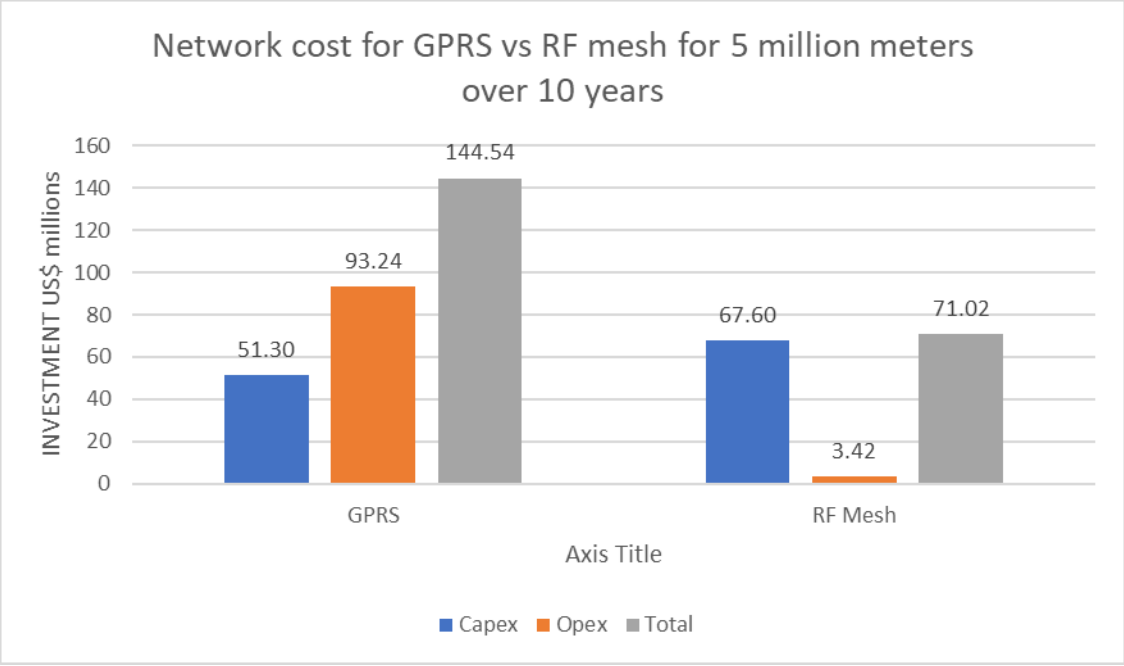
GPRS – negatives

- Fake identities: Someone takes the identity of a meter
- Tamper with communication: Someone tampers with the communication sent between the HES and meters.
- Cellular Jamming
- Repudiation: Meter denies receiving a message or sending a message.
- Eavesdropping: Someone eavesdrops on communication between a meter and the HES

RF mesh - positives

- Encryption (AES128)
- DTLS Sessions
- Public Key Infrastructure(PKI) over IPv6
- Certificate based security
- Hardware Security

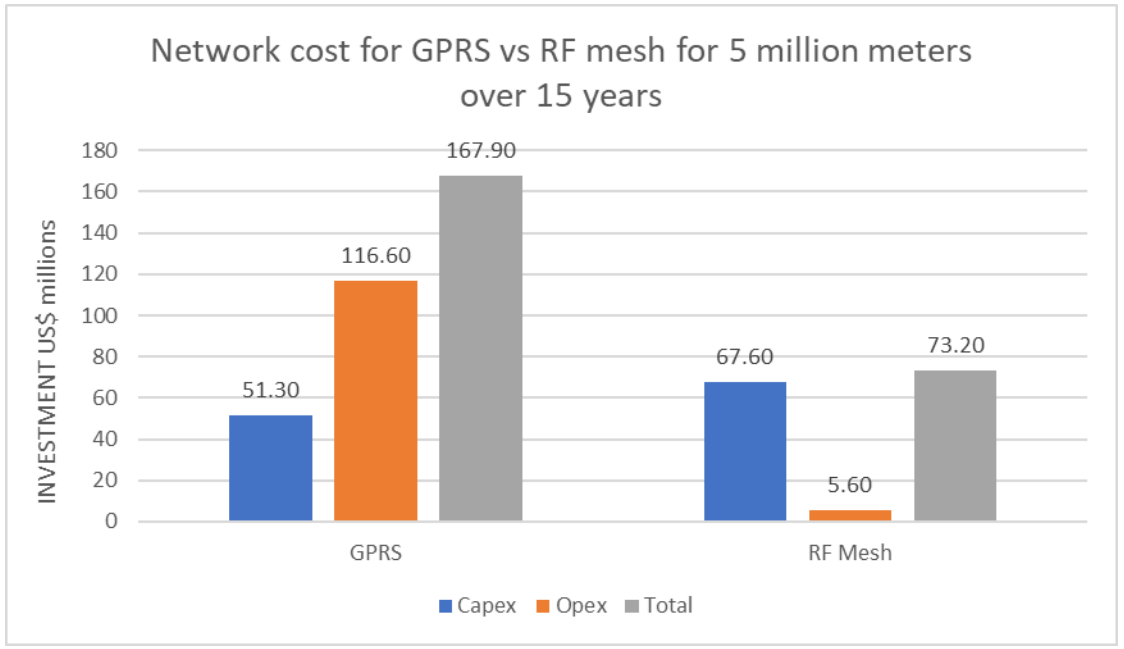
Total Cost of Ownership in 10 years



- Difference in TCO is US$ 73.52 million over the period of 10 years.
- Investment cost for RF Canopy & RF Module is US$71.02 million.

Total Cost of Ownership in 15 years

CYANCONNODE



- Difference in TCO is US$ 94.7 million over the period of 15 years.
- Investment cost for RF Canopy & RF Module is US$73.20 million.