CYANCONNODE

Omni IoT

10th Cambridge Cleanpower Smart Grids Conference
July 2019
www.cir-strategy.com/events

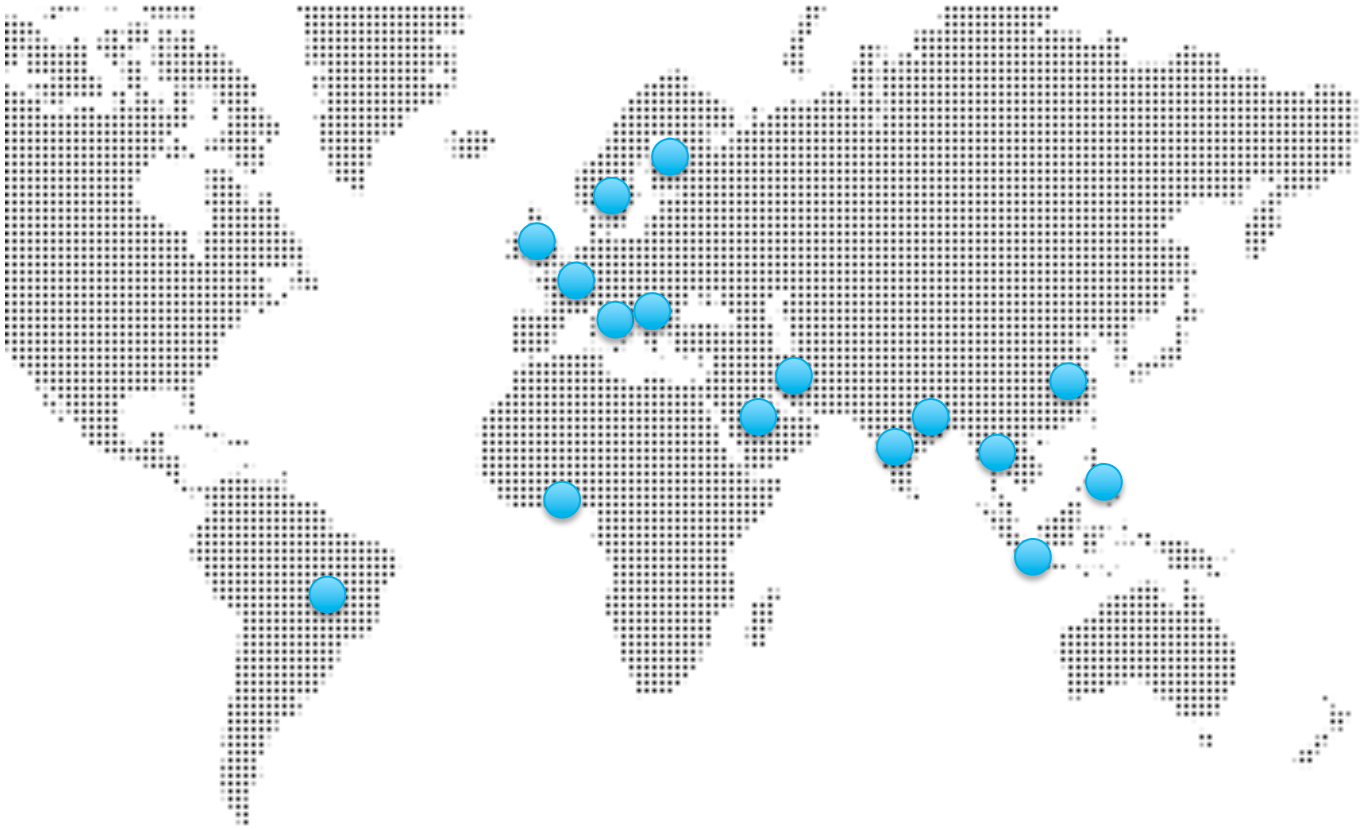
Agenda

- CyanConnode Introduction
- Omnimesh Solution
- Case History (India)
  - Status 2012 to 2019
  - Feeder Loss Reports
- Deployment Challenges
  - Required Services
  - Service Level Agreements (SLA)
- Omnimesh Advantages
  - Meeting the SLA

About CyanConnode
Overview

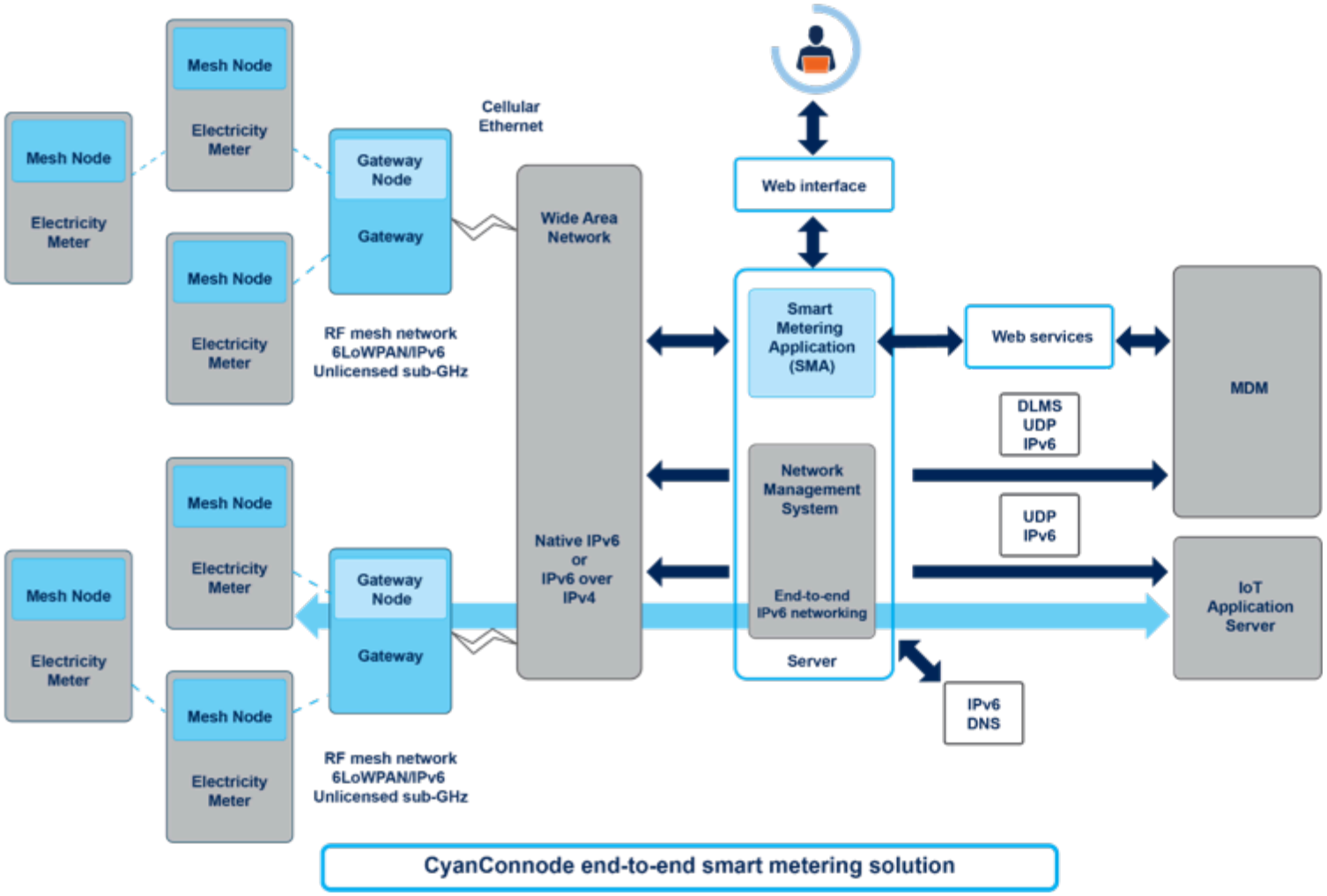
- CyanConnode is a world leader in Narrowband RF mesh networks for IoT
  - Experience in radio technology: development and deployment
  - System integration expertise (remote device to server)
  - 1m devices deployed worldwide
- CyanConnode's Omni IoT platform and Omnimesh networks deliver:
  - An integrated platform for multiple communication technologies
  - Secure M2M communications on IPv6 6LoWPAN radio mesh
  - Cost effective, spectrum efficient, narrowband radio
  - Data intelligence for multi-application networks
  - Resilient scalable solutions (smart city / national infrastructure)
- *Service companies can use Omni IoT to improve their customer's experience and reduce operational costs*

About CyanConnode
Pilots and Deployments



Locations include: Bangladesh, Brazil, China, Europe, Ghana, India, Indonesia, Iran, Philippines, and Thailand

Omnimesh Solution
End-to-End Architecture



Omnimesh Solution
Characteristics

SELF CONFIGURING

The nodes determine the best route to the gateway. Either directly or routed through another node

MULTIPLE HOPS

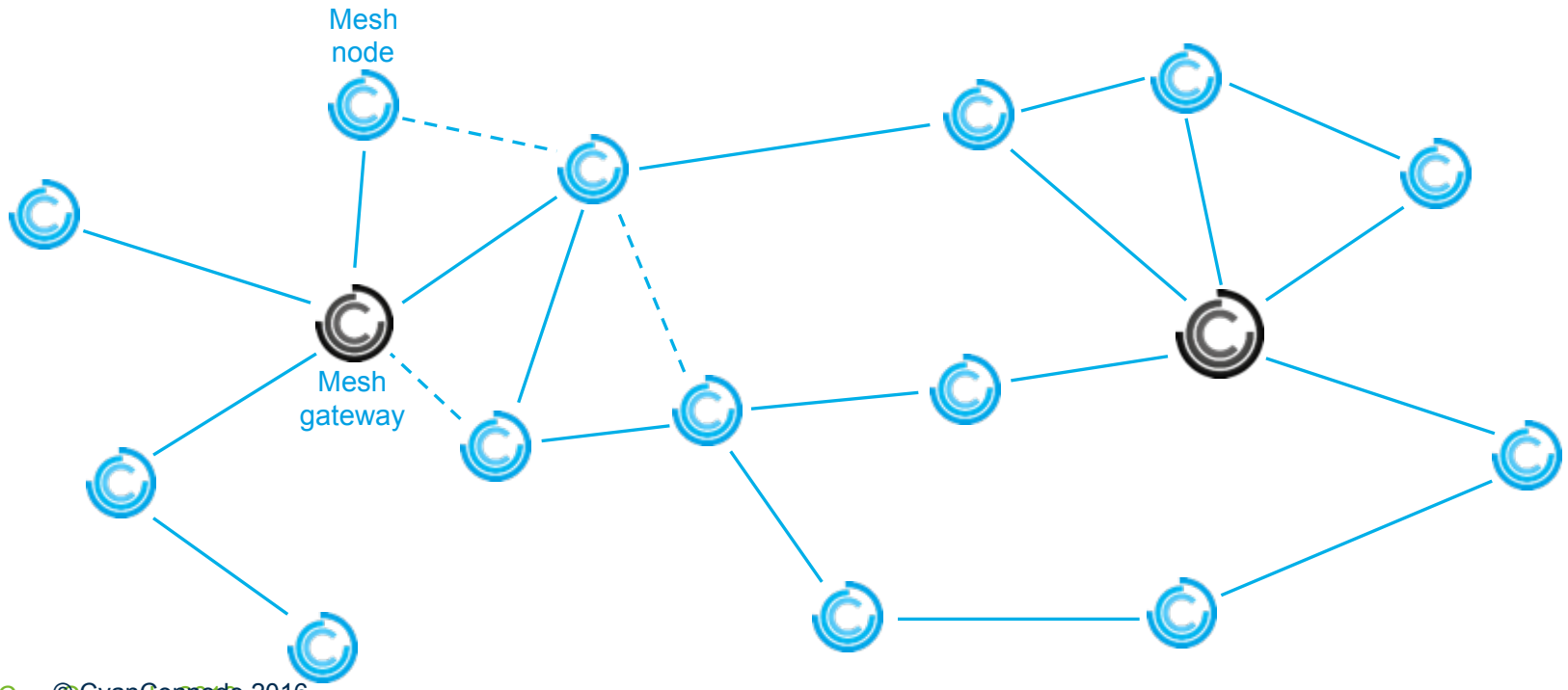
Traffic can be routed through another mesh node before reaching the gateway

SELF-HEALING

If a node becomes unavailable or a gateway loses its backhaul connection, the network will rearrange itself automatically

CONSTANTLY OPTIMISING

The nodes will constantly try to optimise the network topology by evaluating the radio conditions to neighbouring nodes



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Case Study
India Status 2012

- Electricity demand exceeding supply
- Overloaded network infrastructure
- Rapid population growth
- Expansion of dense urban populations
- Remote villages difficult to connect
- Regular outages / rolling blackouts
- High levels of electricity theft and tamper
- Tough environmental conditions
- Western standards: unsuitable
- Western products: too expensive

Case Study
India Status 2012

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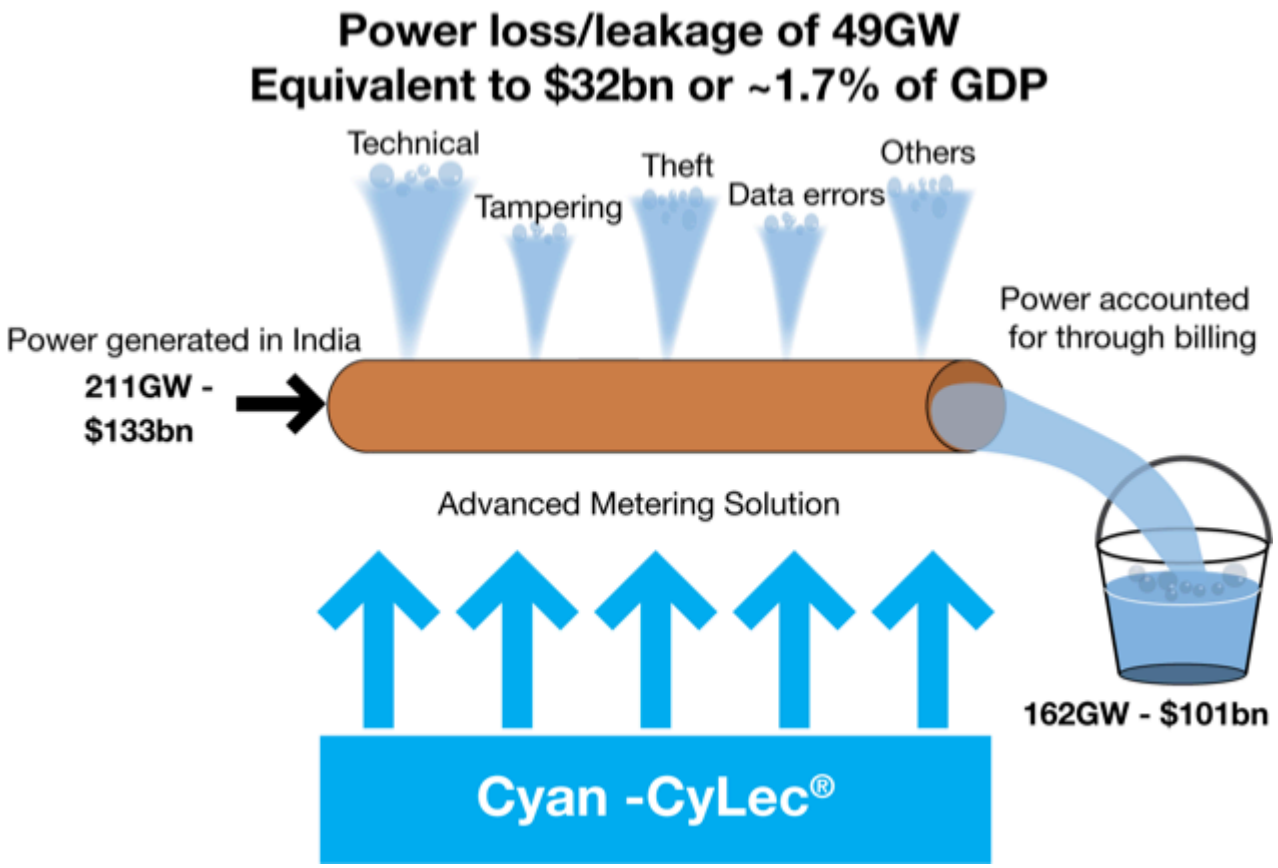

Frost & Sullivan's Inputs on India's Crippling Power Infrastructure, Published: 24 Aug 2012
http://www.frost.com/sublib/display-market-insight-top.do?id=265368525

Case Study
CESC, India

CESC Mysore / Enzen Global Solutions - India

Client: CESC Mysore

Go-to-market partner: Enzen Global Solutions

Location: Mysore, India

Value: £1.0m

Winner of a Platinum Award for Best Smart Grid Project at the ISGF Innovation Awards in India
– March 2018

DCU and meters in mesh network

Background	• Partnered with Enzen to deliver smart meters to Chamundeshwari Electricity Supply Corporation Limited (CESC Mysore) that provides electricity to five districts in the Indian State of Karnataka • This project is the first of 14 smart grid pilots funded by MoP to be rolled out • is to deliver facility management services for years post deployment
Challenges & Requirements	• A project of this type had never successfully been completed in India • Local infrastructure limitations and disparate property layouts
Solution	• Provided over 21,000 smart meters and associated hardware and software. CyanConnode will provide facility management services for a 2 year period post deployment.
Benefits	• The system is achieving over 97% data availability • Reduce the cost of meter readings, and aggregate technical and commercial losses • Improve peak load and power outage management
The Future	• The project has been declared ‘Go Live’ and formally handed over to the utility. • Project has become a valuable reference for the wider Indian Smart Grid community (first AMI project in India), and now holds a leading position in the Indian market • Energy Minister DK Shivakumar has visited the first phase

Leading position in the India market

Case Study
MPWZ, India

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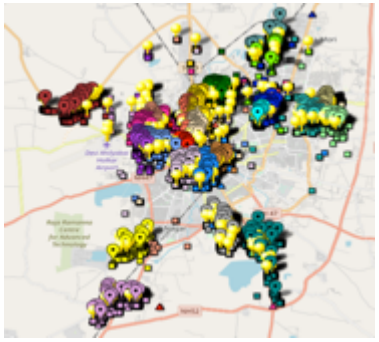
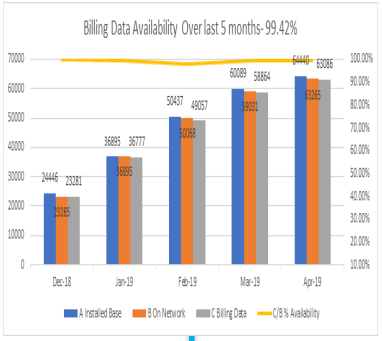
MPWZ/ L&T- India

Client: MPWZ, Indore
Go-to-market partner: L&T
Location: Indore, India

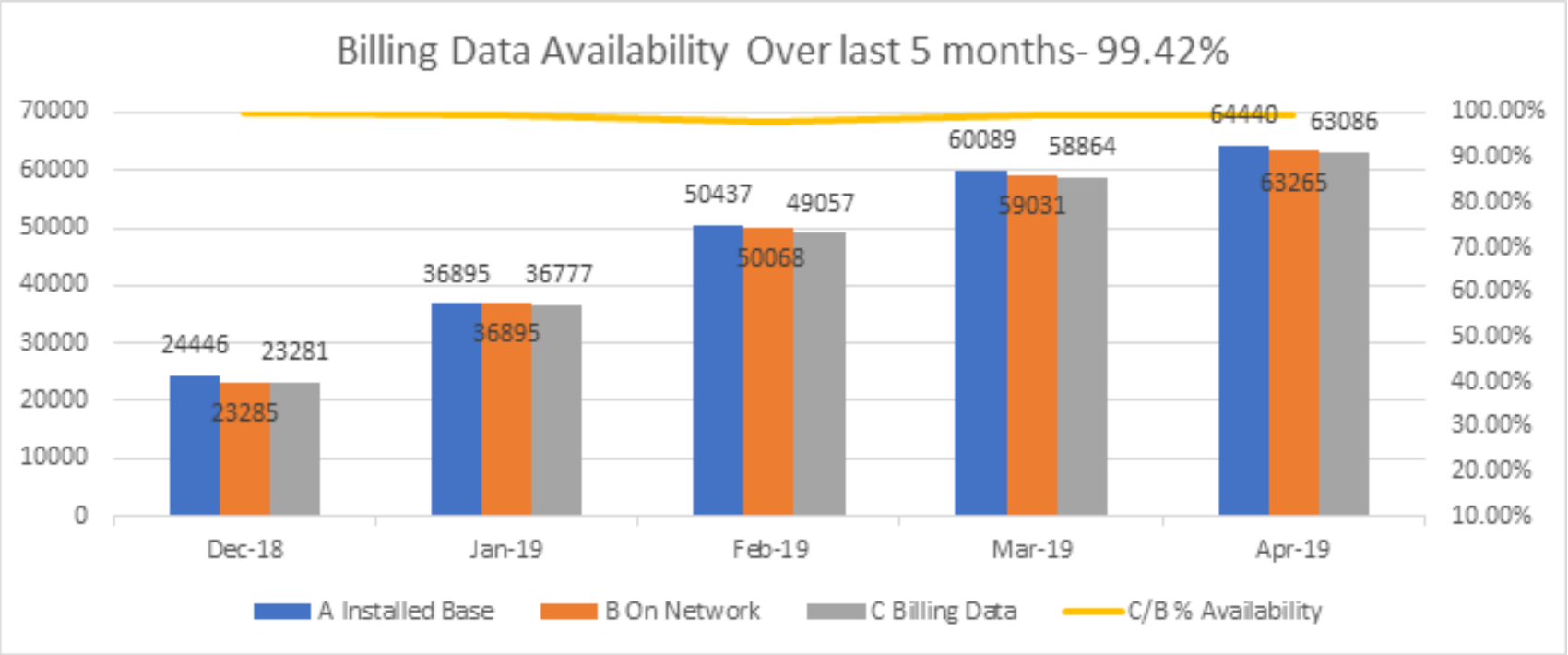




Billing Data Availability over last 5 months – 99.42%

Background	• Partnered with L&T to deliver smart meters to MPWZ that provides electricity to Indore city • Largest Smart Meter Project in India • is to deliver facility management services for 5 years post deployment
Challenges & Requirements	• Cellular Coverage • Site Not Ready in Some cases • Consumers are reluctant, Apprehension of electricity charge increase • Legacy Metallic Boxes for Meter installation • Resource Optimization • Managing interests of Utility persons while implementation
Solution	• Provided over 120,000 smart meters and associated hardware and software. • Till Date 67,500 smart meters have been deployed
Benefits	• Improvement in Billing Efficiency and reduction in losses • 100 % correct bills without any human intervention by seamless integration of XML files with RAPDRP billing system. Resulting in reduction of bill related complaints • Effective Disconnect / Reconnection. • Theft Detection & revenue Protection:- Real time alerts in case of occurrence of tamper events (Magnet, Meter cover open, switch weld etc.) helps in detecting theft cases. • Increased Customer Satisfaction:- For customer satisfaction mobile app is being developed which will help customer in monitoring his consumption pattern

Case Study
MPWZ, India



Case Study
UGVCL, India

UGVCL/ GENUS- India

Client: UGVCL, Gujarat

Go-to-market partner: Genus

Location: Naroda, Gujarat

Hon. Minister of Energy Shri Saurabh bhai Patel cut the ribbon and officially inaugurated the Smart Grid pilot project at the Company's SCADA Center, Gandhinagar.

Background	• Partnered with Genus to deliver smart meters to UGVCL that provides electricity to Gujarat • is to deliver facility management services for 3 years post deployment
Challenges & Requirements	• Cellular Coverage • Consumers are reluctant, Apprehension of electricity charge increase • Legacy Metallic Boxes for Meter installation • Resource Optimization • Managing interests of Utility persons while implementation
Solution	• Provided over 23,760 smart meters and associated hardware and software. • All meters deployed. UAT is in progress.
Benefits	• Achieving ~99.5% Service Level Agreement as per CEA Guidelines • Improvement in Revenue collection, defaulters have started paying outstanding bills • Improvement is attending faults at site • Customer acceptance

Case Study
UGVCL, India

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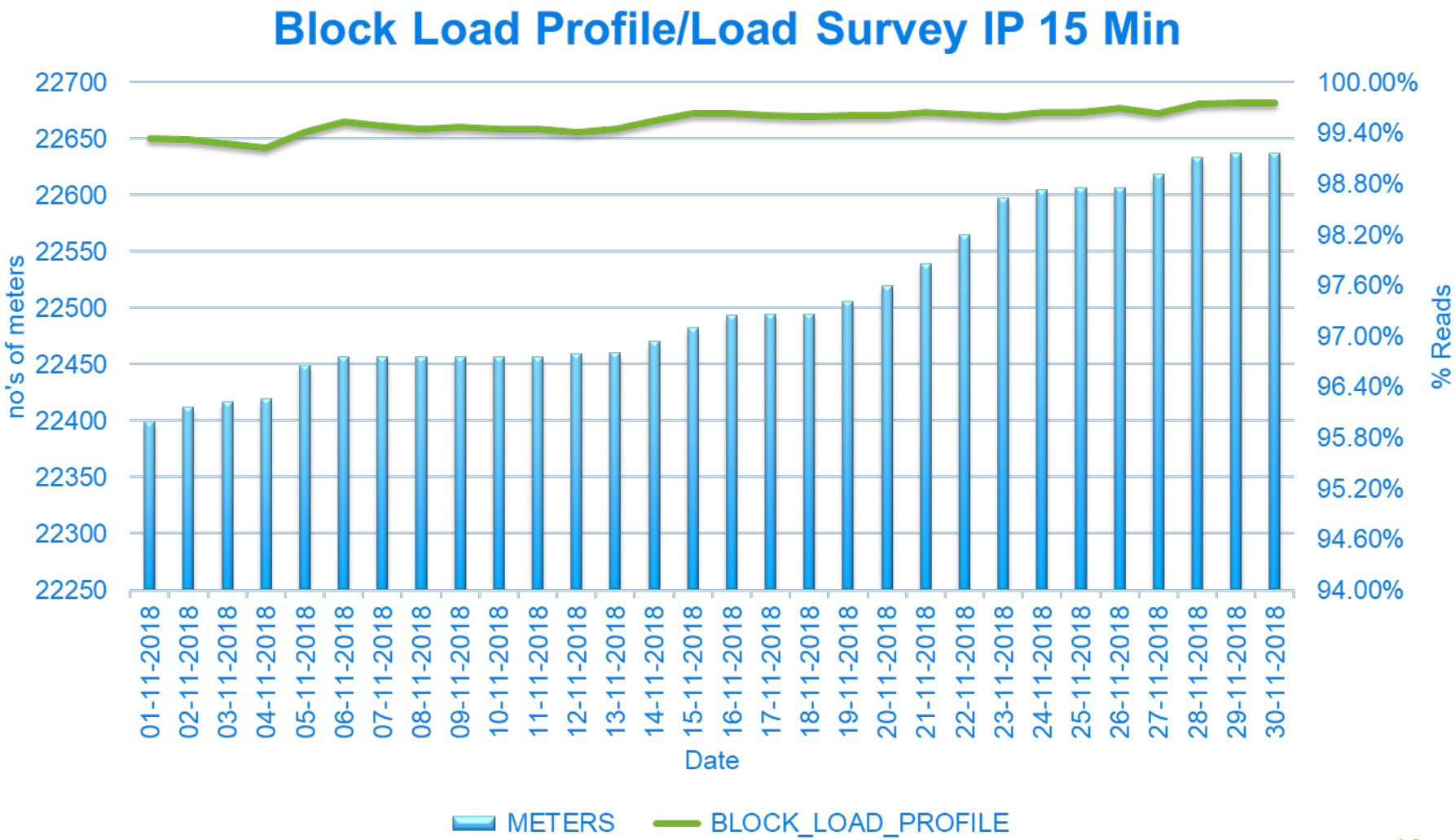

Case Study
UGVCL, India

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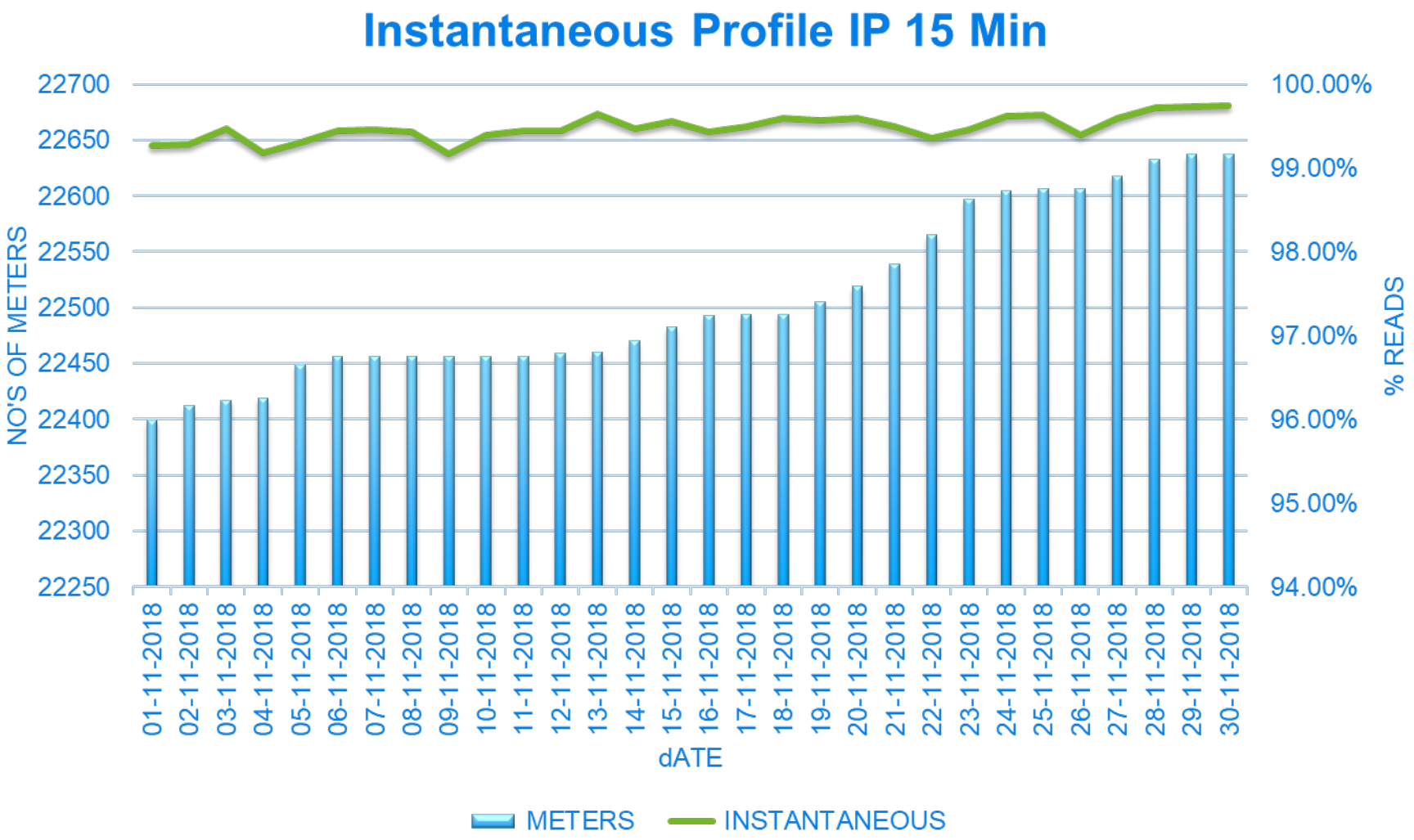

Case Study
India, Feeder Loss Report

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Date	11KV Feeder	Connections	Input	Units Sold	Billing Efficiency	Sold Units Increase	Additional Revenue (USD) Feeder	Connection
Baseline	Feeder A	1,205	347,600	279,610	80.4%	-	-	-
Aug-18	Feeder A	1,205	297,200	234,719	79.0%	-	-	-
Sep-18	Feeder A	1,205	290,000	263,220	90.8%	30,060	2,798	2.32
Oct-18	Feeder A	1,205	351,062	313,746	89.4%	31,392	2,922	2.42
Nov-18	Feeder A	1,205	293,000	272,941	93.2%	37,369	3,478	2.89
Baseline	Feeder B	2,015	886,460	661,565	74.6%	-	-	-
Nov-18	Feeder B	2,059	956,400	694,599	72.6%	-	-	-
Dec-18	Feeder B	2,059	782,400	686,859	87.8%	102,964	9,584	4.65
Baseline	Feeder C	4,354	1,138,000	705,589	62.0%	-	-	-
Sep-18	Feeder C	4,394	1,120,548	705,589	63.0%	-	-	-
Oct-18	Feeder C	4,410	1,134,806	891,725	78.6%	188,145	17,513	3.97
Nov-18	Feeder C	4,410	850,000	751,978	88.5%	224,978	20,942	4.75
Baseline	Feeder D	3,794	1,036,800	661,565	63.8%	-	-	-
Oct-18	Feeder D	3,741	1,030,000	544,330	52.8%	-	-	-
Oct-18	Feeder D	3,747	1,074,172	694,599	64.7%	-	-	-
Dec-18	Feeder D	3,747	892,000	810,250	90.8%	241,065	22,439	5.99

Unit Price	6.50	INR
Unit Price	0.09	USD
Exchange Rate (USD/INR)	69.83	USD

Deployment Challenges
Utility Service Requirements

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- Advanced Metering Infrastructure: Typical Use Cases

Future Services:
- Net metering (integration of renewable)
- Load forecasting and levelling

Advanced Services:
- Remote tariff updates and prepayment
- Improved network and power quality monitoring

User Services:
- Transparency of power usage to consumers
- Basic remote management (connect/disconnect)

Revenue protections: meter to cash
- Near real time outage and tamper detection
- Accurate and timely data for customer billing
- Robust communication security architecture

Deployment Challenges
Service Level Agreements

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1	All interval data from minimum 95% of meters within 8 hours after midnight
2	All interval data from 99.9% of meters within 24 hours after midnight
3	On-demand meter reading data from 90% of meters within 1 hour
4	On-demand meter reading data from 99% of meters within 2 hours
5	On-demand meter reading data from 99.9% of meters within 6 hours
6	Load control at 95% of meters within 5 minutes
7	Load control at 99% of meters within 10 minutes
8	Remote connect/disconnect at 90% of meters within 10 minutes
9	Remote connect/disconnect at 99% of meters within 1 hour
10	Remote connect/disconnect at 99.9% of meters within 2 hours
11	Alarms for loss of supply and outage detection within 5 minutes for 90% of meters
12	Up upgrade the firmware of 99% of meters within 24 hours
13	Upgrade the firmware of 99.9% of meters within 36 hours
14	Remotely read the event logs at 90%of meters within 30 minutes
15	Remotely read the event logs at 99% of meters within 1 hour
16	Remotely read the event logs at 99.9% of meters within 6 hours

1m+ meters with 1mbyte image

Extract from a recent AMI tender

Omnimesh Advantages
Meeting the SLA

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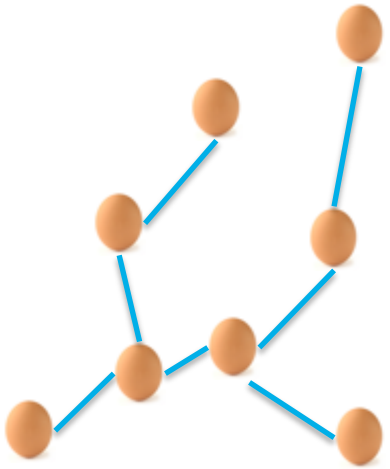
The Omnimesh Stateless Gateway

- Easy to route traffic around a failing gateway
  - Manages cellular network and power outages
- No gateway storage of end user security credentials
  - No single point of attack for hacker
- Easily installed
  - Simple attachment to street post
  - Zero commissioning
- Low cost equipment
  - Very competitive cost model



Network Management System
Networks Can Be Beautiful

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