CEMS – Data Acquisition Systems

How Technology is solving challenges to bring a shift in Regulatory Practices

LogicLadder, Gurgaon
Energy & Environment Intelligence Company

Agenda

- CEMS – CPCB Initiative & Compliance Guidelines
- How technology paradigm has changed
- Security & Scalability
- CEMS Application Snapshots
- Challenges Ahead

CPCB Initiative for central monitoring

Data driven environment management

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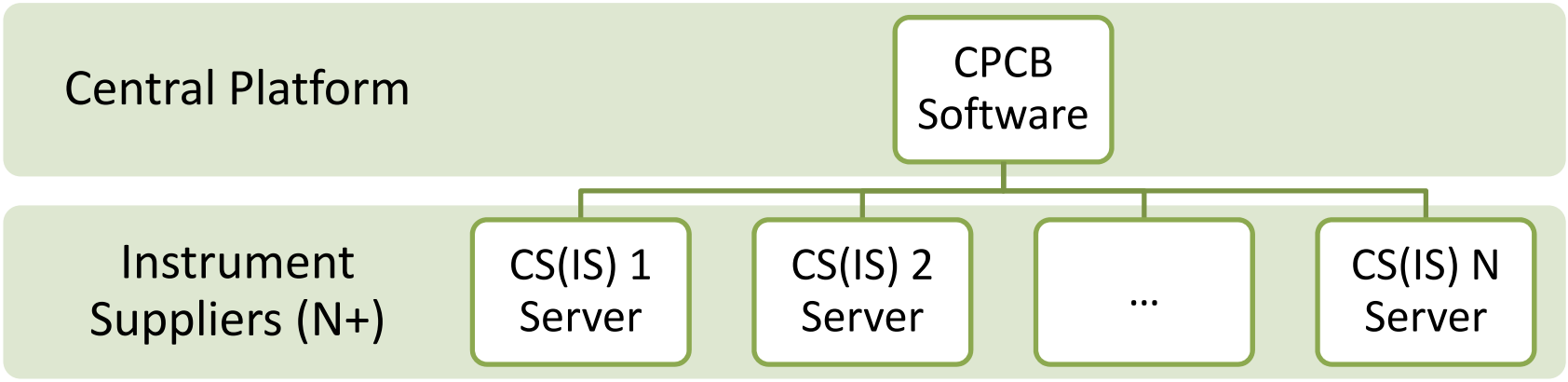
Central Platform At CPCB

- Acquire data from 22 categories of polluting industries, in a modular and analyzer agnostic way.
- Make data available to various stakeholders.



The Instrument supplier layer makes market open for any analyzer or software company to provide solution to the Industry /OEM without changes in existing analyzers.

The CPCB Guidelines for CEMS Data Acquisition

What's required?

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Real time monitoring without any intermediary PC

Accurate timestamps

Two way communication (For on demand calibration & Diagnostics)

Data logging in case of communication failure

Multi tenancy and user access – SPCB, CPCB & Data Generator (Industry) …

Auto report and auto mail generation

Change request and workflow management for managing analyzer downtime/maintenance and data change requests.

Real time video streaming for ZLD industries

Real time alert over email and SMS.

CEMS DATA ACQUISITION: How technology paradigm is changing?

INTERNET 1.0

Client Server -
Request response

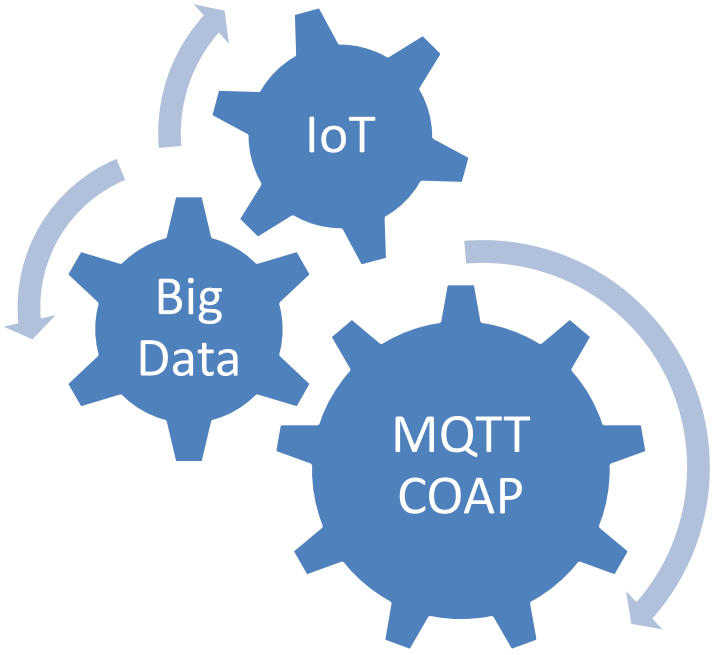
HTTP

REST API

FTP

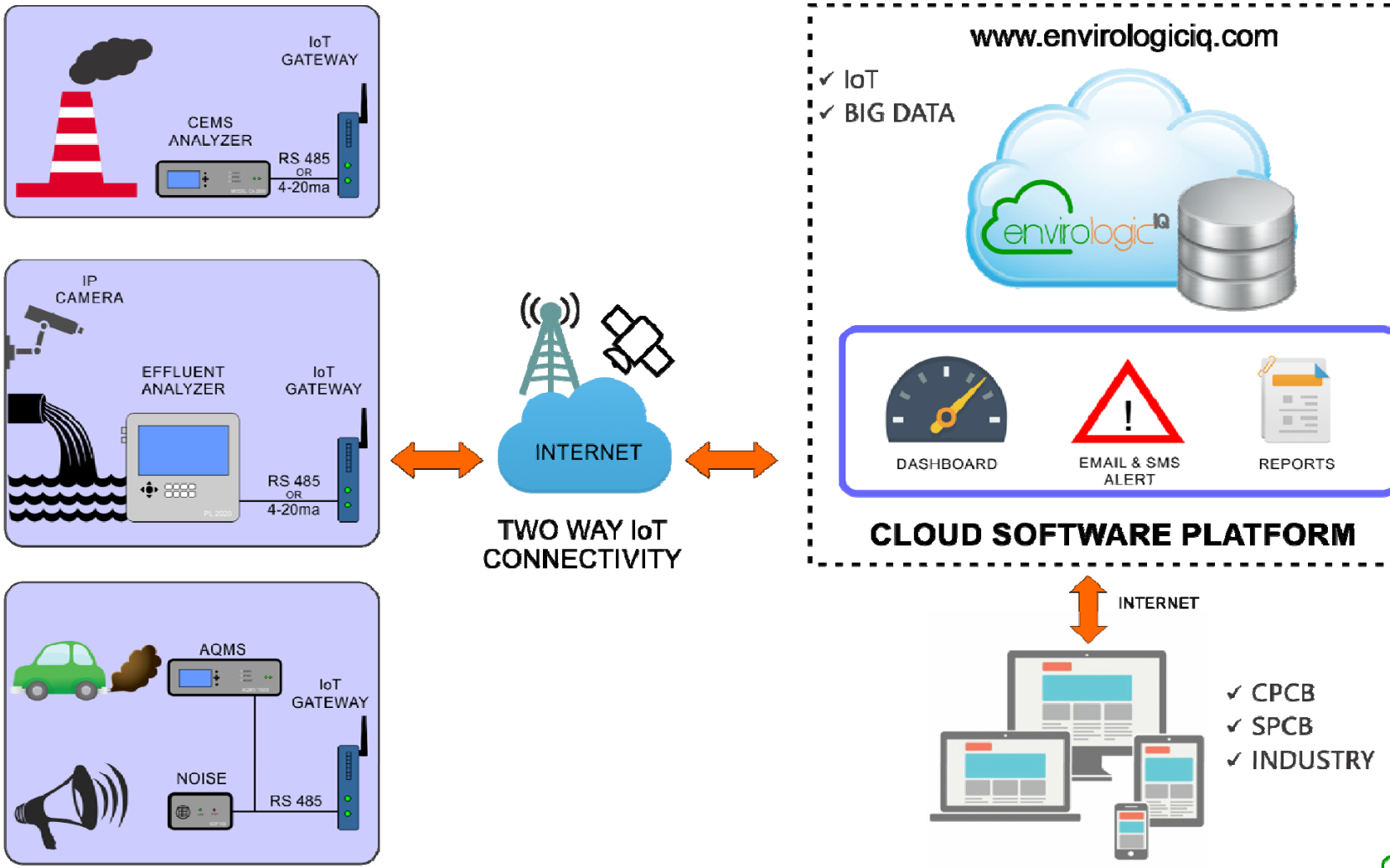
INTERNET 2.0

IoT - Persistent Connectivity with Push Messaging



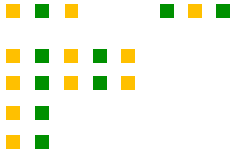
How it Works?

Internet of things (IOT) or Machine to Machine (M2M) platform for remote monitoring, control & management of environment monitoring stations and analyzers over GPRS, satellite and broadband.

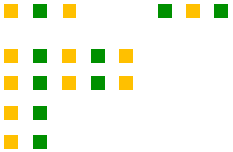


Data AcquisitionSoftware Platform : What to look for ?

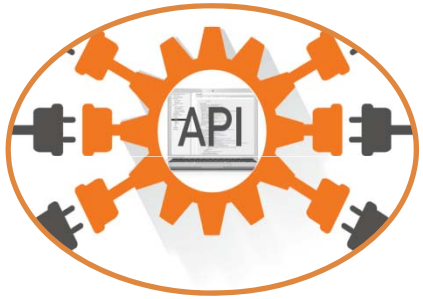
- Should be highly available
- All layers of data transmission should be secure
- Intelligent alarm system
- Scalable
- Reliable
- User Access Control
- Audit logs



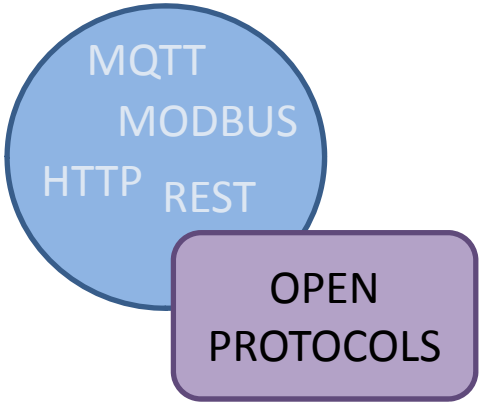
How secure and scalable is it?



Store large amount of data



Share information with multiple stakeholders



Support any device

SCALABLE & RELIABLE

Makes Communication Reliable

Local Logging on Device to Safeguard against Network issues.

NTP

Makes time stamps accurate

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SECURITY & INTEGRITY

Device to Server Secure Communication

Audit Logs

Data Signature

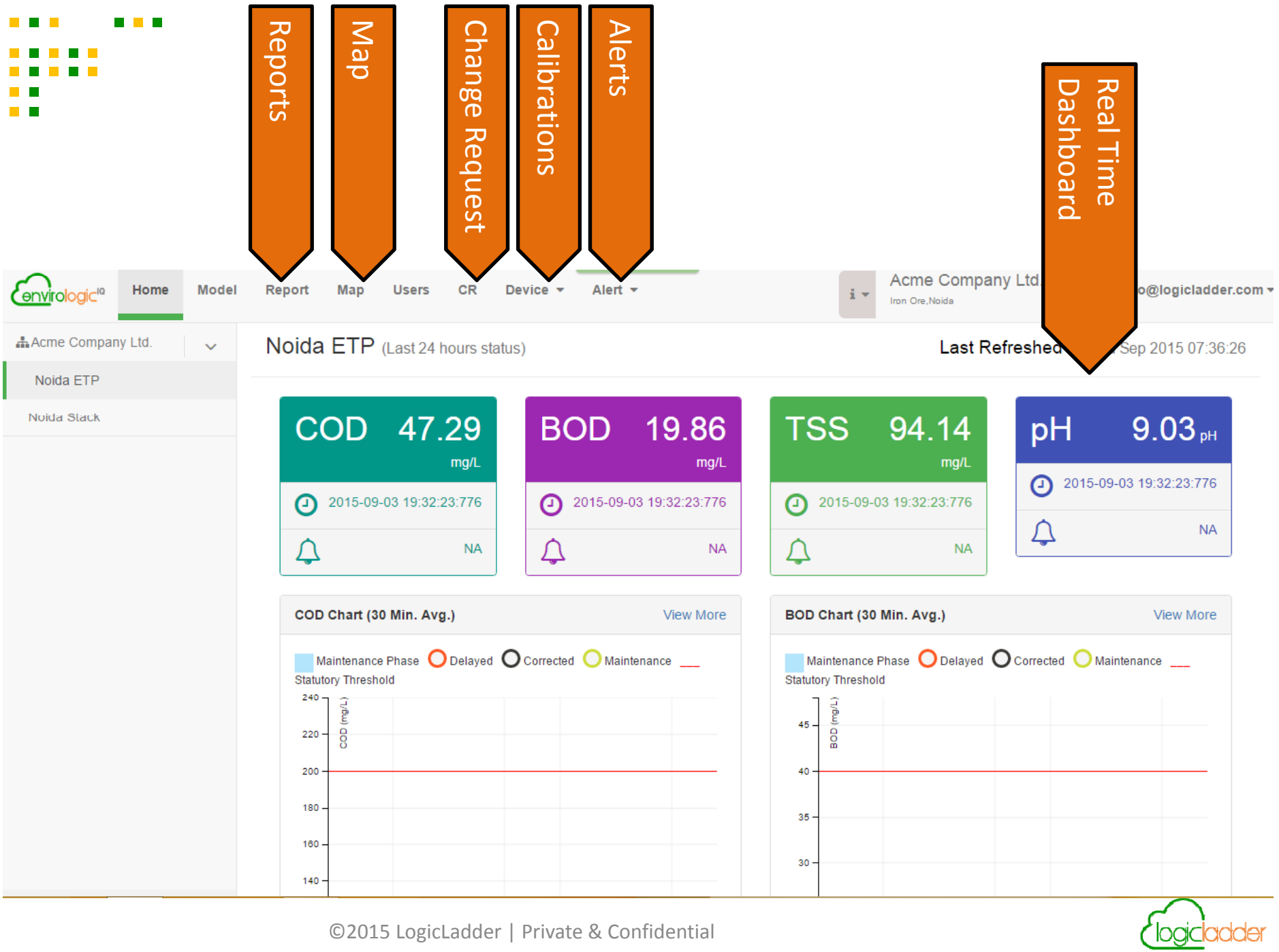
Data Integrity and Validation Test

No fixed IP. Secure streaming.

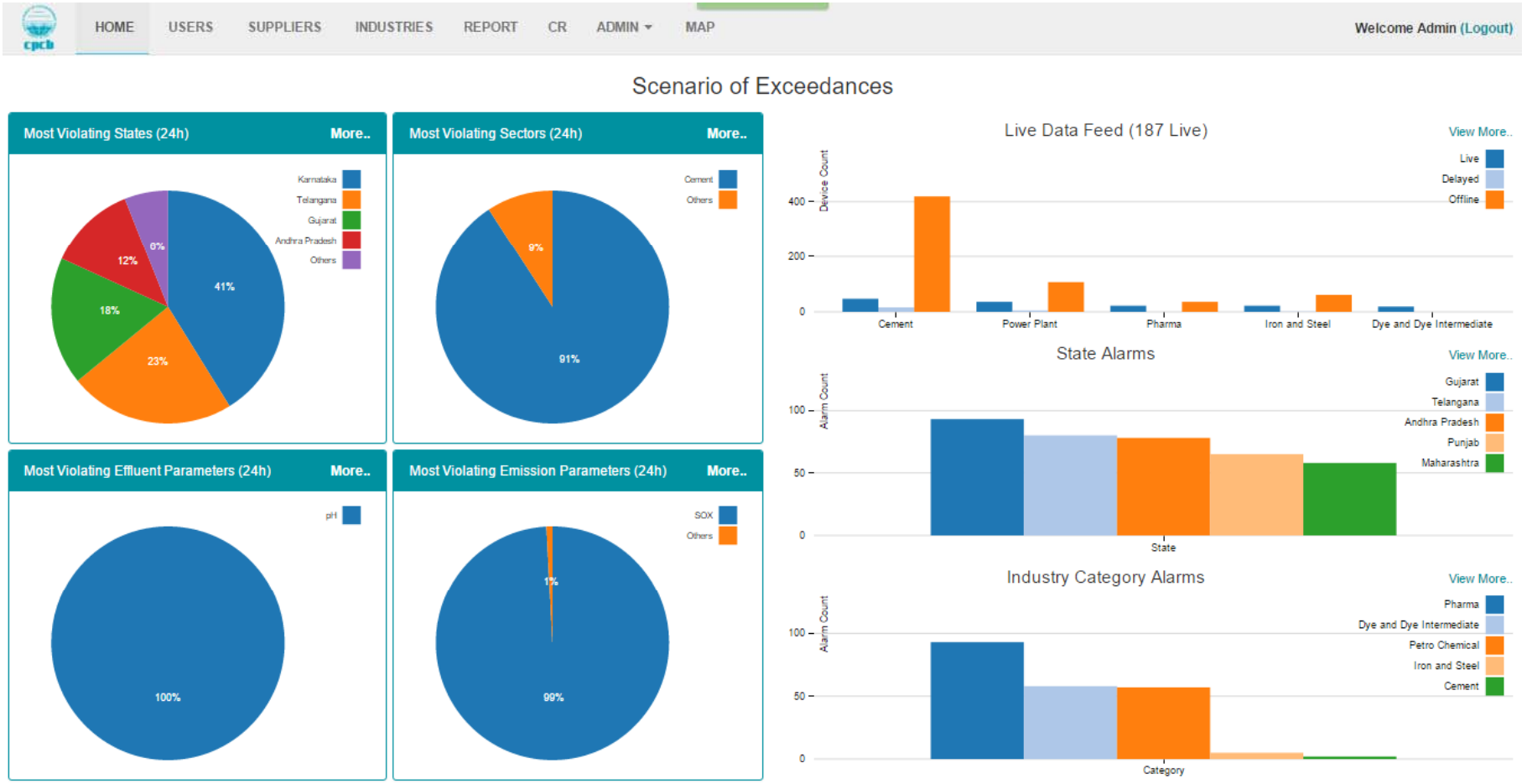
Fraud Analytics

CPCB Application Snapshots

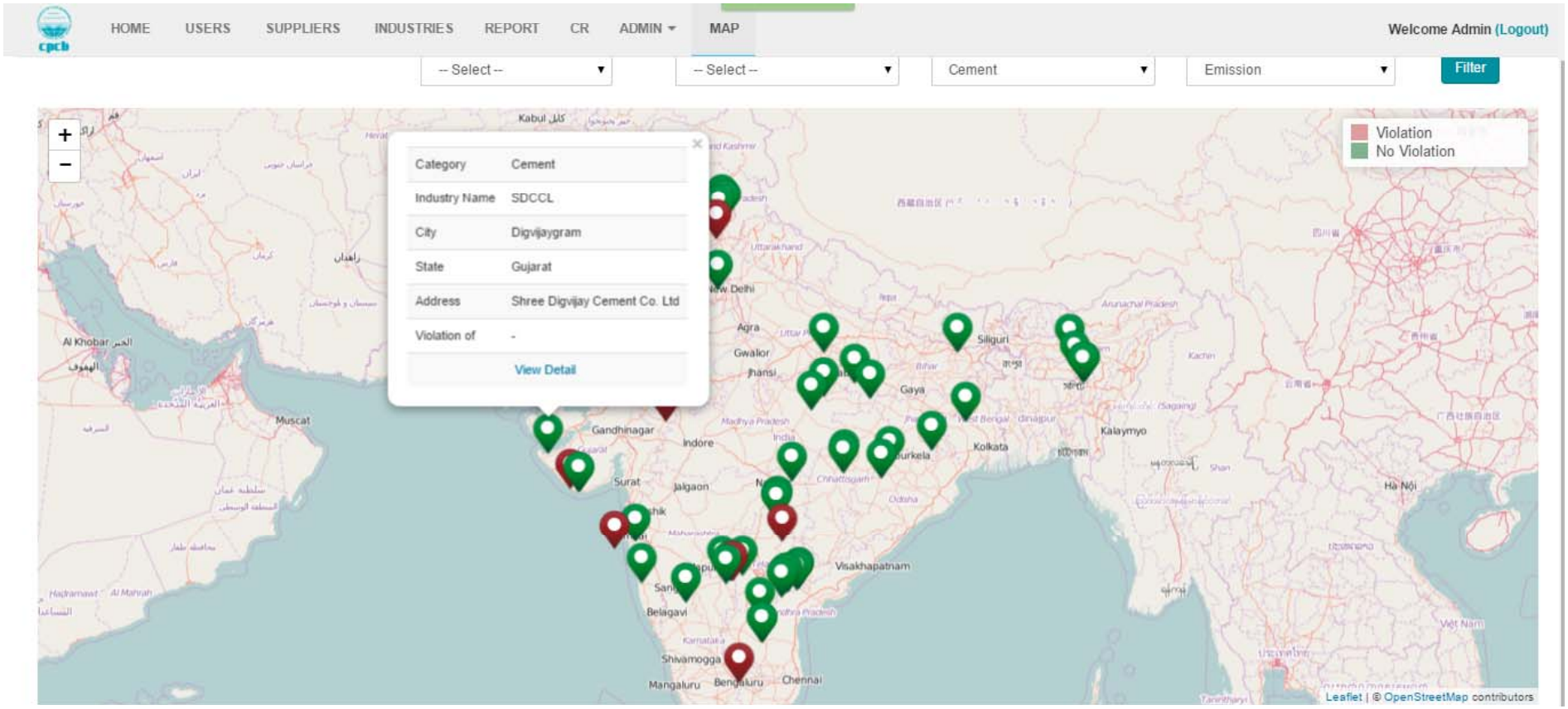
A sneak peek into the platform



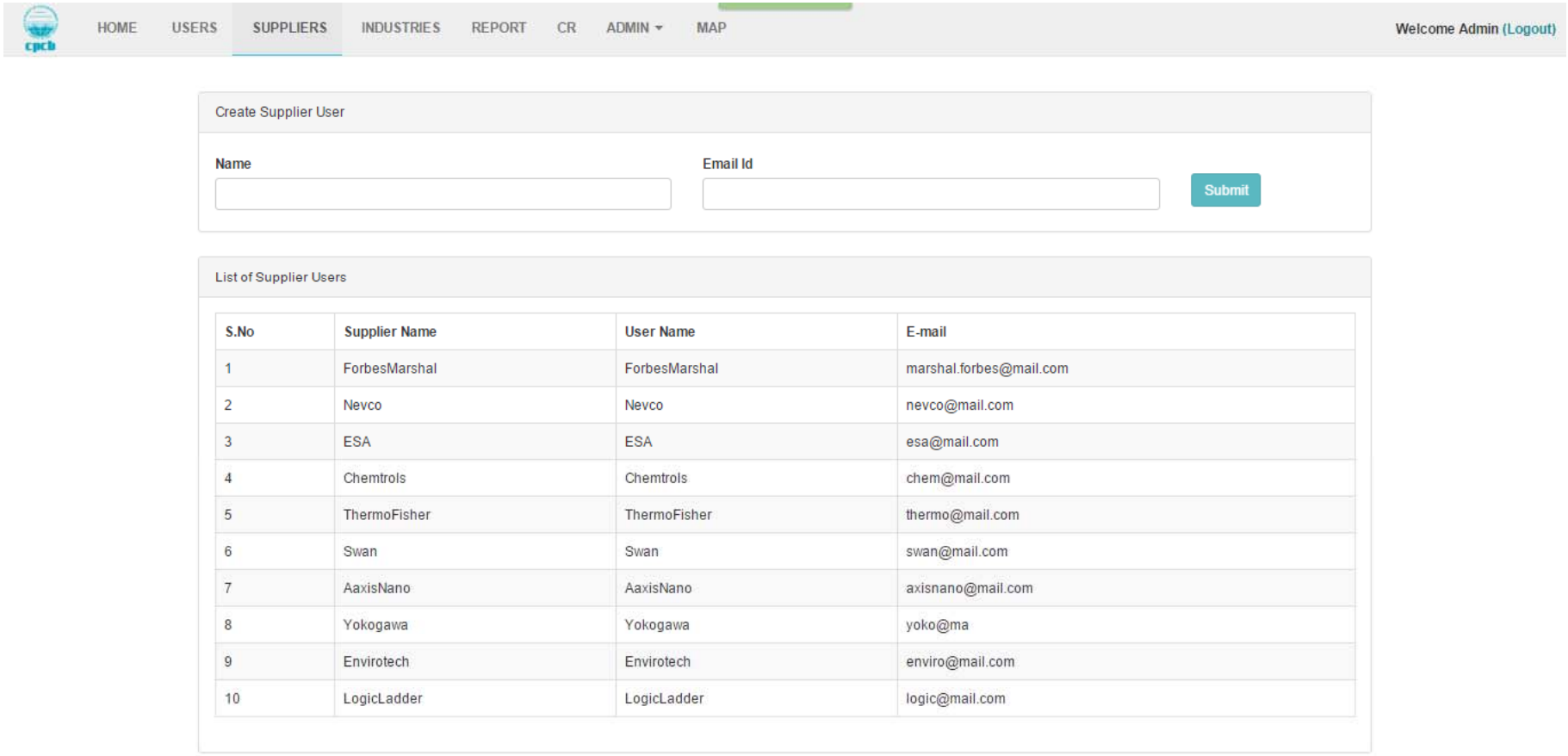
Dashboard – Quick snapshot of Country Scenario



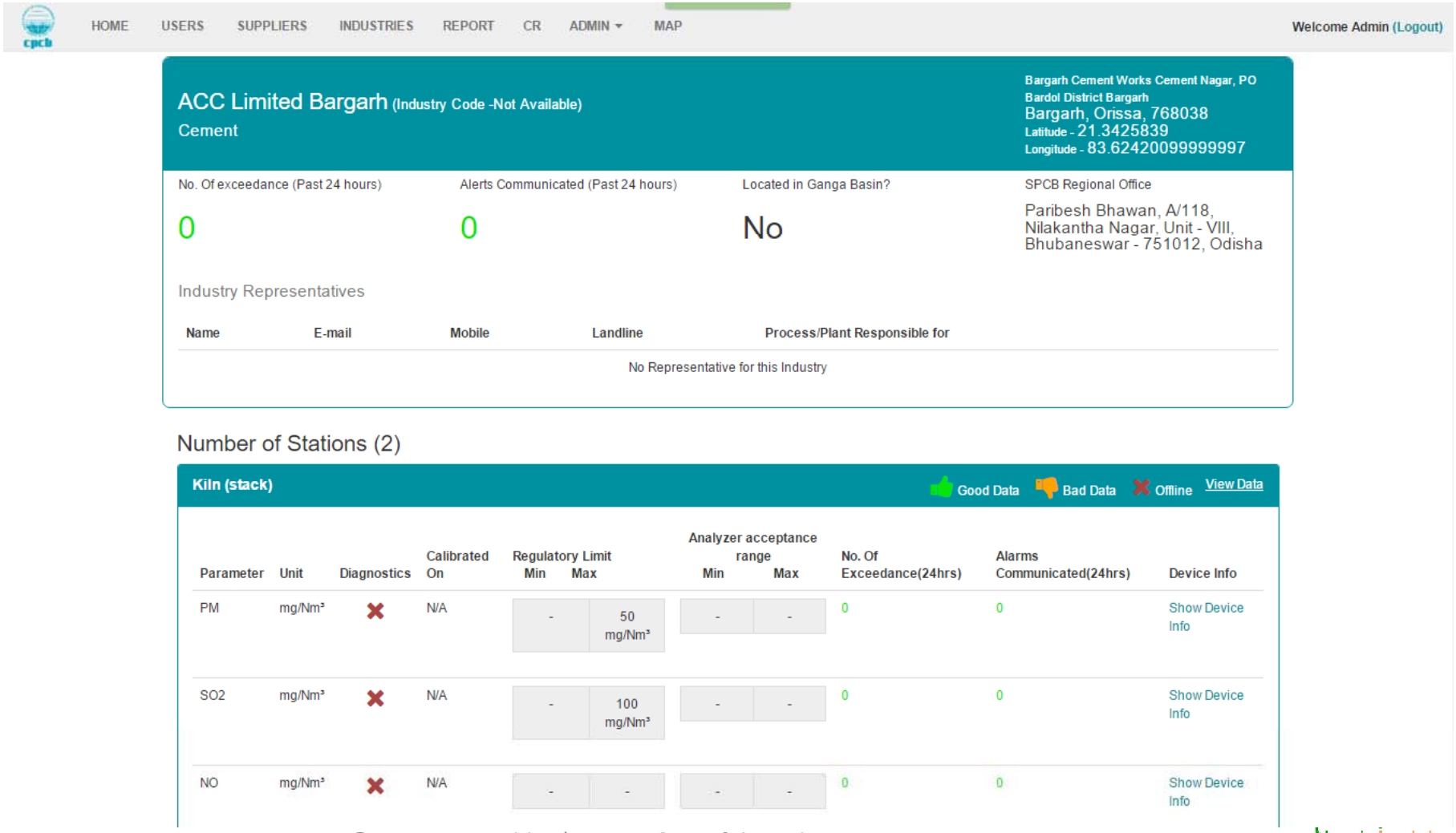
Map View – Easy Location of Industries



Hardware – All models supported



Industry Dashboard – Single centre view of all parameters



Challenges Ahead

Challenges

Limitations in delivering 99.99% real-time uptime	99.99% SLA requires multiple actors to work perfectly – Analyzer, Network, Software. Is it possible?
Dependence on third parties	Communication of data depends on Internet (mobile & broadband) which is owned by third parties. How do we ensure 99.9% SLA from them?
Gap between Reality and Expectations of Industry Uses, Regulators	100% data uptime, except for a downtime of some days allowed in a year for maintenance. Is this possible for the Industry to achieve?

Challenges

Incompatible CEMS analyzers	Not all CEMS hardware provides all the information that may be required by an online system
CEMS communication interfaces	Not all analyzers have digital output, 4-20 mA /analog outputs do not provide diagnostic information
Tampering of Data	Tampering of data at Analyzer or instrumentation level is difficult to stop.

Conclusion – Way Ahead

- Use CEMS data for emission trading and other business benefits
- Integrate the CEMS/AQMS data in public domain for health advisory
- Use data to predict environment impact

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THANK YOU

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