# UNIFYING GRID INTELLEGENCE: Securing Bangladesh Infrastructure with Doble Cloud Analytics via BNX Networks

**Executive Summary**

As national power utilities accelerate digital transformation, bridging offline diagnostic testing with real-time online telemetry is vital for grid resilience. **M2K Technology & Trading Co.** presents a unified systems architecture that combines the predictive power of **Doble Enterprise Cloud** with the operational technology (OT) cybersecurity wrapper of **BNX Networks Inc.**

This integrated framework streams cloud-based artificial intelligence insights directly into localized control rooms—including the **Power Grid Company of Bangladesh (PGCB) National Load Dispatch Center (NLDC) ABB Ability™ platform**—while maintaining zero-trust cyber resiliency and strict data sovereignty.

## 1. The Analytics Core: Doble Enterprise Cloud & FRANK™ AI

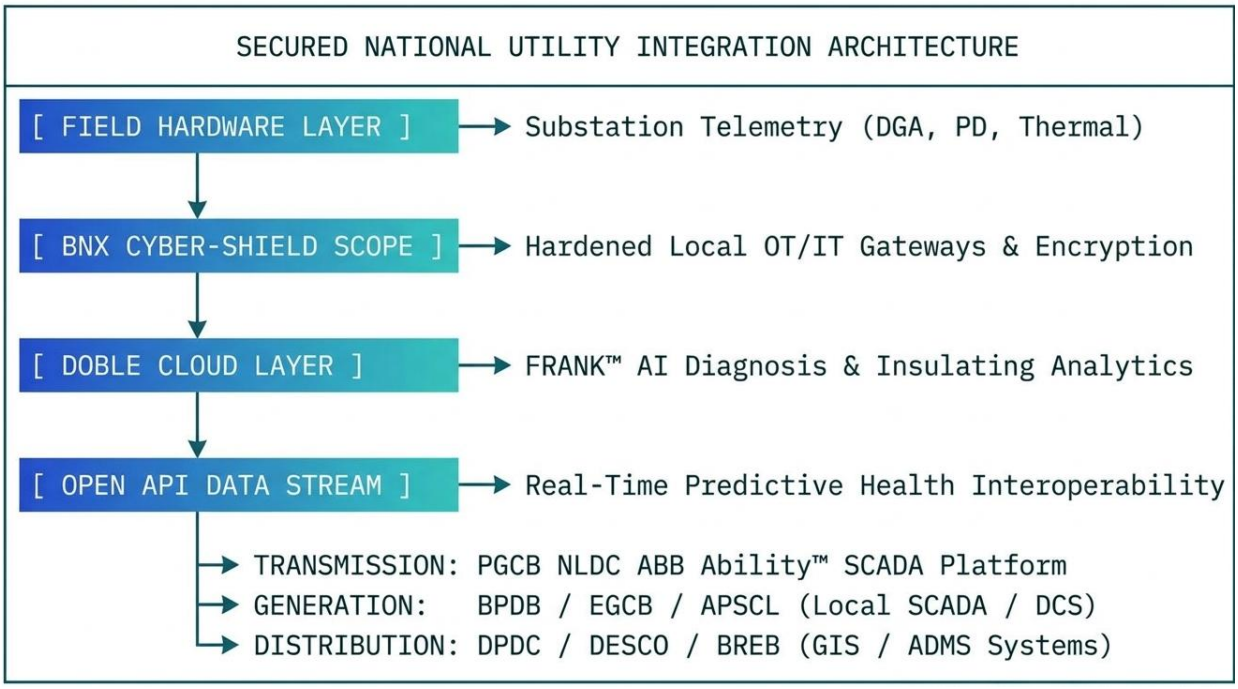
At the center of global grid intelligence is the **Doble Global Benchmark Database**, housing over **80 million high-voltage asset test data points** collected over decades. Built upon this cloud ecosystem are specialized analytics tools designed to predict equipment health before catastrophic failures occur:

- **FRANK™ AI (First Response Analytics Knowledgebase):** An expert artificial intelligence engine sitting on top of the Doble database. FRANK™ automatically ingests field test results, evaluates them against global benchmark curves, and generates immediate asset health recommendations for utility engineers.
- **INSIDEVIEW® (Insulating Liquid Analytics):** Tracks and trends more than 130 structural laboratory test parameters on liquid and solid insulation. It delivers advanced Dissolved Gas Analysis (DGA), oil chemistry tracking, and paper degradation forecasting.

- **dobleARMS™ (Asset Risk Management System):** Bridges offline field diagnostics with real-time telemetry, delivering a geospatial view of grid asset health, criticality, and commercial failure risk across centralized workstations.
- **DTAWeb Framework:** Enables field crews to securely upload test files from Doble diagnostic sets directly into private cloud repositories for rapid cross-comparison against standard asset models.

## 2. Open API Interoperability:-Sector-Wide-Data Harmonization

Doble Cloud operates via a secure, RESTful **Open API Architecture** (JSON/XML payloads), transforming diagnostic metrics into standardized data streams. This architecture feeds directly into existing enterprise Work & Asset Management solutions—such as **IBM Maximo®, SAP®, Oracle®, and Cascade™**—as well as specialized control systems across Bangladesh's power sector:



- **Transmission (PGCB):** Automatically streams real-time transformer health indices into PGCB's NLDC SCADA system, allowing dispatchers to balance power loads against actual equipment risk profiles.
- **Generation (BPDB, EGCB, APSCL):** Feeds thermal and partial discharge predictive matrices into Distributed Control Systems (DCS), safeguarding generation step-up transformers and turbines from unexpected trips.
- **Distribution (DPDC, DESCO, BREB):** Integrates asset risk forecasting with Advanced Distribution Management Systems (ADMS) and GIS mapping to optimize preventative field maintenance.

# 3. The Cybersecurity Wrapper:

# BNX Networks Hardened OT/IT Perimeter

Moving critical state telemetry to a cloud platform requires absolute adherence to national cyber-resiliency mandates (NERC CIP v6, NIST SP 800-82, and the Bangladesh Cyber Security Act). To insulate PGCB's core control networks from public exposure, **BNX Networks Inc.** acts as a localized cyber shield and zero-trust gatekeeper:

1. **Substation Edge Protection:** BNX deploys hardened local firewalls at the substation boundary, ensuring raw telemetry is encrypted in hardware-accelerated **AES-256** before crossing any network threshold.
2. **Local Data Reservoir:** BNX establishes secure, on-premise data lakes inside utility data centers, preserving local mirror backups to guarantee complete national data sovereignty.
3. **Cross-Domain DMZ Filtering:** The Doble Cloud API never connects directly to the core SCADA network. Instead, a BNX Cross-Domain Security Shield operates inside a segmented Demilitarized Zone (DMZ), sanitizing data payloads and enforcing token-authenticated handshakes before feeding the **ABB Ability™** platform.

# 4. Cryptographic Security & Protocol Matrix

To satisfy utility technical review committees and cybersecurity auditors, the integrated Doble-BNX architecture enforces strict cryptographic controls across every data state:

| Data State / Process | Protocol / Technology | Cryptographic Primitive | Operational Implementation Scope |
|---|---|---|---|
| **Data-in-Transit** *(Substation to Cloud)* | TLS 1.3 with Mutual Authentication (mTLS) | ECDHE-RSA-AES256-GCM-SHA384 | Enforced via BNX Edge Gateways; prevents Man-In-The-Middle (MITM) network breaches. |
| **Data-at-Rest** *(Cloud & Local Backup)* | AES-256 Symmetric Cipher | XTS-AES-256 Block Mode | Full-disk and row-level encryption within Doble Cloud repositories and BNX Local Reservoirs. |
| **API Authentication** | OAuth 2.0 via JSON Web Tokens | RS256 / SHA-256 Signature | Time-bound authorization tokens validating communication between Doble API and ABB Ability™. |
| **Payload Integrity** | HMAC-SHA256 | Hash-based MAC | Appended to every API frame to guarantee data cannot be modified or injected in transit. |

# CONCLUSION: Engineering Certainty for Bangladesh's Power Infrastructure

By combining **Doble Cloud's global diagnostic intelligence** with **BNX Networks' hardened cybersecurity infrastructure**, M2K Technology delivers an enterprise-grade integration framework. Utilities like PGCB gain real-time, AI-driven asset health analytics on their operator consoles—without compromising the physical safety or cyber integrity of the national power grid.

*For technical specifications, whitepapers, or project consultations, contact the M2K Engineering Team at info@m2kttc.com or visit www.m2kttc.com.*