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A LoRa Alliance® Member

# INTRODUCTION TO IIOT

# What is Industrial Revolution Generation

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## Industry 1.0
### 1784

First Mechanical Loom

the transition from hand production methods to machines through the use of steam power and waterpower. Its effects had consequences on textile manufacturing, which was first to adopt such changes, as well as iron industry, agriculture, and mining

## Industry 2.0
### 1870

First assembly line with help of electricity

from installations of extensive railroad and telegraph networks, which allowed for faster transfer of people and ideas, as well as electricity. Increasing electrification allowed for factories to develop the modern production line

## Industry 3.0
### 1969

First PLC Programable Logic Controller

The production of the Z1 Computer ,which used binary floating-point numbers and Boolean logic, a decade later, was the beginning of more advanced digital developments. The next significant development in communication technologies was the supercomputer, with extensive use of computer and communication technologies in the production process; machinery began to abrogate the need for human power

## Industry 4.0
### Today

Cyper physical systems , IOT networking

The fundamental shifts are taking place in how the global production and supply network operates through ongoing automation of traditional manufacturing and industrial practices, using modern smart technology, large-scale machine-to-machine communication (M2M), and the internet of things (IoT). This integration results in increasing automation, improving communication and self-monitoring, and the use of smart machines that can analyze and diagnose issues without the need for human intervention.
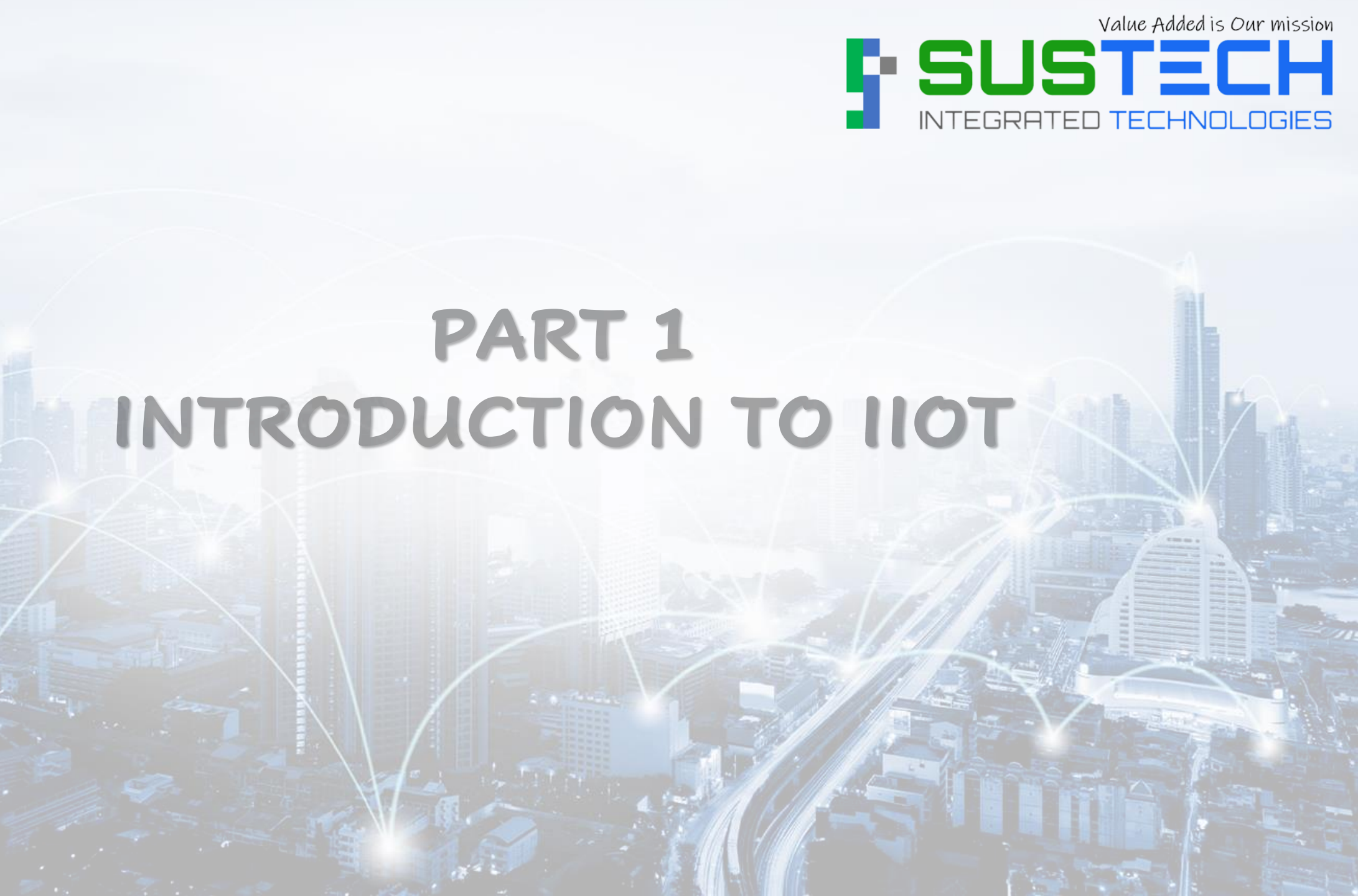
# PART 1
# INTRODUCTION TO IIOT

# 4- Layer IIOT Communication Stack

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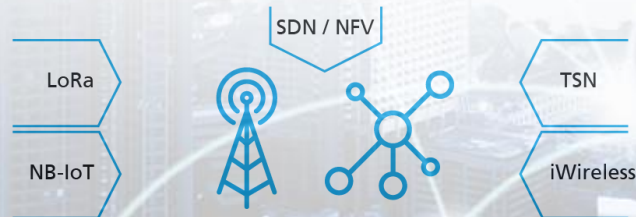
*Sensors, actuators, robotic cameras, microphones, meters, monitors*

# LAYER 3 – INFRASTRUCTURES & PLATFORMS

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**Layer – 3**

Infrastructures & Platforms

| | | |
|---|---|---|
| Stream Processing | | Device Management |
| Video Analytics | | Data Management |
| Machine Learning | CPS / Gateway | M2M Communication |
| Fog & Edge Computing | | Management & Orchestration |

*Data Management: advanced analytics and AI, data visualization, processing via edge IT systems*

**Connectivity**          **Analytics**          **Edge Computing**

**Application Development**          **Data Management**          **Device Management**

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Layer – 4

Applications

Condition Monitoring | Predictive Maintenance | Safety | Retrofitting | ...

*Cloud Data Center: comprehensive analytics, management and storage*

**Condition Monitoring**
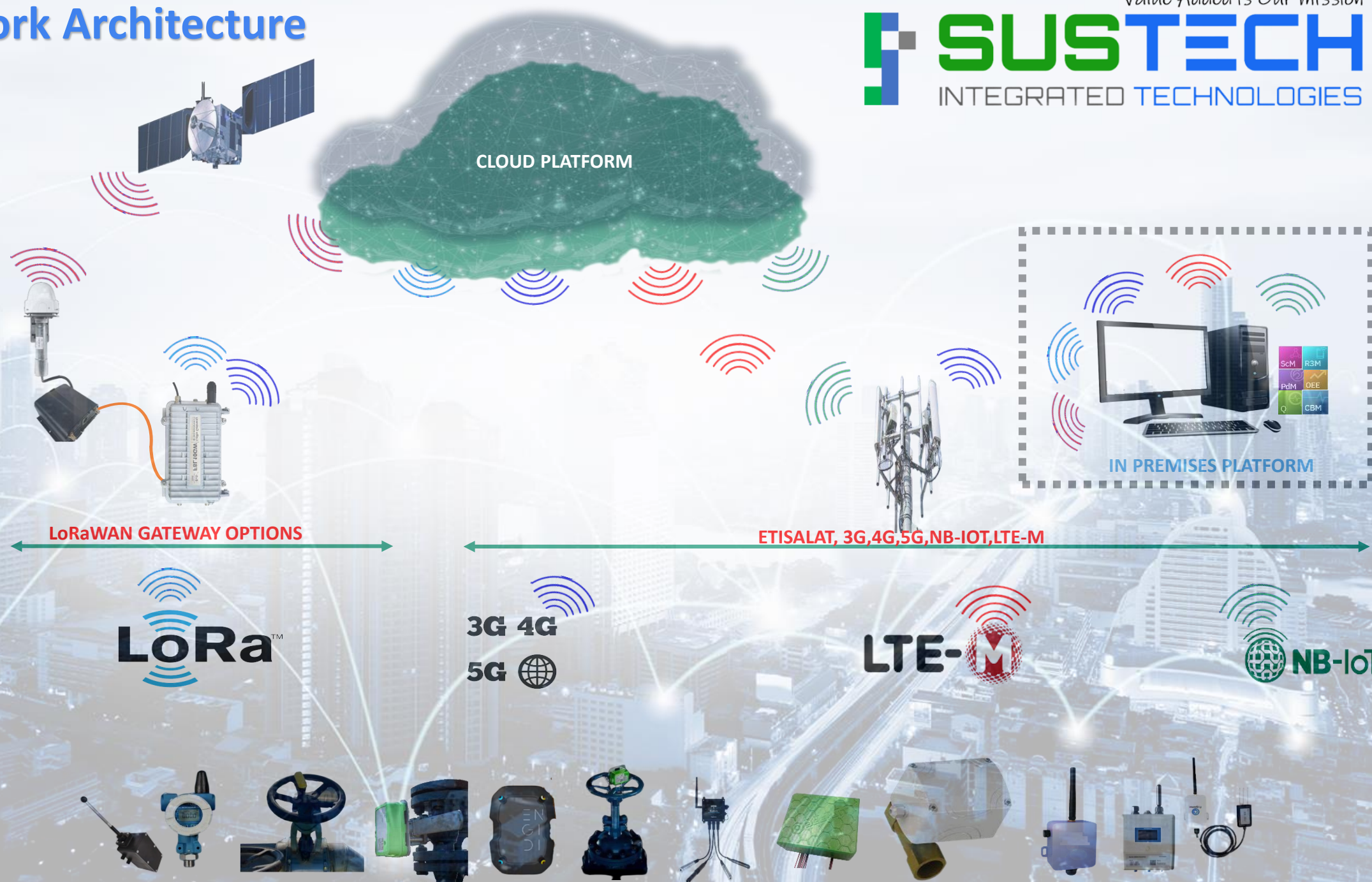
**Predictive Maintenance**

**ERP**

**SCADA**

PART 2
IIOT NETWORK SOLUTIONS

# IIOT Network Architecture

- LoRaWAN Communication
- Satellite Communication
- NB-IOT Communication
- 3G,4G,5G Communication
- LTM-E Communication

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CLOUD PLATFORM

IN PREMISES PLATFORM

LoRaWAN GATEWAY OPTIONS

ETISALAT, 3G,4G,5G,NB-IOT,LTE-M

LoRa™

3G 4G
5G 🌐

LTE-M

NB-IoT

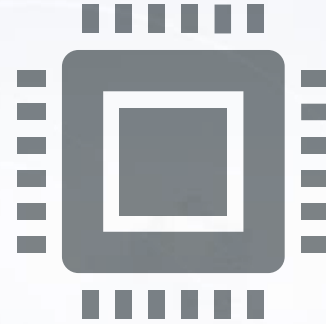INTEGRATE IIOT DEVICES INTO EXISTING SCADA & ERP VIA CLOUD
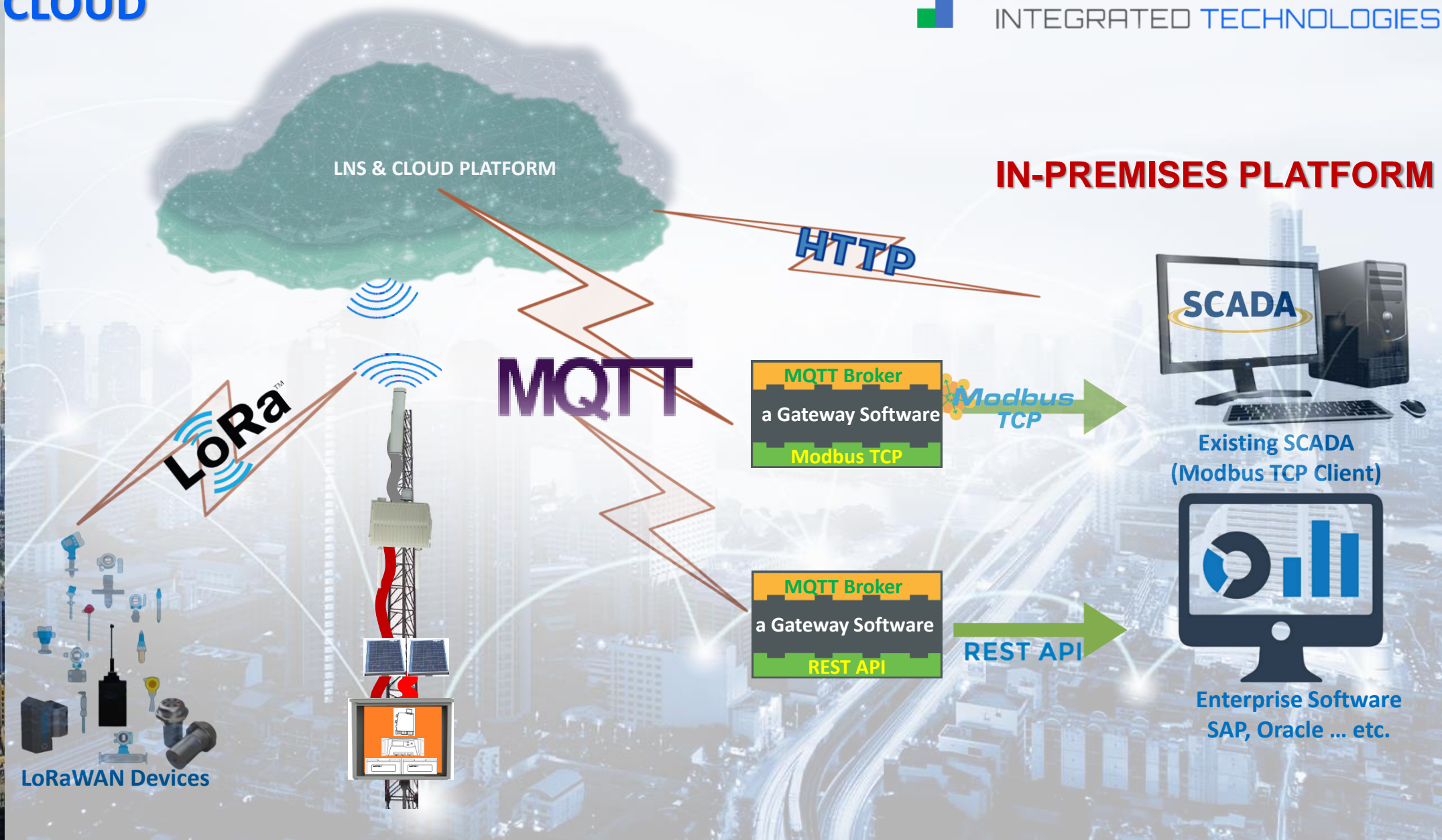
PART 3

IIOT Platform Features

# IIOT DATA COLLECTION PLATFORM

should collect & store the Data. It should be capable of retaining the data for a longer periods of time, being resilient to hardware and network failures.

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## SCALABLE CLOUD DEPLOYMENT

Scalability should be achieved by adding more compute & storage resources to the platform without server restarts, failures or any downtime.

As more devices gets connected and data traffic increases, the platform should adapt to it.

# CYBER SECURITY

Should support SSL encrypted communication over MQTT and HTTPS protocols, device credentials management, device authentication, RBAC and Audit Trails

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# APPLICATION DEVELOPMENT

Keep Swiping It should have a low-code application development environment which enables quick turn around time, at the same time, doesn't require programming skills

# REALTIME DASHBOARDS

The platform should have widget-based drag-and-drop style Dashboard creation tool to enable data visualization and remote device control in real- time.