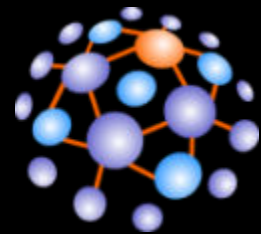




# Smart IOT Solutions using Edge Computing



**technosphere**

SENSE | CONNECT | PROCESS | OUTPUT

[www.technosphere.in](http://www.technosphere.in)

# Technosphere Speaker Profile



## **Bhaskar Rao, Founder & CEO**

- A visionary with more than 30 years of experience in Embedded systems
- Leads customer interactions and overall business out of Bangalore
- Deep domain expertise in IoT – Connected Devices, Embedded System Development and Wearable / Handheld devices

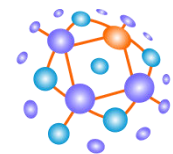


## **Shaun Mitra, Investor & Chief Business Officer**

- 24+ years of experience in the IT industry- Sales & Marketing
- Leads Sales and Business Strategy out of Dallas, USA
- Business leadership roles with Wipro Technologies, UST Global and Tech Mahindra.
- Deep understanding of “digital use cases” leveraging Big Data, IOT, Applied AI, BOTs for various industries such as manufacturing, financial services, healthcare and retail.

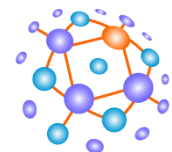
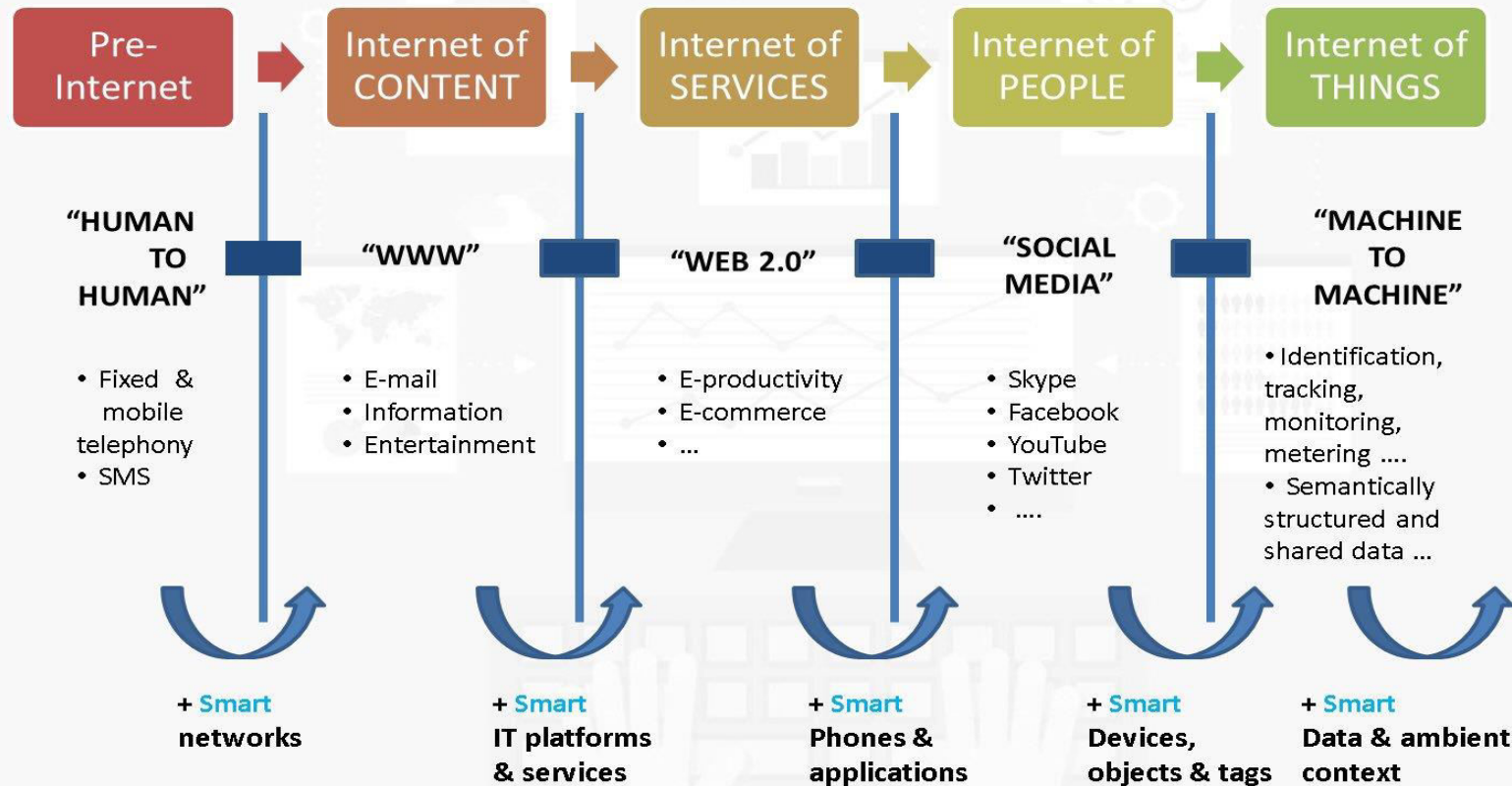
# Agenda

- IOT Evolution
- Edge Computing & IOT
- Edge Node & Gateways
- Wireless Long Range Mesh with Edge Gateway
  - Case study 1: Smart Solar Street Light
  - Case study 2: Smart Retail Shelf
- Case Studies
- Technosphere Overview

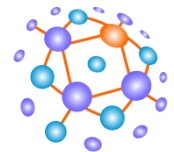


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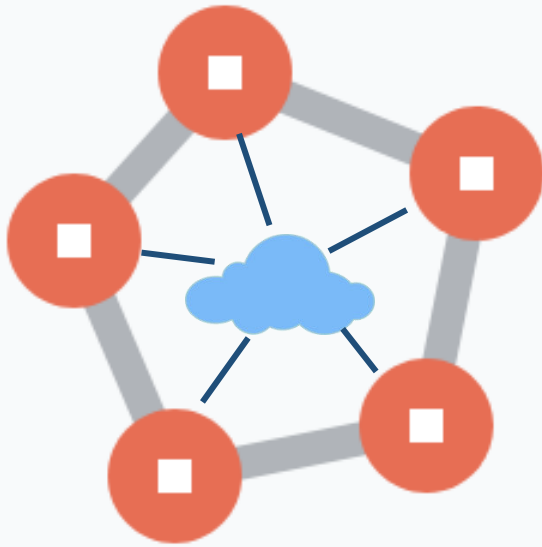
## Evolution of Internet of Things



# EDGE COMPUTING & IOT



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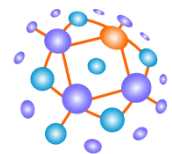


## What is Edge Computing?

- Computing/Analysis being moved from server, and closer to the sensors

## Why Edge Computing?

- Optimize Data traffic
- Better for real-time, fast response
- Optimize data storage and cloud costs
- Practical limitations with high data rate sensors





# Cloud, Fog And Edge Computing – What's The Difference?

## CLOUD LAYER

Big Data Processing  
Business Logic  
Data Warehousing

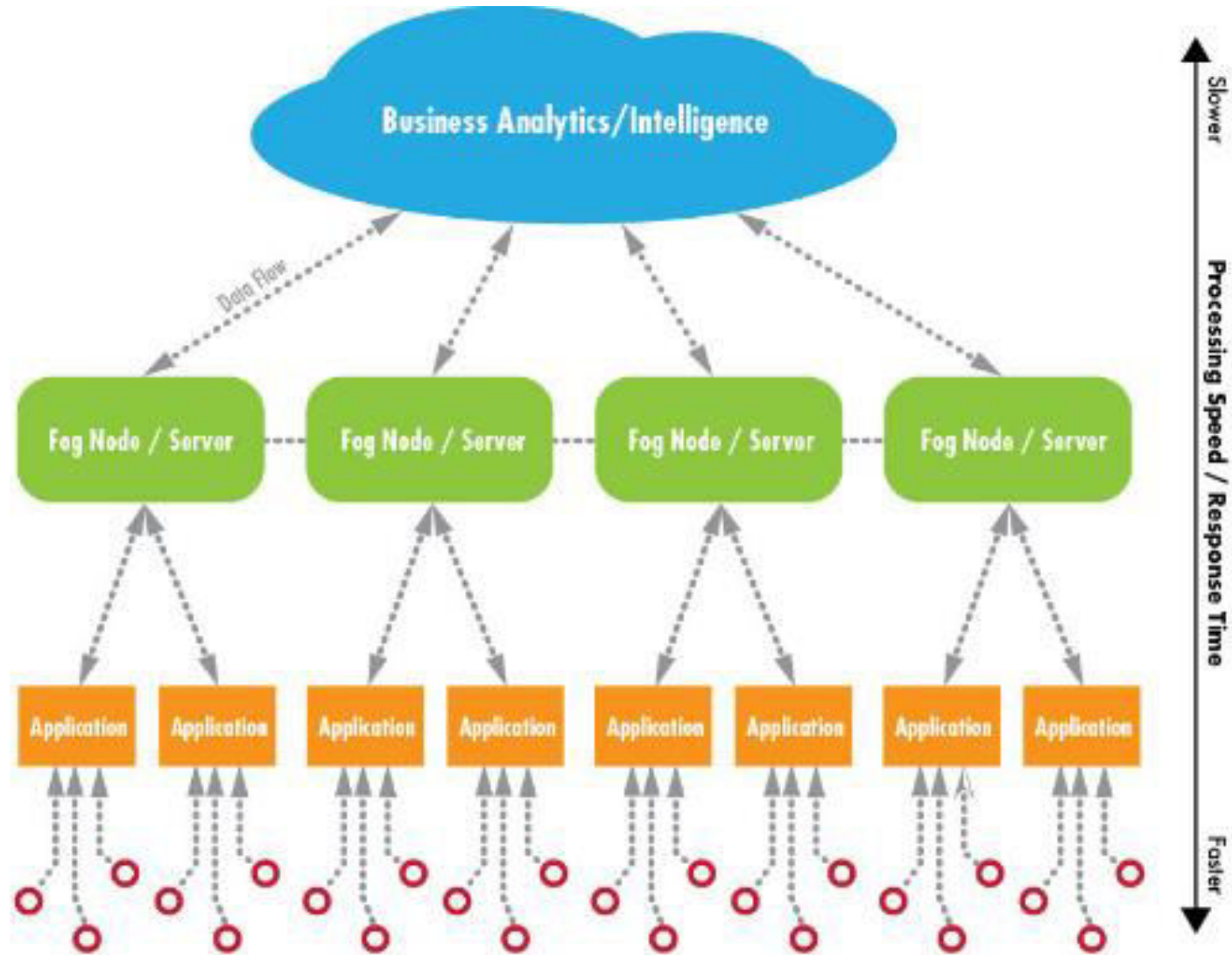
## FOG LAYER

Local Network  
Data Analysis & Reduction  
Control Response  
Virtualization/Standardization

## EDGE LAYER

Large Volume Real-time Data Processing  
At Source/On Premises Data Visualization  
Industrial PCs  
Embedded Systems  
Gateways  
Micro Data Storage

Sensors & Controllers (data origination)



## Computing Directly at Node

- Implement machine learning/deep learning at node level
- Apt for solutions like video analytics
- Non-ML applications : Simple filters for thresholds



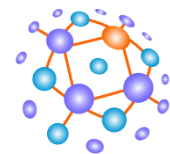
- Fast Response
- Reduced Data Traffic
- Local Alerts

Pros



- Cost
- Battery Life

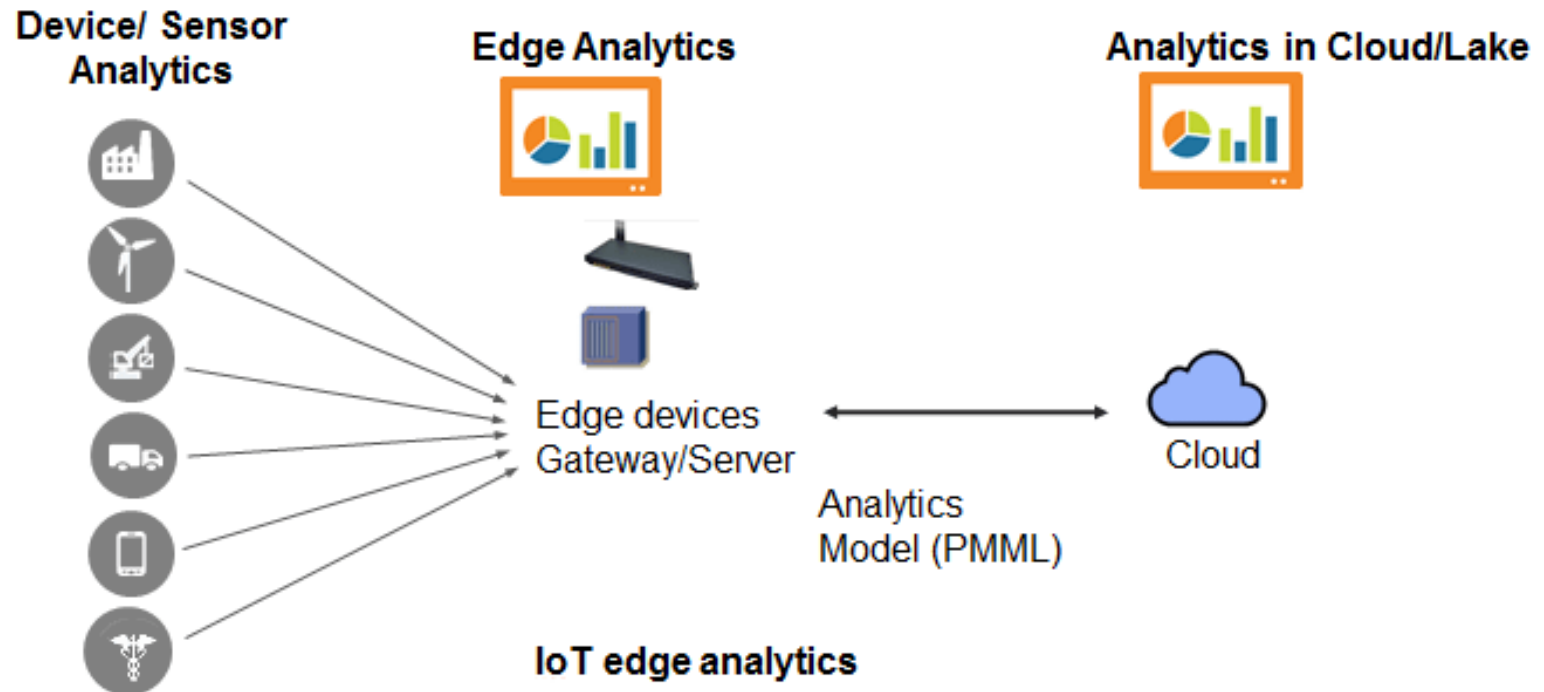
Cons



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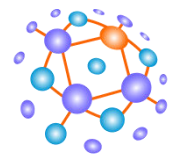


# Architecture



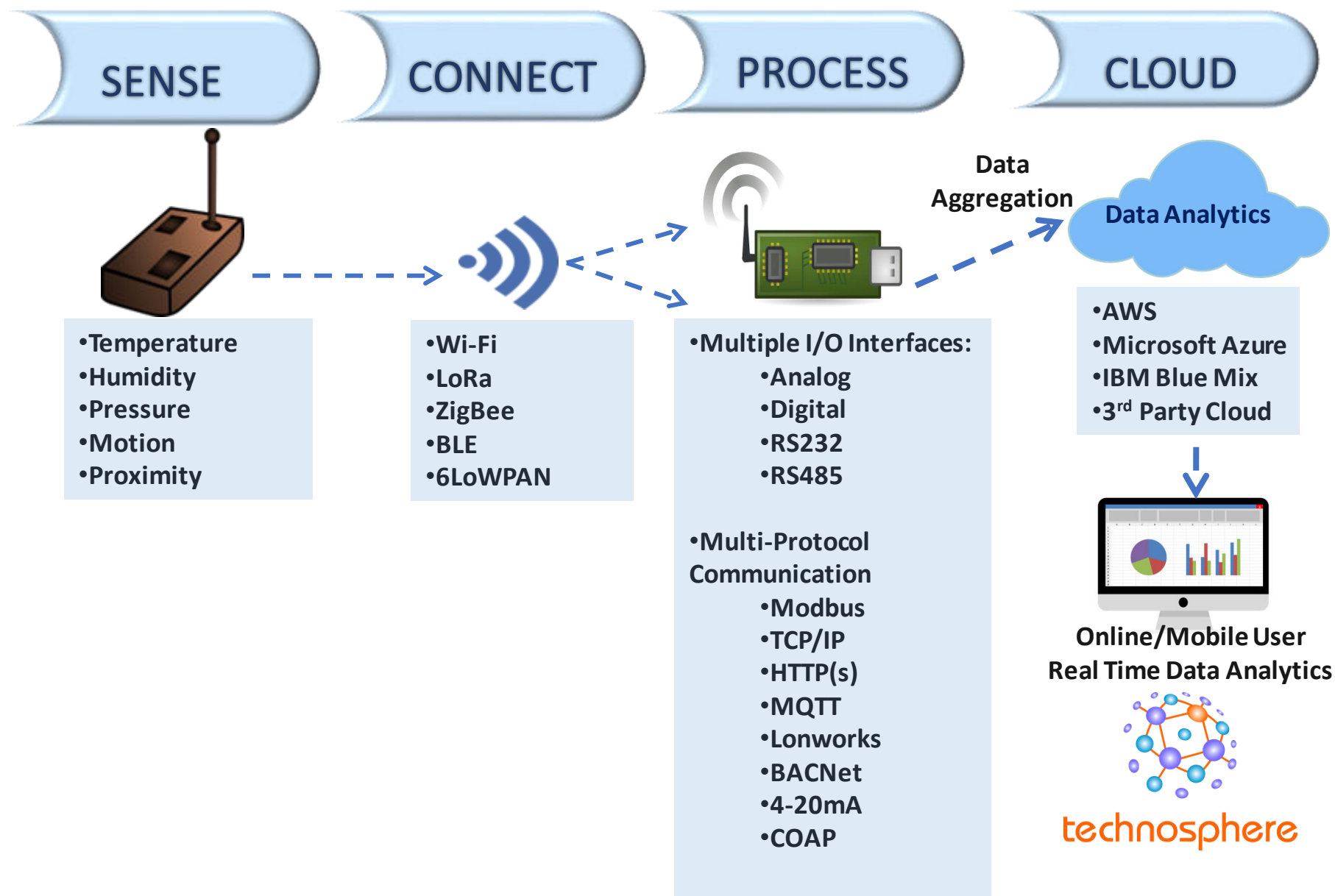
For ML / Deep Learning

- Analytics executed in an external powerful engine and model creation
- Inference engine is running in the Edge Device



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# IIOT Value Chain

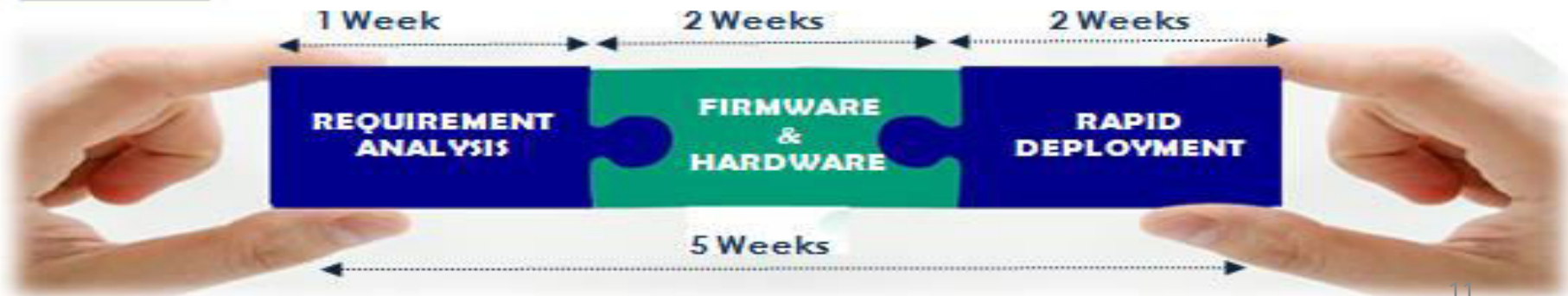


# WhizBlox IOT Hub – Quick Pilots and End to End IOT Integration

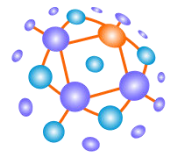


WhizBlox, a smart, multi-sensor, multi-protocol IOT hub, seamlessly integrates more than 100 types of sensors, for quick deployment of vertical IOT solutions

## LIVE IOT PILOTS IN 4-6 WEEKS

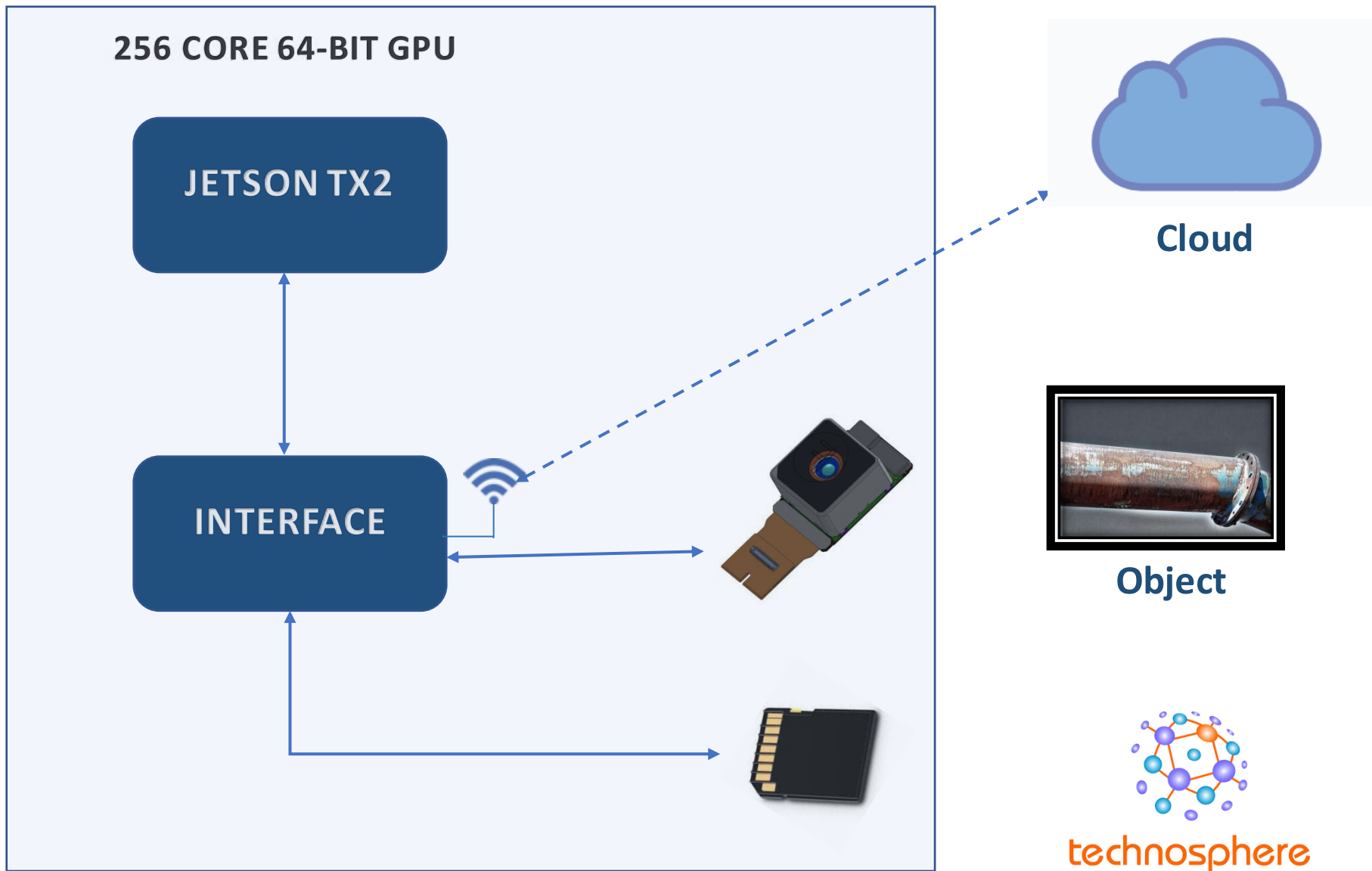


# TECHNOSPHERE'S OWN EXPERIENCE



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# Rust Analysis



# Edge Node Example

## Main Devices

NVIDIA JETSON TX2 with 256 Core each 64bit GPUS, memory, CSI Camera, LCD, Wi-Fi



## First Phase

Machine learning algorithms for detecting rust	Work flow model	Inference engine
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## Second Phase

Object Detection with machine learning	Anomaly detection in machines - EG Vibrations	QR scanner for machine ID	Use thermal sensors for temperature profiling/prediction
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# Smart Solar LED Street Lighting Control Application

## Technology Used

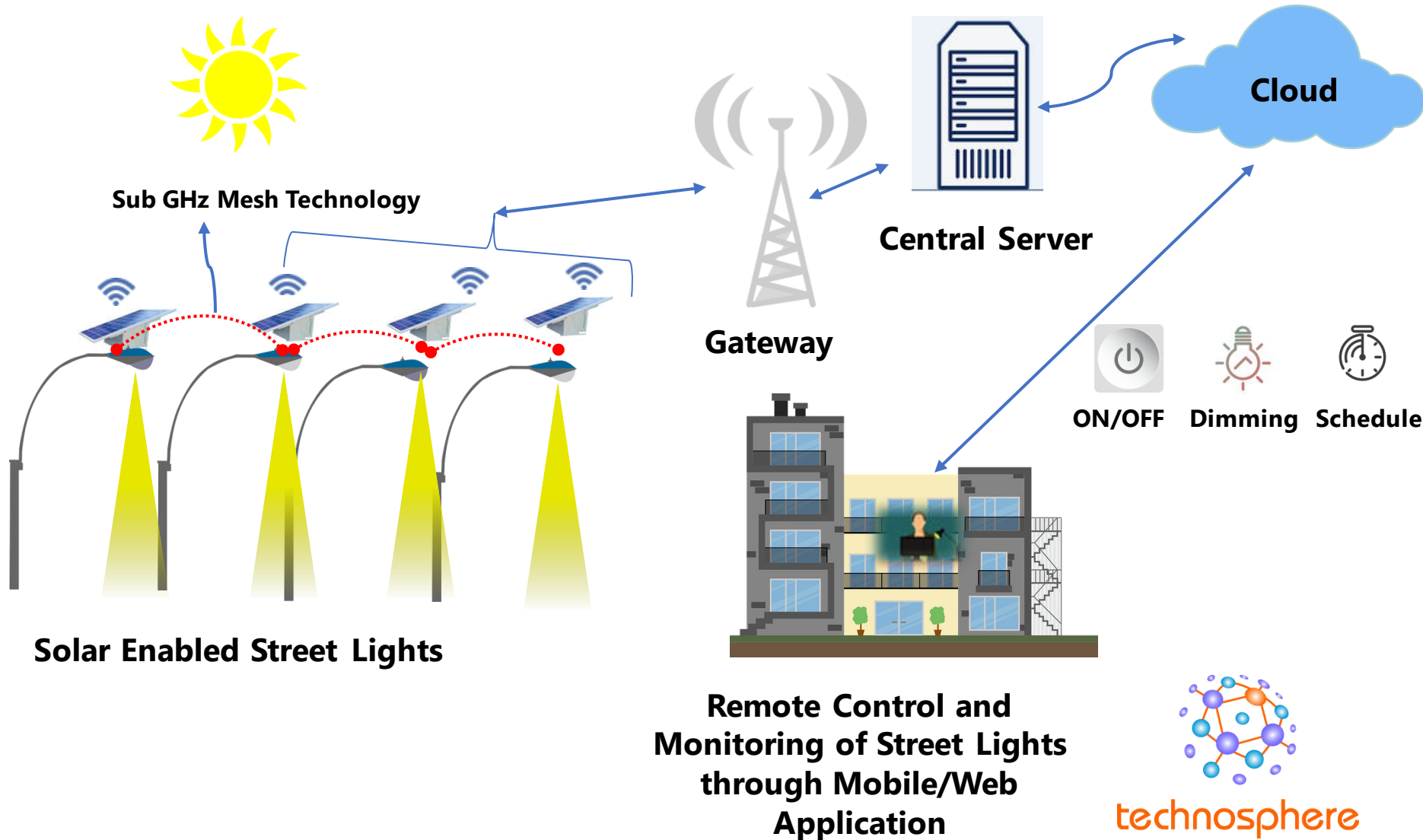
Sub GHz Mesh Topology, GIS Mapping

## Solution Benefits

- Centralized monitoring and control
- Long distance communication
- Custom Schedules
- GIS mapping
- Zero electricity costs
- Environment friendly



# High Level Architecture - Solar Enabled LED Street Lights



# Smart Retail Shelf

## Technology Used

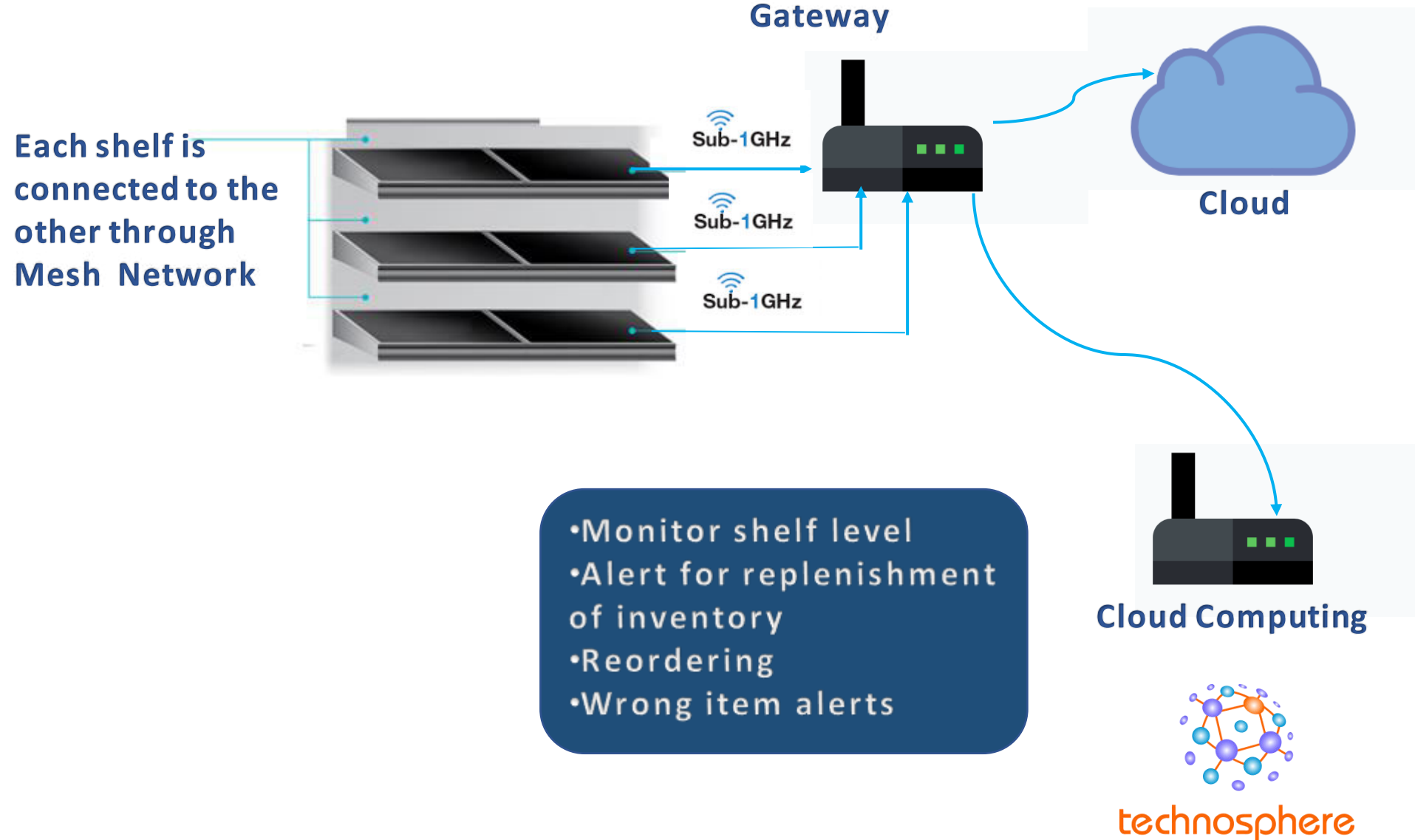
Sub GHz spectrum

## Solution Benefits

- Quick inventory replenishment, thus avoiding stock-outs
- Real time alerts and tracking of inventory
- Better inventory management
- Improved decision making



# High Level Architecture – Smart Retail Shelf





# Industrial Worker Safety

## Technology Used

BLE, LoRa



## Solution Benefits

- Monitors critical real time safety data such as body temperature, heart rate etc.
- Enhances worker safety
- Provides real time alerts
- Prevents occupational accidents and workplace injuries



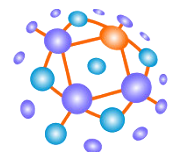
# Summary of our offerings...

## ❖ Engineering & Design Services

- System Architecture (Products & Enterprise)
- Hardware and Firmware Design
- Prototype development
- HMI miniature design
- Product Testing & Certification Services

## ❖ IoT Services

- Industry specific IOT solution design and development
- Sensor & Device connectivity
- Data agreggration
- Cloud connectivity & workflow integration (with partners)



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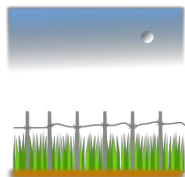
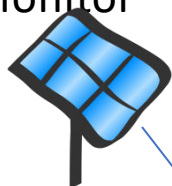


# Technosphere and IoT – Solutions Delivered!



## Energy

- Solar Pump Monitor
- Solar Rooftop Monitor



## Home Automation

- HVAC gateway
- Living room control



## Retail

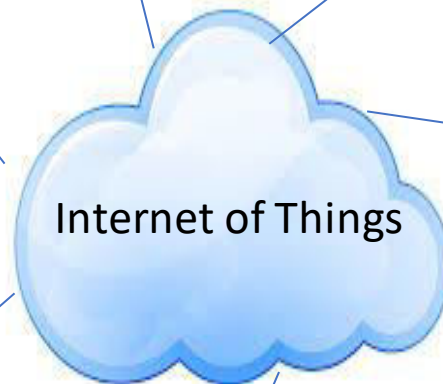
- Wireless Printer
- Wireless Barcode Reader
- Smart Shelf



## Personal

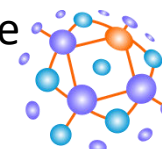
- Smartwatch
- Smart-Helmet

## Internet of Things



## Utilities

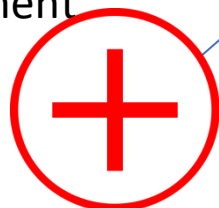
- Water Leakage Management
- Smart Street Lighting



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## Agriculture

- Farm Life Cycle monitor
- Remote Pump Control
- Waste Management



## Healthcare

- Health-Kiosk
- Exerciser/rehabilitation device

## Industry

- Machine Productivity Monitoring
- Employee Safety Wearable
- Asset & Worker Tracking



# THANK YOU

## Relationship Contact

Bhaskar Rao

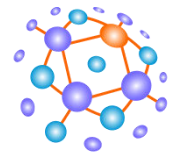
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