

# TRINITYWIRED

A WOODBOWS GROUP COMPANY

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1000+ CLIENTS AND COUNTING..

# PORTFOLIO

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INTERNET OF THINGS

# SMART BUILDING SOLUTIONS PROJECT

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INTERNET OF THINGS

## Executive Summary

### Smart building Solutions

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Digital transformation is redefining business processes across industries. The intelligent buildings market has been growing over the last 20-plus years, but largely through early adopters that were managing the largest, most complex buildings and portfolios. Today, technology innovations associated with the Internet of Things (IoT), cloud and edge computing, and cybersecurity have culminated as an inflection point in the market.

The result is a broader set of potential smart buildings, customers exploring investment opportunities and installing solutions that begin the digital transformation of their smaller facilities or mixed portfolios.

Solutions providers need a more sophisticated and comprehensive set of capabilities to support customers through the journey of digital transformation. As a result, there is a growing ecosystem of strategic partners that combine IT innovation, facilities and energy expertise, and business strategy to support building owners. These trusted advisors will help building owners navigate the digital transformation with guidance on technology selection, implementation and management, and long-term strategy that encompasses equipment performance improvement to whole building, campus, portfolio, and asset optimization.

Today's smart buildings are beginning to leverage the Industrial Internet for improved business outcomes, such as better energy efficiency, improved occupant experience, and lower operational costs. They may contain thousands of sensors measuring various building operating parameters such as temperature, humidity, occupancy, energy usage, keycard readers, parking space occupancy, fire, smoke, flood, security, elevators, and air quality.

In this regard we propose a project which aims to deploy our solution which would not only make a building smart but also provide a highly secured environment.

Our deployments will break down silos between applications, systems and networks, enabling new experiences based on intelligent data-sharing and network-wide interoperability using IOT and Artificial intelligence.

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## 1.0 Introduction

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A smart building is a construction with an appropriate design and technological support to maximize its functionalities and comfort for their occupants with the promise to reduce their operational costs and extend the life of the physical structure.

The smart buildings adapted in a local environment look to optimize four basic correlated elements

- 1) Physical structure
- 2) Systems
- 3) Services
- 4) Management

## Smart Building Solutions

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- SBS transforms a regular building into a smart one using nextGen technologies such as IOT (Internet Of Things) and AI (Artificial Intelligence).
- It provides complete solutions to building management and maintenance such as water, electricity, security, parking, environmental monitoring, and generic floor maintenance.
- SBS monitors and tracks all functionalities in the building and notifies the incidents to the administrator instantly across the world.
- It also records each incident in database. So, historical data can be accessed any time anywhere.
- In a nutshell, Administrator has full control about the building maintenance from his laptop/tablet/phone.

- By getting instant notification, Admin can take quick recovery actions which brings customer satisfaction and earns reputation.

## 2.1 Key Functionalities:

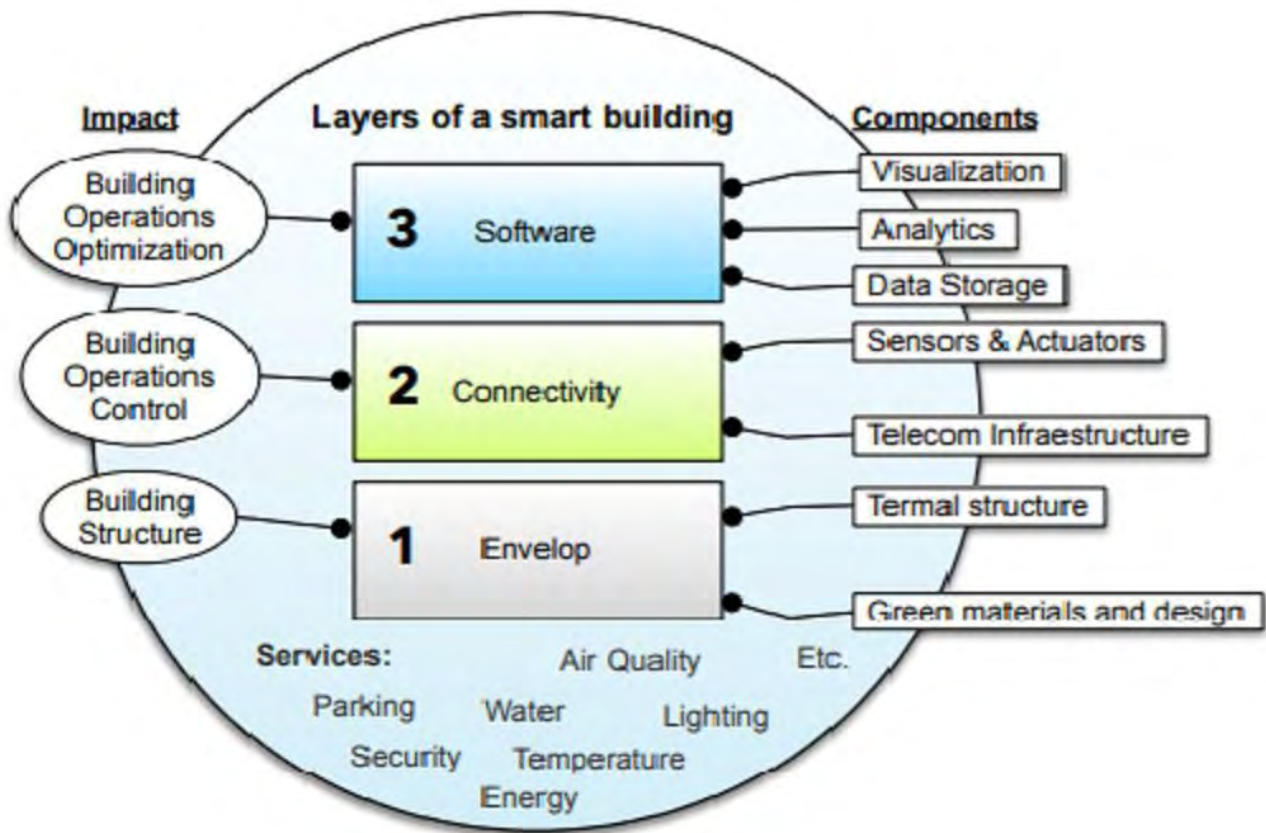
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- Water Management Solutions – Automated water level maintenance, Water leakage identification and reporting, usage tracking, etc. Direct mobile notification to building management and solution assisting faculty for faster resolution. At the same time leakage path will be blocked to avoid further leakage and damage.
- Electricity – End to End Fault monitoring, Location based trip alarm notification, Energy efficient power supply to each room, etc.
- Security – Emergency panic notifications, Door access record, AI powered human movement based door access, AI face identification based employee door access, more securitized private partitions.
- Vehicle tracking – Automated Vehicle classification(employees/customers), vehicle entry/exit tracking and history maintenance, Parking assistance.
- Parking Management – Managing slots effectively for limited parking areas, Mobile app notification of security threads, parking area guidance, locking/unlocking without any manual intervention.
- Environmental Care – Go Green notifications such as Temperature, Moisture, air pollutants, etc.
- Generic Floor maintenance – Cleaning service record, Restroom specific alerts ( ex: tissue paper empty notification, water leakage)

## 2.2 Layers of a Smart Building

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For a first approach we can identify three main layers in a smart building related to the physical structure, connectivity and the software, as shown in the below figure



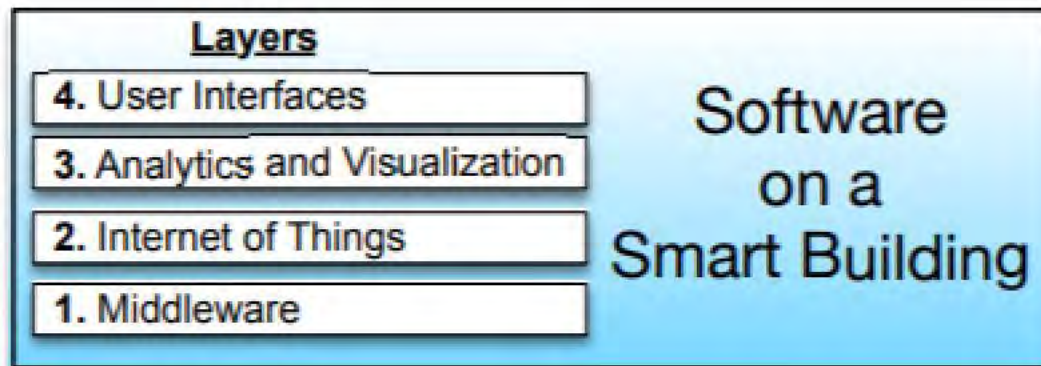
- The envelop of the building is related to all the materials and a green design of architects and civil engineers looking to make a more efficient the use of resources as water, lighting, security, temperature, air quality, parking, etc. This first layer is the body of the building and is related with the materials and design conceived by the architects for the productive activities of the inhabitants.
- The connectivity is the nervous system the building and comprises the data network connecting all the sensors and actuators to react with the environment. In the connectivity layer, open standards as the TCP/IP protocol for a better software integration is recommended for interoperability of systems .
- Finally, the software layer is the brain of the building connected by the nervous system and using its body to interact with the people inside and outside.



## 2.2.1 Software on a smart Building

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The software can be divided in sublayers as shown in the below figure .



The Middleware is related to the low-level programming as firmware on embedded systems used to read sensors and control actuators.

The Internet of Things relates to the specific software and services created to coordinate and manage the different interconnected objects, identified as part of the building.

All the sensors provide information to the analytics platform to find the patterns, models and reach the optimal point of operation of each subsystem in the building.

Finally, the interfaces are the specific settings of the building inhabitants based on their activities.

The classification of layers is important to understand the dynamics of a building and their different elements in order to identify the best practices related to certifications and standards available when a building is planned to be intelligent.

## 2.2.2 Taxonomy of basic services in the proposed Smart Building :

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From the layers of a smart building there are many integrated services that can be seen as subsystems. The set of services are managed to provide the best conditions for the activities of the building occupants. Hence, the below figure shows the taxonomy of basic services.



The building automation systems, such as HVAC control, lighting control, power management, and metering play a major role in determining the operational energy efficiency of a building.

## 2.3 Devices and Apps to be used for the smart building:

### 2.3.1 Sensors

#### Water Management :

- Water flow sensor
- Water leak sensor
- Water Cut off Relay
- Automatic water level Controller Kit

### **Electricity Management :**

- Thermal Sensor
- PIR Motion Sensor
- Panic Controller
- Temperature sensor Module
- Voltage sensor Module
- Current Sensor Module

### **Fire Safety :**

- Alarm Generation based on the smoke location

### **Security :**

- Image Recognition Sensor
- Facial Recognition Camera ( Pi Cam)

### **Parking :**

- Image Recognition Number plate reader
- Vehicle parking slot assistance display
- Parking locker kit

## **2.3.2 Sensor Integrating Modules:**

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- Generic bus interface module for spi, i2c
- RS232/RS485 Modbus Protocol Converter
- Modbus to TCP/IP converter Unit
- WiFi RxTx Module
- DAQ module

## **2.3.3 Master Server Unit**

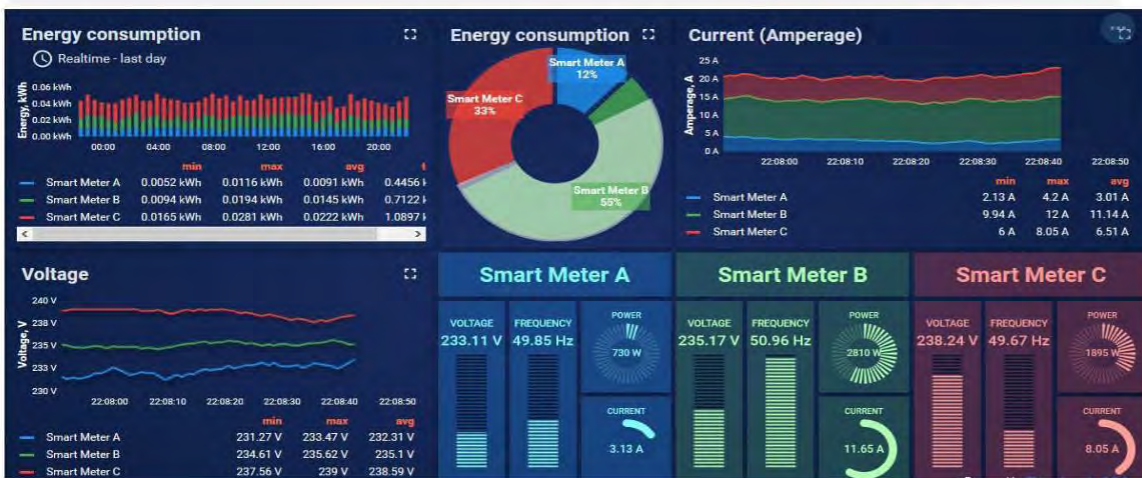
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- Web Server
- Database Server
- Floor control Unit

## 2.3.4 Miscellaneous Accessories

- Connectors
- Data Cables
- Wires

## 2.3.5 IOT Sample User Interface (Web and mobile App)



## 3.1 Our Core Experts

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- Professional in system engineering and hardware profile management over 15 years
- experience in telecom industry,
- Extensive experience in OS Kernel Source Code Editing
- Expert in module integration, and communication on IOT with over
- Demonstrated many POCs using ARM controller and connected devices
- Expert in User interface creation and data manipulation

### **Team's Core Strength :**

- Working with business development team to understand market trend, industry need and influence customer.
- We formulate and execute a strategy to drive adoption of IOT and AI
- Professional expertise on embedded Linux, device driver, WSN, protocol stack (such as WiFi, BlueTooth, ZigBee, ModBus, BacNet), system software.
- Strong analytical and strategic thinking skills
- Over a 15 plus years of experience in solutions development for Telecom industry from innovation through deployment

### Skills

jquery

javascript

css3

html5

### Project description

Microsoft Dynamics 365 solution for brokers. I have developed front-end and backend

<https://www.brokerengine.com.au/>

## PROJECT DESCRIPTION

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Sprout-Flowers.com



Tweedsmag.org



Timedoctor.com



## A FEW AWARDS

30+ AWARDS AND COUNTING..

# Some of our clients' Testimonials

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Lily Zhang, Founder & CEO  
Lyndex Tech, Canada

TrinityWired developers are dedicative and hard working. Our dedicated team were responsible and trustworthy. They helped us with seven projects and always finished the project ahead of our deadline. We have been a long-term client to TrinityWired and continue to be one. I am so pleased to give this testimonial about TrinityWired.



Horatio Franco, Owner  
Studio Four, Florida, USA

Our TrinityWired team put so much of extra work beyond their schedule. I offered to pay extra for their services and they never accepted it once. It's rare to see such people these days. Their service and quality of work are excellent and that's very valuable to us.



Deepak Agarwal, Founder  
Dolmiti Solutions, USA

I had an A+ experience end to end working this team. Let me start by the excellent communication and responsiveness from beginning to the end. They kept me updated and always responded to my questions within minutes and instantly understood what I was looking for although I am not very technical. This made me feel very comfortable. If I had a change of heart during the build on features, color, etc., they were very accommodating.





# TRINITYWIRED

A WOODBOWS GROUP COMPANY

## About Us

We are fired up about welcoming you to our TrinityWired family. This is John, I accepted Jesus as my personal savior when I was doing my MS at the University of Houston, Texas. Let me share an interesting thing about a successful car dealer. He doesn't have any special cars or talented salesmen. However, everyone buys cars from him only. The only secret recipe he has is, honesty. He keeps only a fair profit margin and sells only quality cars that he would buy from others.

I strongly believe if you are honest, people will come to know about it soon. The opposite is true too. Another famous example is Walmart. Sam Walton was selling products for a fair profit margin. Though he didn't advertise about it, people came to know about it and his shop became famous in his area.

I follow the same in TrinityWired. We keep a fair profit margin and people started pouring in. We have been featured as the top app/software development just because of our honesty. We have been growing more than 200% in revenue every year.

Also, the number one requirement to work for our company is honesty. We emphasize on hiring honest developers to work for us. I am sure when you hire us for your projects, you will feel the difference too.

- John

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