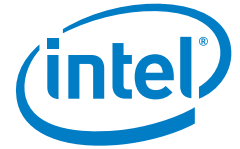


SOLUTION BRIEF

Intel® IoT
Smart Office



Fast, Secure, and Flexible Smart Office Solution

Yanzi Networks delivers an Internet of Things (IoT)-based software and networking platform that equips systems integrators and property managers with quick time to market, automatic data security, and efficient APIs.

“By using the Yanzi solution to collect and analyze data about things as varied as lighting, indoor air quality, space utilization, and noise levels in an office, we can increase our customers’ workforce productivity.”¹

Fredrik Sandqvist
Head of Innovation
Coor Service Management

Making Office Automation a Reality

In a large office environment, facilities management is complex. Both property and facility managers are tasked with tracking the usage, maintenance, and upgrade of every cabinet, recycling bin, bathroom, printer, vending machine, and so on. The reality is that facility managers simply cannot check every piece of office furniture and equipment each day. The solution? Automate the entire office space.

Imagine having technology at your fingertips that would allow you to quickly install, secure, and connect every aspect of your office space through thousands of sensors. In the offices of Swedish consulting firm Tyréns, the dream of a connected office was made a reality. The firm installed 300 sensors tracking their staff members’ movement, plus 200 sensors measuring temperature and humidity, and 500 additional sensors controlling and measuring energy usage—all under four hours.²

In true plug-and-play fashion, this IoT solution from Yanzi automatically detects and provisions wireless sensors, including discovery, configuration, and setup of individual encryption keys, without having to configure the solution manually. In short, the Yanzi solution delivers a simplified and effective way to connect sensors instantly.

Yanzi, a world-class software and networking platform, uses Intel® Security software and the Intel® IoT Gateway to secure hardware, operating systems, applications, and data—all in a single, user-friendly package. The solution supports sensor-side and cloud-side APIs, equipping smart office providers with solutions that can scale and be customized to fit the needs of the user.

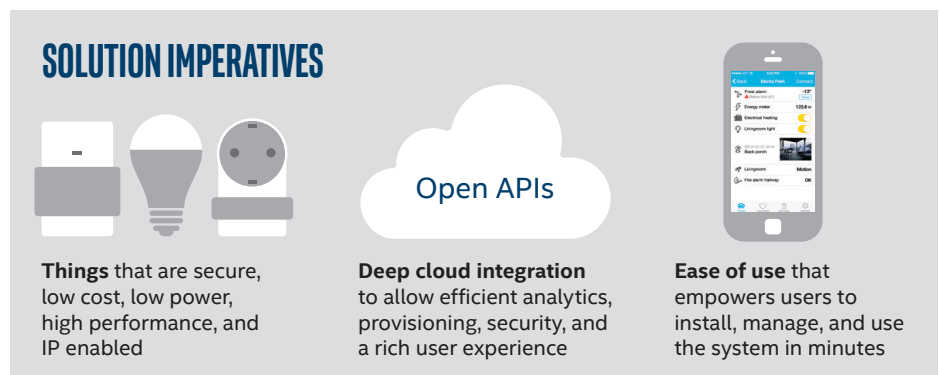


Figure 1. Smart office solution imperatives

The Smart Office Opportunity

By 2020, the smart and/or connected office market is expected to reach US\$43 billion.³ Yet even with the massive market opportunity, there are significant challenges that need to be addressed before this growth is realized.

Smart office solution design and implementation is complex and often cost prohibitive, due to the need to integrate a wide range of sensors and securely send gathered data to the cloud. Additionally, sensors use a wide range of communication protocols (M-Bus*, ModBus*, and BACnet*). In most cases, this requires data to be converted to Internet Protocol (IP) before it can be sent to the cloud for analytics and device management.

To overcome these challenges, an end-to-end solution is needed that delivers secure, low-cost, high-performance, and reliable sensors that can be installed and communicate with the cloud in a matter of minutes.

Driving Down Maintenance Costs

A simple, cost-effective solution, like the one from Yanzi, enables facilities managers to reduce maintenance effort and cost with remote monitoring of office areas, equipment, environmental conditions, and energy consumption:

- Optimize Space Usage**
 Learn whether conference rooms and work stations are oversubscribed or underutilized using motion sensors and power outlet monitors.
- Clean Bathroom Facilities Only When Needed**
 Determine when it is time to clean bathroom stalls by monitoring traffic with motion sensors (non-video sensor).
- Empty Recycle Bins Only When Full**
 Get an alert from a motion sensor when a bin needs to be emptied.
- Constantly Monitor Restricted Areas**
 Track when people are in restricted areas (e.g., file storage rooms) with motion sensors or cameras.
- Prevent Equipment Downtime**
 Measure the runtime of equipment to avoid downtime and improve service planning using a power outlet monitor (i.e., replace projector lamp after 2,000 hours of use).
- Maintain a Comfortable Office Environment**
 Ensure temperature, humidity, noise, and CO₂ levels in rooms and open areas are within preferred and recommended levels using multiple climate sensors.
- Minimize Facility-Wide Energy Consumption**
 Turn off equipment when not in use with a combination of motion sensor, power outlet monitor, and power plug with a remote on/off switch.

The Yanzi Platform: Seamless, Low Cost, and Out-of-the-Box

The Yanzi kit provides a set of sensors and gateway-to-cloud services, mobile applications, and facility management of buildings, as illustrated in Figure 2. Yanzi Things*—including the gateways, plugs, LEDs, cameras, and motion and climate sensors—automatically connect to a smart phone through the Yanzi Cloud*.

Yanzi works out of the box and requires almost no hardware development, allowing the solution to be demonstrated in a matter of minutes. The easy-to-use Yanzi app can be quickly downloaded to virtually any device (Android*, iOS*, and/or PC), and can immediately provision all the sensors so they connect quickly and securely.

When deploying a sensor, it is not necessary to go through the tedious process of manually entering a WPA encryption key, since Yanzi features automatic data security. Plus, Yanzi provides customization flexibility through sensor-side and cloud-side APIs that allow users to incorporate other types of sensors, new cloud-based services, custom user interfaces, and more.

Open, Scalable, and Seamless Architecture

Yanzi architecture is based on an open, industry-standard software platform that can scale to millions of users and billions of things in a seamless and future-proof way. New functions can be added to the platform over time, and the software is continuously upgraded and pushed to the gateways and sensors to further improve value. Ultimately, Yanzi architecture minimizes installation and maintenance costs by delivering a highly secure, all-IP system with mesh networking for increased reliability.

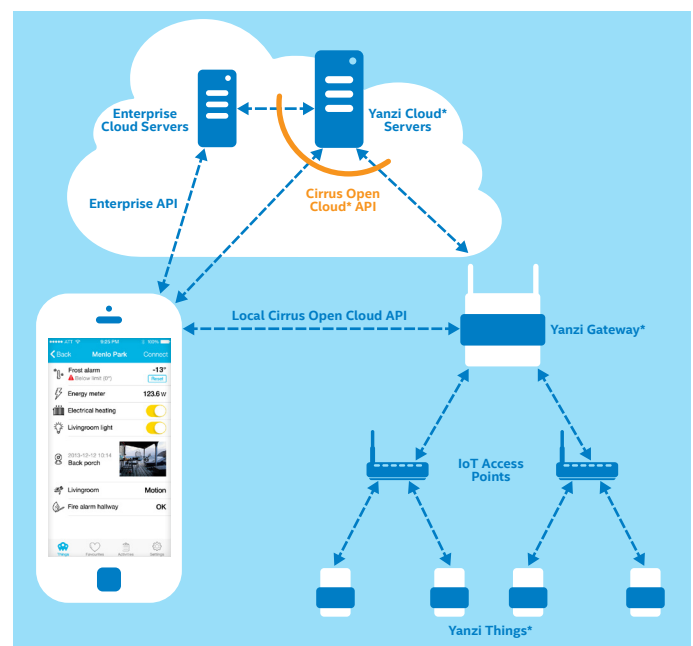


Figure 2. Simplified representation of Yanzi architecture

Both Yanzi Gateway* and Yanzi Cloud run on Intel® processors, allowing them to run the same software from sensor to cloud and deliver always-on service, even if the Internet connection is down. IoT access points provide a cost-effective means to deploy sensors throughout the office.

Systems integrators can write applications to the Cirrus open-cloud API to access remote and local sensor data from servers or the Yanzi app, which also allows them to deliver custom user interfaces for mobile phones. Since Yanzi Gateway is an extension of the cloud, apps may communicate with either.

Yanzi Things

The Yanzi kit features a number of devices, pictured in Figure 3 and described in the following:

Yanzi Plug* controls electrical appliances and lights, measures their power consumption, and can also extend the range of the wireless network.

Yanzi LED* is a lamp that screws into a socket and can be controlled (On/Off/Dim) instantly. The LED can also extend the range of the wireless network.

Yanzi Motion* senses motion and measures temperature, and can be used to control Yanzi Plugs and Yanzi LEDs.

Yanzi Climate* measures temperature and humidity levels, and sends notifications when certain thresholds have been exceeded.

Axis* Cameras are supported by Yanzi, but they may require network configuration.

The sensors—Motion, Climate, and Plug—automatically connect to the Yanzi Cloud using IPv4/IPv6 over 802.15.4 (WPAN). IPv6 is essential for providing much needed scalability into the future. All of the devices support over-the-air upgrades and elliptic curve cryptography (ECC) for setup and AES encryption for communication with an individual key for every device.

Additionally, the motion and climate sensors are battery-powered and can operate for more than 10 years with a single set of batteries. The sensors are easily installed on a wide range of common surfaces (walls, inside trash or recycling bins, or on a flat surface).

Yanzi Gateway

Yanzi Gateway finds, configures, and interacts with Yanzi Things. Based on the Intel® IoT Gateway, it connects to the Internet by Ethernet cable or wirelessly (2G/3G/LTE) and communicates with sensors over Ethernet, Wi-Fi, and IEEE 802.15.4. This all-IP IoT gateway is also a Wi-Fi router or hotspot, and its internal battery guarantees hours of operation in case of power outage.



Figure 3. Yanzi Gateway* and Yanzi Things* in the Yanzi kit

Yanzi Gateway can support just a few Yanzi Things in a small installation, or connect tens of thousands of Yanzi Things and other IP-enabled sensors in a larger implementation. Because the Yanzi system is based on established IP practices and protocols, it is easy and affordable to install Yanzi Things in a few steps on any Internet-connected device running a browser or the Yanzi App.

Yanzi Gateway implements the Yanzi Cloud Platform*, but also provides many gateway-specific functions:

- Aggregates and filters data from things to minimize network load
- Links the wide area network (WAN) and local area network (LAN) technologies
- Encrypts communications with the cloud
- Supports instant remote access and real-time notifications
- Provides autonomous operation if WAN link is unavailable
- Synchronizes sensor data with the cloud
- Discovers and configures sensors

Yanzi Cloud

Powered by cloud servers based on the Intel® Xeon® processor E5 and E7 families, Yanzi Cloud stores and analyzes system data, which is available for review through a simple dashboard application on the user's PC or mobile device.

Yanzi APIs

In order to monitor and interact with Yanzi Things, systems integrators and building managers can either use the Yanzi app or develop their own app using Yanzi APIs. The Yanzi Cloud Platform provides efficient APIs to third-party servers and user devices, such as tablets, computers, and mobile phones, which are the primary devices for most consumers and many professionals. Phones are also natural devices for notifications and user positioning, which is essential to many IoT services.

The Yanzi API supports:

- Email, SMS, and push notifications to end-user devices.
- Tight coupling of things, cloud, and devices, allowing for a richer user experience.
- Automatic redirect to access local resources.

A Better Path to Office Automation

Internet of Things (IoT) technologies are being used to more easily connect things to the cloud to increase efficiency, reduce costs, and generate useful insights across many industries. Yanzi is a perfect example because it enables fast, secure, and flexible smart office deployments. Using Intel IoT technologies, the solution provides systems integrators with fast time to market, ease of use, automatic data security, and customization flexibility.

Join Yanzi's global network of systems integrators and service providers who are deploying this technology today.

For more information about Yanzi products, visit yanzinetworks.com.

For more information about Intel® solutions for smart buildings, visit intel.com/iot/smartbuilding.




1. Intel case study, "Coor Brings IoT to the Office," January 2015, intel.com/content/dam/www/public/us/en/documents/case-studies/iot-coor-yanzi-office-study.pdf.

2. Source: Coor Service Management press release, "Internet of Things (IoT)," coor.com/News--Press/Local-news/2014/Internet-of-Things-IoT.

3. Source: Markets and Markets Inc., "Smart Office / Smart Workplace Market by Product (Smart Lighting, Security Systems, HVAC Control), by Building Type (Retrofit, New Construction), and Geography—Global Forecast to 2020," October 2014, marketsandmarkets.com/Market-Reports/smart-connected-offices-market-254310598.html.

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INTEL® IOT GATEWAY

Along with providing essential connectivity, the Intel IoT Gateway acts as a data router and filter between data-generating sources—such as sensors and intelligent equipment—and the cloud. It enhances data security, accelerates actionable insight, and more importantly, saves money—with the Intel IoT Gateway, companies can securely transfer only data that has operational relevance to the cloud, lowering costs for data transmission and cloud storage.