Technical Article
Automation and Gateways with Scalable Sitara Processors

TEXAS INSTRUMENTS

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As connectivity between devices continues to rise, there is a clear need for centralized data collection and processing gateways. Central networking hubs not only need to make local decisions and provide instruction to end node devices, but they must also access the vast computer power of cloud networks.

Take for example the case of existing smart thermostats that can be managed remotely from computers, tablets or smartphones. These thermostats could expand to have more data collection and decision power within a building, such as motion sensor feedback to adjust room temperatures based on occupancy. Smart thermostats could also merge with security systems to monitor doors, windows, and even stream video from security cameras and relay data to cloud applications managed by service providers. Moreover, the ability to connect many nodes to the computing power of cloud networks allows for data analysis that could help predict machine failures (based on factors like excessive vibrations or increased temperatures or power consumption) and allow for faster response and less down time.

The tasks of these gateways also increase as wireless technology advances and enables connectivity at longer ranges. For example, Sub-1 GHz technology provides whole house and vicinity coverage and coverage in spread out areas.
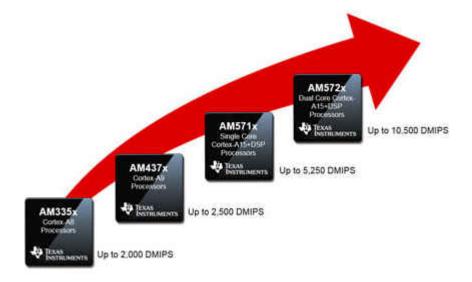
Since a network of connected devices can range from things as simple as remote sensors all the way up to large machines or even entire factories, finding a common platform for gateways can be a challenge. With a wide range of processing power, a common software platform across devices, and a track record of reliability, Sitara™ processors provide a scalable portfolio of devices and are a leading solution for Internet of Things (IoT) gateways.

Scalable Processing Power

With an industry leading Dhrystone million instructions per second (DMIPS) per dollar, the AM335x processor is an excellent and economical starting point for implementing your gateway design. It features an ARM® Cortex®-A8 running at up to 1GHz and is capable of supporting 3D graphics for user interfaces. Its PRU-ICSS allows for communication across multiple industrial Ethernet standards, such as EtherCAT, Ethernet/IP and Profinet.

If security is a concern, the AM437x processor has a customer programmable secure boot option for added data protection. It features an ARM® Cortex®-A9 running at up to 1GHz, with the ability to drive 3D graphic user interfaces and support dual camera inputs, not to mention it has two PRU-ICSS cores, one for industrial Ethernet communication and one for serial-based communication. It's an excellent choice for gateways that need added security.

For added processing power, the AM57x processor features up to two ARM® Cortex®-A15 cores and C66x DSPs. It's capable of supporting high definition video and high speed peripherals, including PCIe, USB 3.0, SATA, and up to six ports of Gb Ethernet. On top of the dual PRU-ICSS for industrial Ethernet communication, it also has a dual core ARM® Cortex®-M4 for managing additional functions. When a high performance gateway for tasks like building or factory automation is needed, the AM57x processor is a solid choice.

Common Software Platform

While each family of Sitara processors offers a different feature set, the TI Processor Software Development Kit (SDK) is a common bridge that connects them all in a designer-friendly way. With software support for both Linux and TI-RTOS, the Processor SDK provides a unified software platform that is scalable across all of the Sitara processor families. The Processor SDK also provides the benefits of mainline Linux, including support for the more recent Long Term Support (LTS) Linux Kernel. As your designs grow or change and require different hardware capabilities, your software experience remains the same, allowing you to seamlessly reuse and migrate your software across devices. This platform approach translates into lower software investment and faster time to market.

Proven Reliability

Information gateways play a critical role in a network of devices, so it's important to have a processor with a proven track record that is capable of handling the load and managing the system. Sitara processors have already been used in a number of well-known gateway products, including smart thermostats, home automation kits, and personal assistant devices. Additionally, Sitara processor's ability to run higher level operating systems like Linux allows for the implementation of new gateway technologies, including Amazon Greengrass, a platform that provides local computing, messaging, and data caching to optimize communication with the cloud.

If you're looking to implement an IoT gateway into your design, the scalable processing power, transferable software development platform, and proven reliability of Sitara processors make them an excellent choice to meet your requirements and support growth for years to come.

To jumpstart your design, check out the Sub-1 GHz Sensor-to-Cloud with gateway reference design. This reference design accelerates the time it takes to develop a cloud-based application that interacts with Sub-1 GHz sensors. For more information about this design take a look at the blog, "A scalable approach to cloud computing applications for low power sensors."

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