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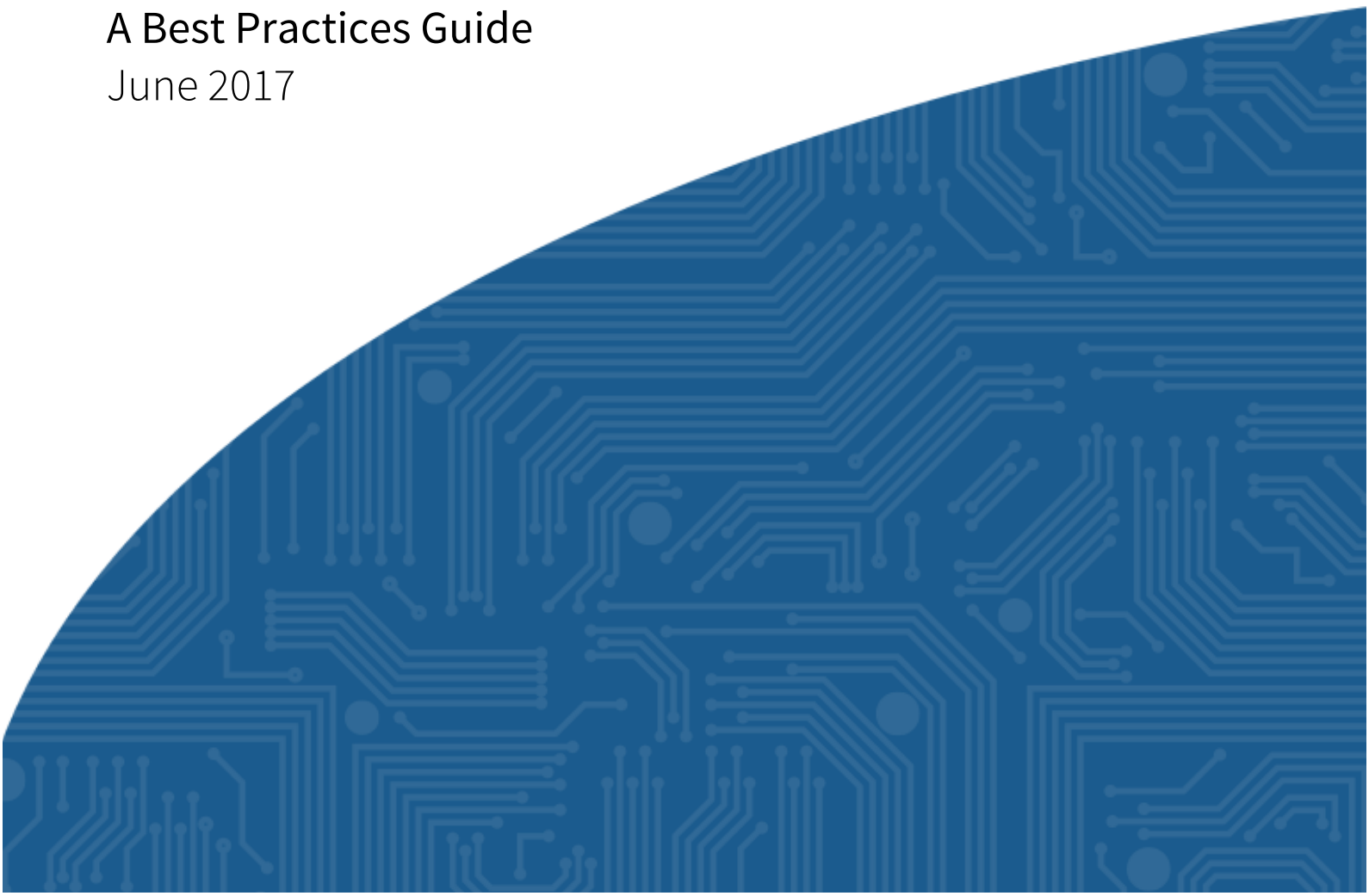
# Configuring your IoT Gateway for Cost-Effective Edge Computing

A Best Practices Guide

June 2017



In bridge building, engineers start by carefully surveying the topology, selecting the best location and design for a given landscape. Bridges are critical connection points and, to a large extent, determine the paths that will ultimately lead to them.

Providing a similar critical connection point in an IoT solution, Gateways should be a central consideration when planning your IoT architecture.

Indeed, selecting the right Gateway should often be the starting point, as the role Gateways play in all facets of IoT – from connectivity management to monitoring and data processing to cloud integration – will be critical to your long-term success.

To ensure you arrive at the selection of the best-fit Gateway, read on as we discuss three important planning considerations for anyone designing an IoT solution:

## Selecting the Right Amount of Edge Compute Capability

Gartner research predicts that by 2020 there will be more than 20 billion IoT devices in use, up from just over 6 billion in 2016. The amount of data generated by this vast number of devices will present unprecedented bandwidth challenges.

Consider, for example, a thermostat that reports a temperature every second. If each reading were sent directly to the cloud, the amount of data from just one device would become an obstacle. Multiply that by billions of devices and it's clear that careful planning is required to determine what pre-processing of data can and should be performed by your IoT Gateway – striking the right balance between 'actionable data' vs. 'overwhelming data'.

In addition to separating important data from noise, edge computing at the Gateway can quickly pay for itself in saved data plan expenses. Given that even today's least expensive bulk IoT cellular data plans cost around $25 for only 1GB, you can see how a frequently reporting device could cost you a great deal in the long run.



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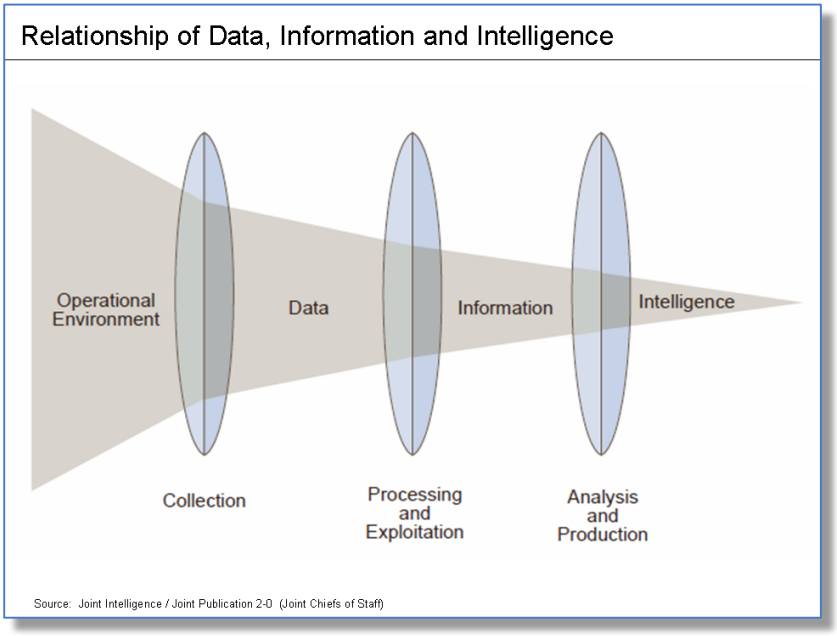
However, utilizing a Gateway to process the majority of this data at the edge - and only selecting important data to send to the cloud - can quickly prove the ROI of the Gateway.




Moreover, when you separate out 'business as usual' data and only send anomalous information to the cloud, you can then focus your cloud computing on real business intelligence efforts.

## Key Considerations

When selecting a Gateway for its edge computing capabilities, focus on choosing a Gateway that is right-sized for your IoT needs. Important questions to ask are:

- Am I choosing a Gateway with enough edge computing capability for my solution, so that I can take advantage of scalability and cost-saving opportunities?
- Am I over-paying for more compute power than I need? IoT Gateways with edge compute capability vary widely in price – and you may be able to save money with a $100 - $200 configured option vs. a $600 - $1,000 all-purpose Gateway.
- Am I working with unreliable data networks and need a Gateway that can cache and process data locally for uploading when a network becomes available?
- Is my Gateway solution able to collect, sync and collate data coming in from multiple sensors simultaneously?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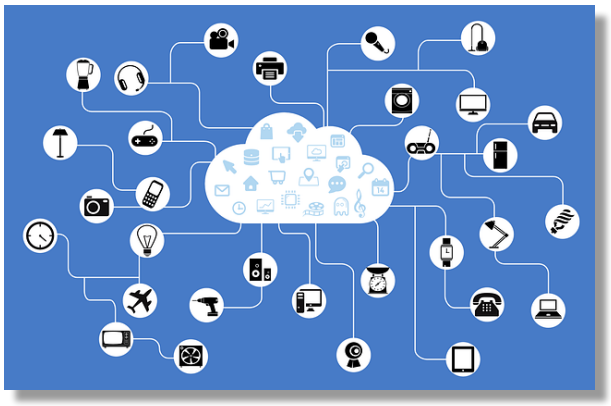
## Managing your Low Power Wireless Devices Effectively

Edge computing Gateways are particularly well-suited to low power wireless networks (e.g. Bluetooth Low Energy, Thread, Zigbee) where many sensors often gather a large amount of consistent data.

These types of networks are becoming more and more common in smart buildings, retail or light industrial environments, where many sensors coexist in a single location. In these environments, Gateways give you the flexibility to put sensors anywhere you need them, and rely on the Gateways as a central point of coordination and communication to the Internet.



In that central coordination role, these Gateways should also be equipped to monitor, manage and update the network and devices, keeping sensors connected and up to date. Specifically, Gateways should be able to manage and distribute firmware and configuration updates to all devices from a central, cached file instead of every device having to download each update directly.

In this way, you can be more efficient and coordinated in the management of your devices, especially as they begin to scale toward thousands or millions of nodes. Some Gateways will even perform 'differential updating' in which only the new code in an update is transferred to and changed on the device, reducing the size of each update.

If you are considering using a wireless mesh network, there are additional advantages to leveraging a Gateway for local monitoring and management capability - rather than attempting to coordinate your mesh networks entirely from the cloud. As with other sensor networks, Gateways can cost-effectively monitor and report on mesh network health and availability for large-scale solutions. Moreover, by leveraging the Gateway to manage your low power wireless networks, you can focus your cloud efforts on creating valuable, actionable data.

### Key Considerations

When selecting a Gateway to support a low power wireless network such as BLE, Thread or Zigbee:

- Consider the exponential growth in IoT devices and ask, will my Gateway handle the increase in scale that my IoT solution brings? Can it effectively manage and update hundreds of thousands of devices at scale?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- Does the Gateway solution support network health monitoring where it regularly queries and monitors traffic, and communicates periodic or alert reports to my cloud service?

- Will my chosen Gateway work with existing and future low power wireless and mesh technologies?

## Making Sure to Future-Proof in Key Areas

In such a fast-moving technology area as IoT, it's challenging to pick a truly 'future proof' solution that - regardless of the changes to come - sets the stage for both near- and long-term success. We recommend the following considerations when choosing a Gateway that will be able to evolve with the IoT landscape:

- Security Features for Managed Updating: No one wants to be the subject of a security incident. It is strongly recommended that your Gateway solution supports both forced security updates for critical patches, as well as scheduled updates (e.g. feature updates) that don't interrupt services. Most leading solutions will queue these updates and be able apply them when device loads are low, reducing the impact on the end customer or device network.

- Flexible Connectivity Options: Make sure your Gateway can support the connectivity options you need for today – and tomorrow. For example, supporting multiple WiFi bands is an often overlooked, yet critical consideration. While many low power wireless devices communicate via WiFi 2.4, this band is quickly becoming very crowded. Leading Gateways as a result communicate on both WiFi 2.4 and 5.0, allowing the Gateway to communicate with IoT devices on one band (2.4) and the Internet on the other (5.0), ensuring that optimal performance is maintained and interference is negated, so that devices are always able to communicate with the Gateway.


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- On the sensor side, it's also important for future proofing to have a Gateway that supports multiple radio protocols out of the box. Consider technologies like WiFi, Bluetooth LE 4.2, Bluetooth 5.0, the upcoming Bluetooth LE Mesh, and 802.15.4 (for ZigBee and Thread).

  Finally, many companies should consider a Gateway option that supports cellular LTE for Internet connections, with a worldwide coverage option should your organization need it.

- Customer & Maintenance Experience: It's likely that your Gateway will ultimately be installed in the field, perhaps at a large number of locations. These installation costs can rival the cost of the Gateway itself - especially if it needs to be hard-wired. Consider Power over Ethernet (PoE) as an option to reduce your installation costs and time, as this uses a single connection for both power and Internet.

  In addition, especially in installations like retail where branding is critical, consider the look and feel of your selected Gateway. Pick a Gateway that looks good and supports typical commercial building environments with things like ceiling mounts and the ability to hide wires. You may even want to select a Gateway that can be custom-branded for larger customer installations.

## Key Considerations

When selecting a future-proof Gateway, be sure to take under advisement:

- Does the Gateway support the wireless protocols we've selected for our IoT devices? What about future options?

- Can we brand the Gateway to match our company's look and feel?

- Which technologies are supported that will streamline installation and implementation? How involved will my IT department need to be? Is this solution as easy as plug it in and go?

## In Conclusion

IoT is in a period of rapid – but often fragmented – expansion right now, with many different technologies vying to become the industry standard. Businesses, however, don't have the luxury of sitting back and waiting, as the IoT race is on for customer and market share.

To remain competitive, organizations must make careful choices – especially when it comes to the critical role of IoT Gateways – that support their current and future plans. With these considerations in hand, you are well-equipped to choose the best-fit Gateway for your needs, designing the best bridge to IoT success.

For additional information, including custom configuration orders, contact us at info@rigado.com.


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