

## Where AIoT is Headed



After decades of research and anticipation, it seems that the artificial intelligence (AI) is finally upon us and here to stay. Last September, [IDC predicted](#) that 2018 would close out with \$24 billion spent on cognitive and AI systems. The research company predicts that number will more than triple to \$77.6 billion in 2022.

Meanwhile, the Internet of Things (IoT) continues on its similarly explosive track. Last December, [Forbes reported](#) that the global IoT market would be \$151 billion in 2018, from whence it would compound by 39 percent annually to over \$1.5 trillion in 2025, according to IoT Analytics.

If viewed like a two-circle Venn diagram, these two megatrends have an overlapping area: the AIoT.

Conventional IoT devices integrate sensors that gather data. Built-in communications hardware relay this data either to nearby or cloud-based systems for analysis. Those systems may subsequently transmit instructions back to the IoT devices for further action.

By equipping those IoT devices with built-in intelligence, though, there's no need to send data beyond the device. Analysis, filtering, actionable outcomes, and even user interaction can all be handled from the device itself. This capability frees many solutions from the latencies and delays inherent in cloud communications, which can be particularly critical in applications where multi-source data must be acted on in real-time.

The AIoT is an extension of edge computing, which is already prevalent in embedded markets, especially where vision and automation control are key. Edge networks keep critical computing and data-driven actions localized rather than incurring cloud delays. [IDC predicted](#) that 40% of IoT-created data to be handled at the edge in 2019.

Put simply, the difference between a "connected" device and an AIoT device is that the latter can take over decisions and tasks for humans.

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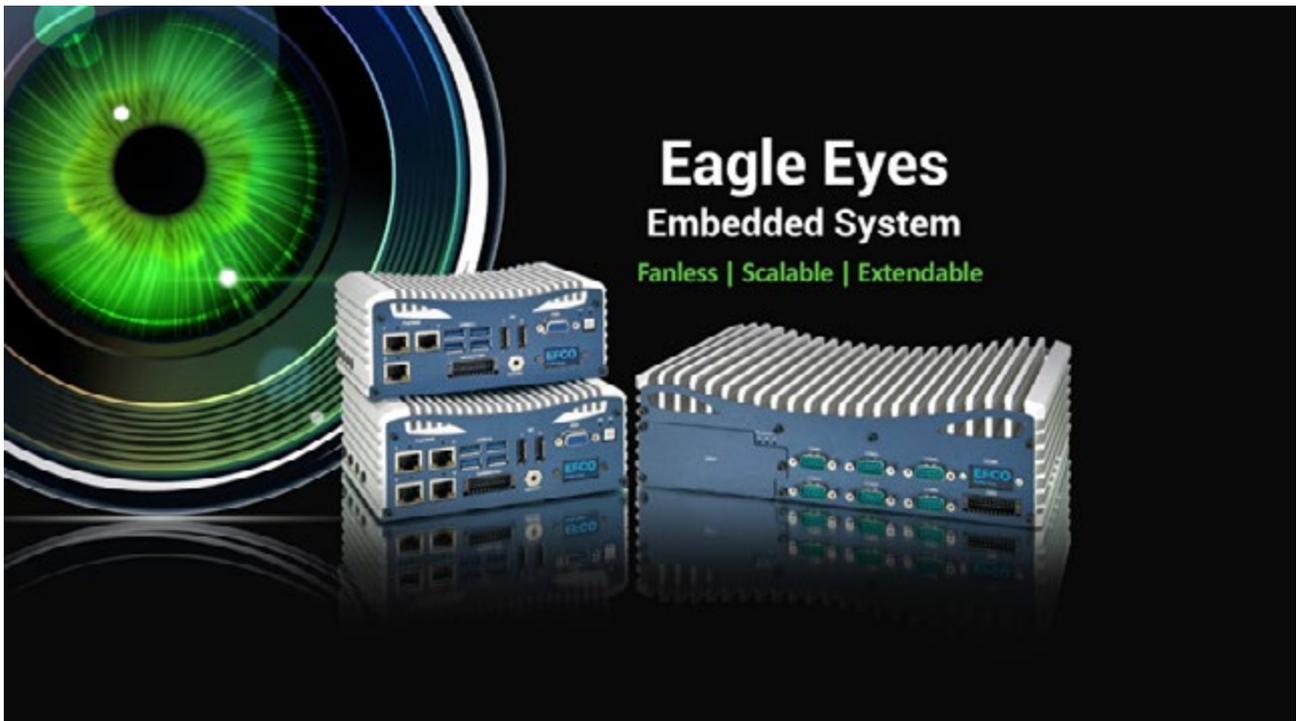
At the [AWS: re:Invent 2018](#) event, Amazon Web Services set out four areas in which AIoT is ripe for growth and excellence:

- Machines monitoring machines. Humans get tired and bore easily. Attention wanes. We loathe highly repetitive tasks, yet these are exactly what dominate assembly lines. AIoT systems can blend various kinds of sensors, including visual recognition systems, to make sure that industrial machines perform within approved tolerances.
- Machines learning from each other and us. Previously, humans have been required to teach machines everything they know. But as AIoT frameworks become standardized, expect more opportunities for devices to begin exchanging data and teaching one another.
- Machines collaborating. Just as collaborating humans tend to create more value collectively than individually, so too can AIoT networks, with each device performing its own complementary task(s).
- Machines making machines for people. When AIoT devices gain the ability to work together to create new devices, a radical new world of individualized customization for consumers will blossom.

The amount of promise and potential from AIoT cannot be overstated. However, we face an immediate challenge in getting deep learning and analytics capabilities into these AIoT devices residing at the network edge. Just as AI requires a formidable amount of computing capability from workstations and servers, the same will also prove true of AIoT edge nodes.

Organizations like their edge devices small, so they're easy to deploy, don't consume much space, and generally don't require much power. Of course, historically, smaller computing systems tended to sacrifice performance.

Fortunately, that condition has now changed.



## EFCO Eagle Eyes

Traditional small form factor embedded systems lack the processing strength necessary to analyze and visualize data flowing in from multiple simultaneous sources in real-time. They compromise on CPU and graphics capability in order to meet desired size, noise, heat, and other characteristics. EFCO now offers its growing family of [Eagle Eyes](#) compact systems specifically customized to the needs of embedded edge and AIoT applications. Features include:

- **Powerful processor:** With CPU options up to the seventh-generation Intel Core i7 Series or Xeon E3 v6 Family, [Eagle Eyes](#) systems can handle robust, data-intensive workloads from within a physical footprint smaller than one's hand.
- **Rugged:** EFCO's tough, finned aluminum enclosure keeps the system protected against the hazards of use and transportation as well as offering excellent heat dissipation for fanless operation.
- **Silent:** Fanless, low-power operation also means that [Eagle Eyes](#) systems can play a valuable role in environments where maintaining the lowest possible noise levels is advantageous.
- **Reliable:** [Eagle Eyes](#) systems are built to operate at peak levels even in a wide array of cold, hot, or humid environments.

- **Special power design:** EFCO equips [Eagle Eyes](#) systems 80V/1ms ~ 200V/1ms surge protection along with wide 9-36VDC input range.
- **Easy diagnostics:** EFCO's unique eKit, which feeds integrated, intelligent system monitoring into an on-device digital display, provides at-a-glance insight into system statuses for quick monitoring and maintenance as well as improved uptime.
- **Compact but powerful:** [Eagle Eyes](#) systems feature up to twelve gigabit power-over-Ethernet (PoE) ports for faster, lower-cost deployment.

[Gartner predicts](#) that "by 2022, IoT will save consumers and businesses \$1 trillion a year in maintenance, services, and consumables." Imagine the additional savings possible by adding AI into the picture via high value-add systems such as EFCO's Eagle Eyes line. The amount of total solution value realized will be in part determined by having the right AIoT hardware systems at the edge.



## Our Services

### *Flexible and Collaborative Manufacturing Services*

With more than 26 years experience, EFCO offers turnkey manufacturing services with state-of-the-art production equipment for both PCB assembly and complete system builds. EFCO utilizes its professional manufacturing process with customized designs in support of small/medium/large-volume and high-mix orders to achieve quick production ramp up and competitive ROI benefits. EFCO's in-house production center provides not only box-build services, but also Conformal Coating, Extended Temperature Screening, and Burn-In services, to ensure the best quality and product longevity.

### *International Quality Assurance Standards*

EFCO is ISO 13485 and ISO 9001 certified, and its total quality management covers customer satisfaction, supplier management, product design and verification, manufacturing, and quality assurance. EFCO proudly offers our customers innovative products and services with the highest level of quality.

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