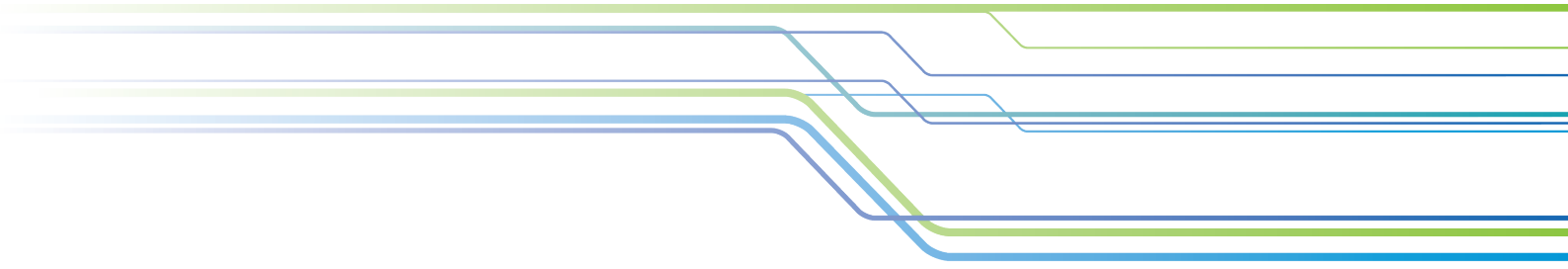
EUROTECH
Imagine. Build. Succeed.

The Accelerator of Digital Transformation



white paper

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PART 1: THE JOURNEY

Introduction

Embracing digital transformation presents many opportunities for companies of all sizes.

They represent critical steps along the path for renewing their business practices, that are often seen as “challenges”. In our view, technological advancements can truly propel business into new dimensions and innovative models.

The most recent growth estimated as the result of Digital Transformation is over $18 trillion in increased annual revenue value across all industries.

Nonetheless, currently fewer than 15% of industrial companies have digital transformation measures in place, which leaves room for radical interventions in many sectors, for both small-sized companies and large conglomerates.

Early adopters were almost always startups or young companies with extra capital to invest, that could afford the higher risk associated with radically new digital solutions for making their businesses more profitable. These early adopters are benefiting now, and have a head start on their competitors.

Today, survival of the fittest is not linked to the size or power or willingness to take the risk of trying but to the **ability and capability to change** — to move quickly, adapt, seize opportunities, and be agile.

Digital transformation is truly **driving every industry sector into a new business context**. From manufacturers, to sellers, traders and intermediaries, they are all

questioned to **rethink their business models**, especially their technology strategy and they start to include in the picture what we believe is the **most effective accelerator of digital transformation, the Internet of Things (IoT).**

The benefits of digital transformation

The impact of incorporating digital initiatives into a business model cannot be generalized.

Digital Transformation is changing the way any organization operates. Systems, processes, workflows, and culture are all impacted by the transformation process which affects each level of an organization.

Digital Transformation integrates data coming from different areas to work together and more effectively, mainly by taking advantage of workflow automation and advanced computing technologies, such as artificial intelligence (AI) and machine learning (ML). Through their Digital Transformation, companies can reach new levels of control on their data, connect the dots on their strategic where it was not possible before.

1. Enhanced data collection

Most businesses are collecting mountains of data on customers, but the real benefit is optimizing this data for analysis. Digital Transformation creates a coherent system of connected devices for gathering data, filter it and integrate it into business intelligence processes at a higher level.

The organization can now **translate raw data into valuable insights across various level in the company**. By doing this, it produces a single view of the customer journey, operations, production, finance, and business opportunities.

2. Resource management

Digital Transformation consolidates information and resources into a suite of tools for business. Rather than dispersed software and databases, it brings together company resources into a single place. Digital Transformation can integrate applications, databases, and software into a central repository for business intelligence.

Digital Transformation encompasses every area of a business and can lead to process innovation and efficiency across units.

3. Data-driven customer insights

Data can be the key to unlocking customer insights. By better understanding your customer and their needs, you can create a business strategy that is even more customer centric. Using both structured data (personal customer information) and unstructured data, such as social media metrics, these insights can help drive business growth.

Data enables strategies to provide more relevant, personalized, and agile content.

4. Overall better customer experience

Customer expectations are sky-high when it comes to their experience. Customers have gotten used to having endless choices, low prices, and fast delivery. Customer experience is the new battleground. Gartner, Accenture and many other analysts report that customer experience "is the key driver of sustainable growth." **Analysts suggest that even a single point increase in customer experience scores can generate millions in annual revenue growth**[1]**.**

[1] https://www.accenture.com/us-en/about/interactive-index

5. Digital culture

By providing team members with the right tools, tailored to their environment, digital transformation encourages a digital culture[2].

While these tools provide an easy way for collaboration, they also help to move the entire organization ahead digitally. This digital culture will be crucial in the future. It forces **digital learning where all the team members can take advantage** of the benefits of digital transformation.

6. Profits growth

Companies that undergo digital transformation improve efficiency and profitability. Many reports already agree on stating that more than 80% of organizations that have completed digital transformation **increased profits and they have also increased their market share** over their direct competitors.

7. Agility

Digital transformation makes organizations more agile. Borrowing from the world of software development, businesses can increase their **to accelerate time-to-market** and adopt continuous improvement strategies. This allows for faster innovation and adaptation while providing a pathway to future improvements.

[2] https://www.virtru.com/blog/data-management-best-practices/

8. Production efficiency

Having the right tech tools working together can streamline workflows and improve productivity, not only by automating manual tasks, but also by integrating new digital workloads and new valuable data throughout the organization. This deep transformation truly **empowers team members to work more efficiently especially in production** and manufacturing activities.

Digital transformation may not always be the right fit

Despite the very promising forecasts for digital transformation that many researchers promote, we should consider that it do not *always* lead to a profit or revenue increase.. While digital transformation certainly provides new business prospects and higher growth expectations for OEMs (original equipment manufacturers) and ISVs (independent software vendors), it may not be appropriate for all companies. For example, companies that provide commodities (e.g. grains, metals, livestock, energy, etc.) or mature companies (over 10 years) which are focusing their business on limited integration services like transportation, refinery, warehouse services, etc., may find it more beneficial to **partner up to build their digital businesses rather than to attempt to undergo the digital transformation process by themselves.**

The long journey to digital transformation

Digital transformation rewards are potentially rich and promising, but **the journey toward it is long and full of challenges, which we prefer to consider as opportunities**. There are calculated business decisions to make at every stage of the process, like the urgency to implement digital transformation, the consistent investment needed and the radical shift in the processes to change.

Urgency: The more time that passes without taking any action, the more of an advantage a competitor will gain, and this gap will only grow over time. Today's competitive industrial environment does not allow companies to remain inactive. It is not a question of "if" a business needs digital transformation, but which aspect of the business need it more urgently.

Investments: Even when the return is well worth it, one should be prepared for the fact that digital initiatives can require significant investments upfront**.**

Processes: A common challenge is that companies still rely on manual or paper-based processes across the enterprise. Digitalized processes result in many immediate business benefits, but more importantly, they serve as the foundation for digital transformation to succeed.

It is clear that the market demands digital transformation and more and more companies think it is inevitable. While all this is already happening, **the biggest opportunity** should be figure out **how to integrate into the equation the benefits of IoT.**

Whether IoT fits in all these digital transformation opportunities is still something to be determined. IoT could be considered merely one of the many digital technologies available today, but we believe IoT is more than an add-on. There is a growing number of experts and companies starting to believe that IoT is strategic, it is transformational, and it is a general requirement and enabler and accelerator of digital transformation. Embracing this vision of IoT, let us move on now to see how impactful it is in the journey of digital transformation.

The digital transformation ecosystem

Technologies like cloud, mobile networks, big data & analytics are related to digital transformation. They are for sure essential parts of the process, but they are ineffective without IoT.

- **IoT integration methodology**: Methodology is important for all these digital technologies to fit a company's need. Without an overall system that assures coherency and control, digital transformation could easily remain a failed experiment

- **IoT network:** Especially when considering digital transformation for industrial organizations such as manufacturing, oil & gas, utilities, etc., IoT is the sole technology that can unlock digital transformation. It depends upon having a secure network of **intelligent field–to-edge–to cloud interconnected devices**

- **Real-time IoT:** Being able to collect deterministic data on the status of assets, processes, and people is essential for responsive and effective decision making. Real-time IoT is another key enabler of desired digital transformation outcome.

IoT provides the foundation for digital transformation; methodology, network and real-time controls are considered as one toolkit, **as the ecosystem provided by IoT.** In the end, considering IoT as the "system", it lays the groundwork that assures that actions taken towards digital transformation will mitigate individual, isolated risks and become **part of a group of cohesive steps.**

PART 2: EUROTECH'S IOT OFFERING

Eurotech OT and IT integration, the foundation of digital transformation

Eurotech is leading the IoT revolution, envisioning and developing a revolutionary set of IoT components, from hardware to software, and forming a strong network of partnerships and foundations to lead the charge.

Eurotech's appeal is its decade-long experience in manufacturing rugged and fully customizable embedded computers. In addition, for over 10 years now, Eurotech has been integrating IoT software capabilities into its own devices as well as third party IoT solutions.

Eurotech's Everyware IoT delivers fully integrated IT & OT enterprise environments; companies adopting Eurotech IoT will be able to easily combine efficient operation with scalability and agility. **Real-time** decision making is critical to business success. A **Secure network** of connected devices is the core of any IoT architecture to supply both the raw device data and sophisticated real-time local analytics that shape intelligent business decisions.

This level of integration is the core of Eurotech **development methodology** in digital transformation scenarios.

Companies that may enter digital transformation without such an IoT infrastructure will find themselves stuck with some basic digital applications that will inevitably only add complexity to their infrastructure.

The ongoing developments in chipset and sensor technology suggest that continuing to imagine our future in a linear way will probably lead to seriously flawed assumptions about the scale, speed, and potential impacts of change. Eurotech provides an architecture that can accommodate change along the way and that can be implemented today.

Eurotech's architecture is based on **industry-wide proven standards, secure channels (like MQTT) and open source technologies** like Linux and enterprise-ready software building blocks. All Eurotech's IoT components are based on this approach.

Use Case: Factory Floor 4.0

Eurotech's supercomputing performance is at the service of some of the most demanding smart factories using high levels of machine and process automation: from assembly line robots, to moving chains and manufacturing machines of any size and type. Eurotech's High Performance Embedded Computing (HPEC) systems and boards can retrofit existing facilities and re-invent new models of automated plants. All Eurotech's HPEC products are built to guarantee:

- faster data access and management
- computing power to enable AI applications and virtualization
- optimized form factors for space management
- rugged and fanless design for cooling management

The **real advantages** of bringing high performance computing capabilities typical of data centers into field-deployable edge devices are:

- reducing **size, weight and power** consumption
- increasing **resilience, robustness and reliability**

- maintaining computational **performance**
- unlocking deterministic data sets for **predictive analytics**
- boosting the advent of Factory 4.0, **automated factories**

Eurotech's HPEC portfolio confirms once and for all that edge computing can really be the key for decentralizing **computing performance** and reducing latency issues, while leveraging **all the flexible and modular IoT capabilities** to enable data center infrastructures at the edge (a.k.a. hyperconvergence at the edge).

DynaNET 10G-01

DynaNET 100G-01

DynaCOR 40-35

BoltCOR 30-17

Related HPEC factory floor automation

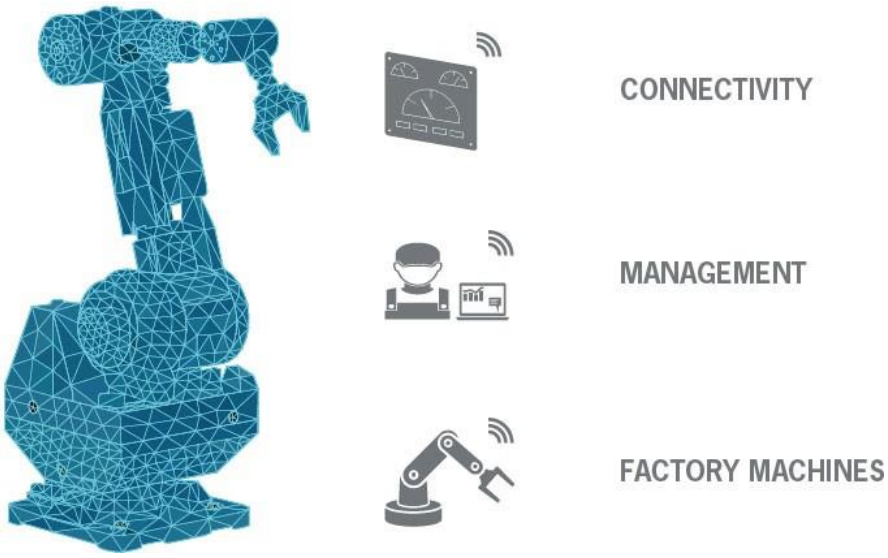
Eurotech's HPEC offerings are bridging the gap between data centers and edge computing. HPECs can maximize computing performance directly at the site where they are located on the edge, namely the manufacturing facilities. Data-center supercomputing performance is now available at the edge where assets, plants, machines, and real needs are.

Eurotech's HPEC solutions succeed in many key aspects of automating factories and especially in automating assets located on the factory floors. Below are some of the most recurrent and highly demanded needs in today's manufacturing plants:

- **Monitoring and Modeling Digital Twins:** HPECs makes it possible to create digital replicas of existing systems to serve as testbeds for new projects and experiments. With a well-modeled digital twin, planning stages can be dramatically simplified. For example, if you were breaking ground for new facilities, having a "lookalike" (the digital twin) to try out different configurations with regard to floor plans and equipment layouts would help in maximize the space you will be working with. Digital Twins are the best way to achieve first class predictive maintenance, product development and ultimately, customer satisfaction.

- **Optimal connectivity:** The use of HPEC on factory floors also implies using wireless connectivity which makes it simpler to implement complex control systems in awkward remote or hazardous environments. For instance, using traditional wired networks to link remotely controlled cranes, robot arms and other manufacturing devices can be very problematic to the point where factory managers abandon the asset itself and never extract data from the device due to their unique ranges of motion and exposure to harsh fabrication environments. HPEC compatibility with wireless technology lets enterprises replace standard connections with fully enclosed mesh radios that perform the same functions. Furthermore, wireless technology may be more useful for automation processes that require fine-tuning or ongoing adjustments as, for example, you don't have to replace miles of Ethernet cable to achieve higher transmission speeds with Wi-Fi.

- **Decentralized management:** Self-detecting issues: debug, tweak and maintain controllers and sensors from local network nodes to cut down on overhead and make the best use of limited bandwidth, sending notifications to its nearest employee or machinist or automatically shut local systems down only when trouble arises.



Once Eurotech's High Performance Edge Computers are installed and connected to the assets throughout factory floors, many are the obtained advantages:

- Latency-free computing between monitored assets and HPEC through smart gateways
- Greater space management due to optimized form factors that require minimal to no data transfer to the cloud
- Minimal human interaction required on HPEC and monitored assets
- Full compatibility with existing assets and even legacy devices
- Full compatibility with existing communication protocols, PLCs, and sensors already in use

To better understand the benefits of HPECs we should analyze real factory applications.

1. Data analysis and transfer

Achieving true automation throughout industrial floors is possible only through the complete integration of edge computing with the equipment, devices, and processes

that drive operations taking place on those specific floors. Eurotech's HPECs, despite being extremely power dense, are engineered to remain small in size yet still be equipped with various connectivity options & ports to retrofit and connect to any existing machine.

In situations where IoT devices produce large data sets, sending captured data to centralized systems for analysis before sending actionable results back to the device slows down automation. HPEC alleviates and **contains dead-times and latency of connectivity**. Its integration eliminates communication and processing time lags to unlock previously impossible real-time automation. This means that "lights-out", "autonomous" factories can be achieved in a very real sense; factories where human contact and labor are considerably reduced.

2. Maintenance procedures

One of the cornerstones of Industry 4.0 is its introduction of predictive maintenance to factory floors. The Industrial IoT devices within smart facilities must also be maintained and optimized to ensure they operate at full capacity. High Performance Edge devices can completely automate the maintenance procedures since all the IoT interconnected devices know **when, where, and how to seek updating points, new instructions, activity bundles & routines, thus autonomously implementing these actions.**

IoT devices with high performance computational capabilities will not only capture data about the immediate environment but also, and **most importantly, monitor their condition and take preemptive measures to ensure they continue to function properly.** The most common functions that factories require are those in which Eurotech's HPECs excel the most: running diagnostic checks, reporting status of operations, and preserving the device's physical system integrity.

The overall advantage is undeniable: reduced downtime and enhanced productivity.

3. Safety & Security

In manufacturing, dealing with security loopholes across IT ecosystems has proven to be a challenge for both large enterprises and SMEs. The introduction of IoT to the factory floor may also increase these challenges as IoT devices create multiple holes and weak points for attackers to exploit. Applying Eurotech HPEC is the way to tackle and resolve these security challenges because:

- the computing process is carried out directly on site;
- there is minimal to no data transfer out of the factory;
- Eurotech's end-to-end approach to data security
- communication protocols, data computation and data transfer all come through secure authentications and account privileges to ensure there are no leaks or external attacks.

4. Scalability: past, present & future Integration

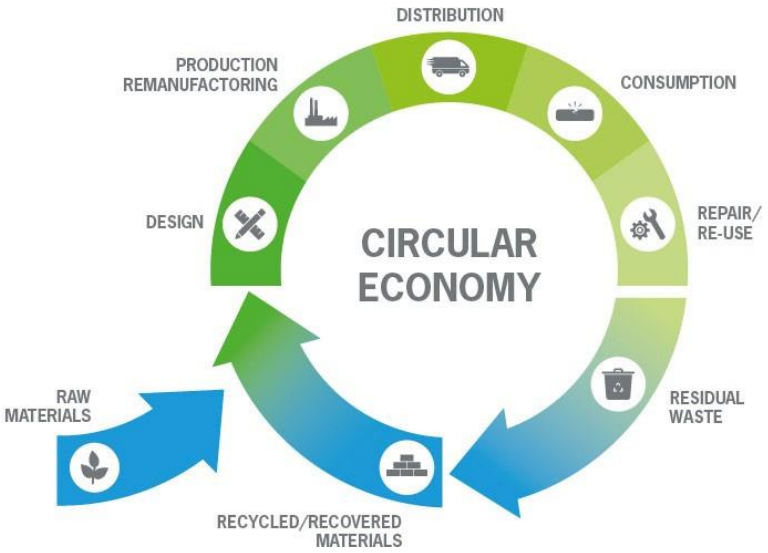
The application of HPEC reduces the points of failure or vulnerable access points that can be exploited as every IoT device operates independently from one another. **The independence, flexibility, and highly dense computational capabilities that HPEC enables can also be extended to existing legacy equipment simply by connecting through an IoT gateway.** This means that IoT and legacy equipment together, will capture, process, and discard temporary data while sending specific permanent data to a centralized gateway with no need to replace very expensive assets which are still otherwise perfectly executing their main function.

Eurotech IoT components can **access applications in the Cloud and platform management technology and are completely network agnostic**; they can connect via different network providers and technologies including GSM, Wi-Fi, LoRa and NB-IoT.

All Eurotech devices with network capabilities are accessible via their own management portal through **EC and ESF web consoles** – offering control of all the connected services via a fully configurable dashboard and widgets.

5. Circular Business Model: Products "as-a-service"

Having Eurotech's HPEC solutions inside factories guarantees precise, low-cost, always-connected IoT equipment and monitoring devices, improved quality of the products the factories produce, and ultimately enhance the types of services provided. Therefore, the technological investment associated with factory automation creates a totally new business model, where the companies can now offer services in addition to just products. This service-driven business model that factory automation and HPEC unlock is not the traditional "linear", based on consumption and waste model but a **new "circular" model base on service use and re-cycle**. The circular business model emphasizes the **maintenance and refurbishment of components at every stage of manufacture, sale, and utilization.** The selling point becomes to **use a service rather than own the product**, consume rather than waste, and recycle rather than discard. By contrast, classic linear economic models focus on the final value created at delivery, and the progressive loss of value generated by uncontrolled waste and disposal.



CONCLUSIONS

To achieve sustainable business growth with digital transformation in the realm of modern factories, **HPECs have become an automatic choice** for all the advantages that they bring compared to traditional edge computing and IoT devices.

Automated factories that, through the application of Eurotech's HPECs and IoT components, switch into the circular, service-focused business model truly become an example of what successful Digital Transformation means.

It is also beneficial to have access to a **global network infrastructure, with a global footprint and a solid range of complementary partners** to assist a company throughout the various phases of digital transformation.

With Eurotech's HPECs, any factory can achieve true automated systems; any company can implement a successful digital transformation strategy that will ensure better performance throughout its business.

Eurotech's IoT components are building the foundation for a new level of automation where:

- **owners, partners and customers all have an overall better experience**
- **digital transformation paves the way into the future where stakeholders interact with each other maximizing the value of business.**

Wherever the Journey of DIGITAL TRANSFORMATION Takes You,
Eurotech Everyware IoT Leads the Way.