# The private industrial edge: what it is and what it means

*April 2024*

**Daniel Beazer**

The private industrial edge is the largest segment of the edge compute market.[1] It is also the one attracting the most interest from vendors, operators and public clouds, but it is the most complex, fragmented and difficult to interpret. Analysys Mason's *Private industrial edge tracker* picks out the trends and emerging use cases that will enable both those who are interested in the market and those who are looking to enter it to improve their strategies and revenue generation efforts.

## The private industrial edge is a radical departure from traditional on-premises compute environments

At its simplest, the private industrial edge consists of edge nodes that are located on the premises of the consumers and producers of data, regardless of industry vertical. The word 'industrial' has a close association with manufacturing, but it also has a broader meaning; indeed, industry sectors as diverse as smart cities, agriculture and mining can benefit from industrial edge computing. Private industrial edges are edge-native compute environments, and are designed specifically for applications that can run autonomously from the central cloud.

The private industrial edge is quite different from the traditional compute environments found in on-premises environments such as ports, warehouses and manufacturing facilities. UK Power Networks's Constellation project is a good example.[2] The traditional operational technology (OT) compute devices that UK Power Networks deploys across its network of substations, are proprietary, specialised devices. These are standard across the power generation industry and each device supports a single application. UK Power Networks, like other electricity generators, needs to evolve its infrastructure to support new-generation sources such as renewables. This requires cloud-like agility, and supporting this new infrastructure using current hardware would call for a costly and difficult-to-manage increase in the number of devices in each substation. UK Power Networks aims to solve this issue as part of the Constellation project by working with vendors of these traditional devices to disaggregate application software from underlying device hardware. The applications can then be moved to a virtualised environment in an industrial edge cloud node located in the substation, thereby replacing multiple proprietary devices.

Private industrial edge clouds that can support multiple use cases are replacing single-application proprietary appliances and/or commodity servers in industrial environments. Momentum for the private industrial edge is growing because enterprises are showing a clear preference for keeping OT applications on premises and away from the public cloud. Using the public cloud is out of the question for utilities (such as UK Power Networks) and players in many other industries. OT applications consume high quantities of data, which is costly to ship to public clouds, and they have stringent performance and security requirements that the public cloud cannot meet.

---

1 For an edge taxonomy, see Analysys Mason's *The edge: what it is and what it means*.

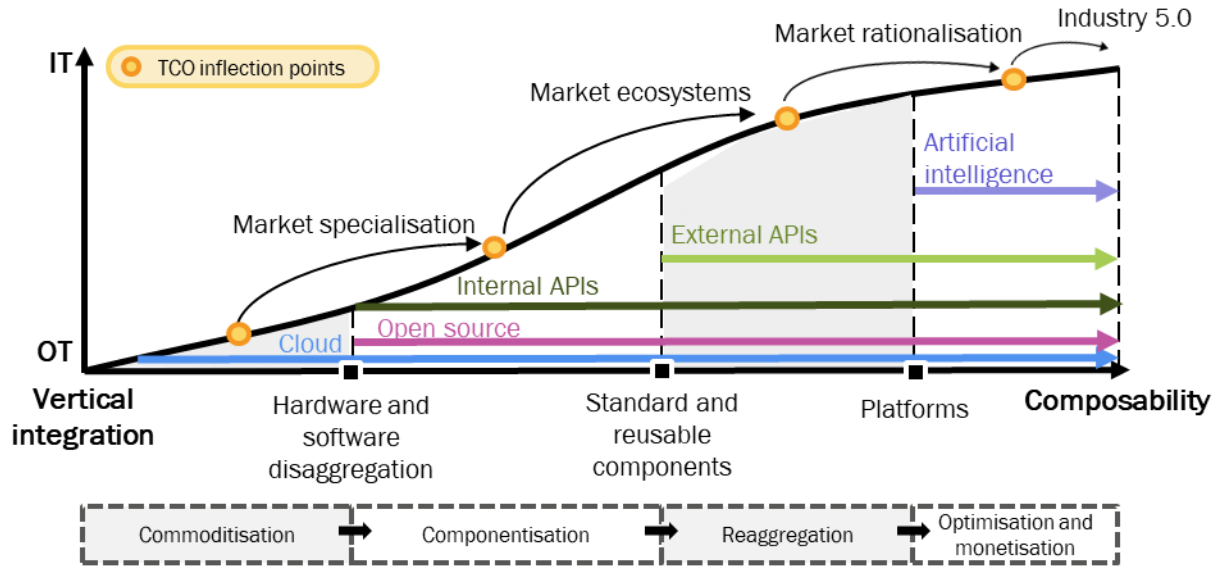
2 For more information, see Analysys Mason's *UK Power Networks: edge case study*.

Industries that have tried moving applications such as point-of-sale (PoS) systems to the public cloud have rapidly repatriated them on-premises.

## OT-to-IT transformation is the goal for many private industrial edges, but there are other use cases

UK Power Networks's substation-based virtual data centre is an example of the OT-to-IT transformation process that we are seeing across all industries. The next step for UK Power Networks may be to establish a cloud that is distributed across multiple substations and nodes and use it to pool resources and run applications with microservices architecture. This is a phase of development that has already been reached by far-sighted enterprises, particularly those in the retail sector. Indeed, retailers such as Lidl have been building private industrial edge clouds based on Open Stack in their retail outlets for nearly 10 years. Players in other verticals such as logistics, manufacturing and healthcare are also undergoing an OT-to-IT transformation process (Figure 1), and each sector is at a different phase of development.

***Figure 1: Four phases of software-driven OT-to-IT transformation***




Source: Analysys Mason

We believe that some OT application workloads will eventually migrate from private industrial edge clouds to public industrial edge clouds. OT applications will increasingly be redeveloped using microservices, so the opportunity will arise to take functionality that is less sensitive to interruptions and security and latency requirements and run it in a shared edge environment. These public clouds will be close to the producers and consumers of operational data, but they will be off-premises and run by a third party, so their costs can be better shared across workloads.[3]

Analysys Mason's *Private industrial edge tracker* shows that OT application modernisation is the leading private industrial edge use case, but there are two other prominent use cases. Field operations is a use case that covers newer, next-generation-type edge deployments such as drones and AV. Field operations require the

[3] For more information, see Analysys Mason's *OT/IT transformation will drive the market for public industrial edge cloud*.

ability to operate autonomously in locations where connectivity/cloud access is limited or where the data/application is mobile. These deployments can also be at scale and highly distributed.

Cloud-out is the third and least common type of use case according to the tracker. Cloud-out applications are IT applications that are capable of, and suitable for, running in the public cloud, but regulatory/security requirements or the conservative attitude of the end customer means that they need to run on on-premises clouds.

The imperative for on-premises compute that drives OT applications means that they will run on private industrial edge clouds for the foreseeable future. Conversely, many field operations use cases are edge-native, distributed, next-generation applications that are natural candidates for the public industrial edge. Field operations use cases are at early stages of development, as are public industrial edges, so applications and infrastructure will need to mature together. Vendors and operators that are targeting the private industrial edge can use our tracker to follow the direction of all three types of use case in the fast-moving and complex private industrial edge market.