



ROC IT Technology Platform

Development platform and control plane for edge data capture applications enables distributed, diverse and dynamic supply chain systems

Summary

ROC IT Solutions developed its software platform to create applications that enable edge data capture with any device, and data exchange with any host environment. The ROC IT technology platform serves as a control plane, enabling powerful applications ranging from policy-based distribution and control of the serialized supply chain processes, to sensor networks in smart infrastructure, to monitoring and management in cloud computing environments.

The applications enabled by the ROC IT technology platform are distributed, diverse and dynamic. Decoupling business logic from the devices allows interoperability with many device technologies. It allows devices to be associated with business logic and business parameters in real time, thus allowing for extremely powerful and flexible solutions. Applications can be run in a distributed fashion and are scalable without high cost and management complexity.

The ROC IT technology platform meets the need for systems that scale simply and cost-effectively, support the diversity and heterogeneity that exist in all systems, and give business and IT leaders comfort that their investments will support current and future decisions.

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Essential qualities for today's supply chain

ROC IT Solutions' software application suites are built on a platform we developed for creating applications that enable edge data capture with any device, and data exchange with any host environment. The platform serves as a control plane, enabling powerful applications ranging from policy-based distribution and control of the serialized supply chain processes, to sensor networks in smart infrastructure, to monitoring and management in cloud computing environments.

With this robust technology platform, we develop applications characterized by three qualities essential for creating business value in today's fast-moving supply chain:

Distributed. The applications are distributed across large, often global, footprints with many nodes or instances that need to run autonomously and independently of one another (unless specified to work together). An example is a global pharmaceutical manufacturer with operations that extend to networked points of automation in worker areas of manufacturing and distribution facilities.

Diverse. Each node in the system may have different hardware and its own set of policies, behaviors, and integrations. An example is a large sensor network for a "smart building" in which endpoints range from lighting controls to HVAC systems.

Dynamic. The applications are dynamic in two ways. First, they are event-rich, and need to respond to both local events at endpoints in the system as well as global events that are sent to the system through a central mechanism. Second, they are ever-changing, and need to be re-configured often to accommodate changes in business process. An example is a system of monitoring and management agents in a cloud computing environment that detect new hardware resources and facilitate dynamic scaling processes utilizing those resources.

Business benefits delivered

This technology is deployed in mission-critical, production environments of Fortune 500 companies. It has created value in many ways, including:

- Enabling a large retail chain to achieve its goal of 100 percent distribution accuracy.
- Making it possible for a healthcare distributor to remotely manage the inventory of life-saving drugs for hospitals around the country.
- Future-proofing the serialization track-and-trace operations of a global pharmaceutical manufacturer.

What is it about the platform that enables organizations to deploy, and get value from, these types of applications? We believe the ability to address the needs of our customers and partners lies in the architecture and its related technological features.

A brief history of the technology platform

This technology platform was conceived after pioneer pharmaceutical track and trace pilots proved that RFID was NOT the best technical choice to solve the serialization requirement mandated by requirements such as California’s ePedigree requirement, and later, broader legislation such as the Drug Quality and Safety Act (DQSA).

This realization gave way to the concept of Edge Data Capture with any form factor or device (“bring your own device” or BYOD).

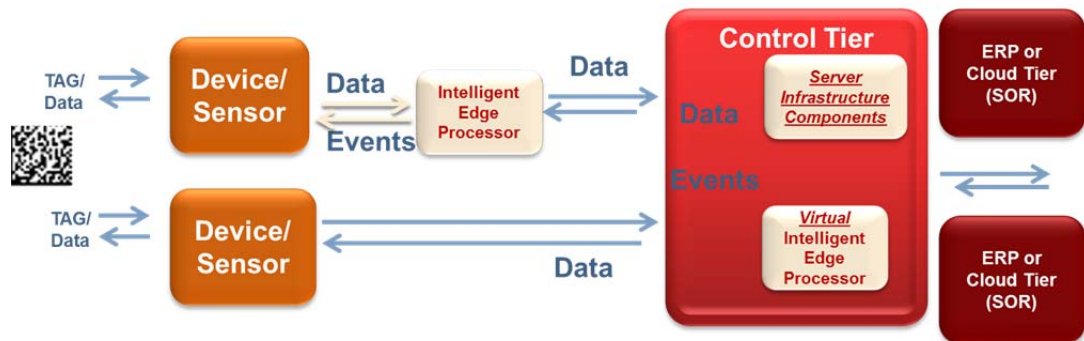
Embarking on the project, the ROC IT Solutions team quickly realized that we needed to develop a methodology for allowing business logic to be decoupled from the device, thus allowing interoperability with many device technologies.

In addition, we decided that we needed to build applications that could be run in a distributed fashion but whose scalability would be independent of cost and management complexity.

From this, we developed a new architectural paradigm that allows devices to be associated with business logic and business parameters in real time, thus allowing for extremely powerful and flexible solutions.

Open source foundation

The Platform is built on the concepts of open source software. A simplified view is shown below.



Benefits of the ROC IT technology platform

We believe the primary areas of business value that the architecture enables include **simplicity**, **scalability**, **diversity**, and **future-resilience**.

What do we mean by each of those, and how does software architecture enable these benefits?

Simplicity

Because the platform allows users to separate parameters for each device and pushes the install automatically to those devices, scaling becomes a simple, efficient, error-proof exercise for the user via a Web-based user interface.

Change management is similarly uncomplicated. When the system needs maintenance or re-configuration, users need only make changes to the devices they care about via the user interface. Because the platform keeps a real-time global system state, it knows where that the configuration is for each end point (device). Changes to end points can be made independent of the other end points.

The concept of two Tiers (Control and Device) could not be simpler: changes to end points can be made without IT being involved. This also translates to lower total cost of ownership.

Scalability - without the cost and complexity

Because the platform allows users to setup N nodes (devices) per Control Tier, scaling is very doable when it is needed.

Achieving scalability is not hard; achieving it without the associated cost and complexity is. In a traditional distributed software system, if users want to scale by adding nodes, they would have to port existing code to new nodes or create code from scratch if the newly-added node required different processes, policies, or integrations.

In a change management scenario, users would have to remember which node carried which concerns and would have to re-configure each unit's software individually. In traditional systems, scaling distributed systems makes them brittle and makes change an unmanageable process.

By contrast, the ROC IT technology platform takes the heavy lifting out of creating new software for added nodes and remembering which nodes do what in order to perform maintenance or re-configuration. These unique capabilities enable true scalability of distributed systems without the associated high cost and complexity.

Inherent support for diversity

Because the ROC IT technology platform automatically generates and distributes targeted code, and remembers where that code resides, it enables a very powerful concept: diversity. This includes:

- Diversity of hardware and devices supported at each node.
- Diversity of business process that must be carried where that node resides.
- Diversity of policies that each node requires, and which may be different from other nodes with similar processes.
- Diversity of integrations for each node, with local or centralized applications or touch-points within the same applications.

Whereas other distributed systems force users to make trade-offs between diversity and complexity (either they have a diverse system that is extremely complex and difficult to manage or they have a homogeneous system that they can manage because all nodes perform the same tasks), the ROC IT technology platform enables users to have both heterogeneity and simplicity.

Future-resilient architecture

The ROC IT technology platform offers the utmost in flexibility, making the system future-resilient.

Because the architecture enables simple, low-cost scaling and change management, it is easy to predict the cost and effort associated with future changes. It also serves as a re-usable platform for the roll-out of powerful, new, distributed applications.

For example, if a global drug maker is using the system to track and trace serialized pharmaceuticals from manufacture through distribution, the organization may wish to:

- Extend the system to add distribution accuracy functionality
- Add a network of touch-screen displays for workers to use.
- Extend information to its suppliers and retailers.
- Integrate more of its centralized applications as the system grows in functionality and capabilities.

All of these future activities are supported and made easier by the architecture and platform.

Meeting current and future needs

From its origins, the ROC IT technology platform was purpose-built to enable distributed, diverse, and dynamic applications. We believe that customers' needs have come full circle since that time, and demand for the benefits envisaged by a simple, scalable enterprise architecture is even stronger today.

As networks have become larger and more geographically dispersed, and as organizations increasingly seek to break down IT silos and get more out of their application investments, there is a growing need for systems that scale simply and cost-effectively, support the diversity and heterogeneity that exist in all systems, and give business and IT leaders comfort that their investments will support current and future decisions.

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ROC IT Solutions enables serialized receiving, shipping, returns, deactivation, aggregation and de-aggregation at all points in the supply chain, from manufacturers to wholesalers, distributors, and retailers. Through more accurate and efficient supply chain serialization, ROC IT Solutions helps companies protect revenues, combat counterfeiting and diversion, and ensure consumer safety. Our solutions allow companies to capture and process data for serialized assets at the edge of the supply chain, where materials handling takes place. By reducing data capture errors and providing real-time decision making at the point of materials handling, our solutions enable serialized product tracking without bottlenecks or bandwidth issues. Our unique distributed architecture enables agile and scalable solutions that are easily deployed and maintained to support any ERP, EPCIS, track-and-trace, Auto-ID or other application, as well as interoperability with any device for barcode and RFID data capture, using GS1 standards. Learn more at www.rocitsolutions.com.

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