

# ENABLING ACTIONABLE INSIGHTS THROUGH SMART LOGISTICS

The ability to discern—and act upon—the smallest details raises the bar on quality, efficiency and customer satisfaction



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Right now, at this very moment, where in the world are the products you are shipping for your customers?

You could probably run a report—perhaps multiple reports—that would tell you how many are in transit to you, how many you are shipping, where they are and how many sit in one of your warehouses. But can those reports tell you:

- If those shipments will be delayed by storms at sea or construction on the roads?
- If those delays cause you to miss other downstream delivery dates and result in additional operational costs (which are already difficult to afford on slim margins)?
- Whether the actions of other logistics providers will compromise your ability to service your shared customer?

Most likely, those reports will give you none of those insights. Yet, really, aren't those insights more important than the raw data about the position of a truck or ship at a specific point in time?

In the world of logistics, these are the hard questions that have always been easy to ask but never easy to answer. Today, though, it is possible to answer these questions. Even more valuably, today it is possible to act upon the answers to these questions—quickly and effectively—with what Software AG calls smart logistics. The benefits? Greater insight, greater control, a greater capacity to run your operations in an optimized manner and a greater ability not only to meet but to exceed customer expectations, all the while protecting your margins.

**Whether shipping critical medicines to a hospital or running the logistical operations of a seaport, you need access to real-time data to gain insights to manage logistics effectively and maintain customer confidence.**

## A world of greater insight

Imagine a pharmaceutical company has engaged you to ship critical medicines to a hospital. The medicine needs to be stored at a temperature below 40 Fahrenheit, so you arrange to ship it in refrigerated trucks. It needs to remain stable, so you pack it carefully and instruct your operator that the trucks cannot be driven hard or jostled about. You want to ensure that an on-time arrival at the pickup location is closely followed by an on-time departure and, most importantly, an on-time delivery.

The question is how can you be sure that your instructions have been followed? How can you know that the temperature in the trucks remains below 40F at all times? How can you be sure the drivers are driving as carefully as you've specified? And it's not just insight about your instructions that matter: If another shipping provider causes a delay at a facility that will subsequently affect the on-time arrival of your shipment, how can you gain accurate insight into this delay and take action to avoid charges that might arise if you don't meet delivery expectations? More importantly, how can you communicate the true reason for the delay to your customer so as not to allow the event to erode your customer's confidence in your services?

Today, with all the data from the sensors in the truck's cargo compartment, engine, drive train, brake lines and tires and with GPS data from e-logs, anti-theft devices, even from the mobile device of the operator, the insights you seek are attainable. You can know with 100 percent certainty where the truck is, where it has been and where it is going. Indeed, with real-time data streaming forth from an ever-increasing number of sources—and not just from the truck but from the broader Internet of Things (IoT)—it's almost hard to imagine that you could not gain access to the data that would verify that your instructions have been followed and that the medicine will arrive in precisely the condition that the hospital requires.

Yet, in many instances, you can't get that data. It may be out there, but you can't access it. Or, even if you can, it may be that you cannot do anything with it. The streams of data are too deep or too fast for you to pluck from them the insights you need.

Or, imagine instead that you're running the logistical operations of a seaport. You've got container ships coming and going at all hours of the day and night. You may know in advance that a ship is supposed to arrive on a certain date, but you may not know exactly when it is going to arrive until just a few hours before it enters the harbor. Between Auckland and Newark or Long Beach and Rotterdam, there are innumerable complications—from weather to rescue operations to the threat of piracy—that can add unexpected days to a transit. Yet precision planning is important. A ship needs a berth or a dock against which to unload; it needs cranes and drayage teams to unload or reload its cargo. You need to schedule people, machines and other resources—and not just for one ship but for many. Without better insight into precisely when ships will arrive and depart, you may be unable to make optimal decisions about where to send harbor pilots, whether to keep a berth open, when and where to assemble the people and machines required to handle the ship's cargo. Ships may stack up in the harbor while teams stand idle on the clock, waiting to unload cargo that has not yet arrived.

Again, the information an operator needs to manage seaport logistics more efficiently is out there. A ship's GPS system can identify its exact position; its communications systems can convey that information in real time, any time. Innumerable sensors on-board a ship can report on engine performance, electrical systems performance, water speed and more. There's plenty of data about shipping lane traffic, environmental conditions and piracy threats. If you could access this data, you could manage the speed of inbound ships based on real-time and projected traffic congestion. You could orchestrate arrival and departure times precisely—and with that the deployment of human and machine resources. By eliminating waste, you could reduce your operating costs and improve margins—and you could help your shipper clients reduce their costs and improve margins at the same time.

But can you access the data? Can you use it effectively? When you are orchestrating the movement of hundreds of ships, cranes, crews and more there may be too much data coming in, too quickly, to act upon it.

In a not-too-distant past, people managing the movement of goods—on trucks and ships, trains and planes—bemoaned a lack of information. Where on the face of the earth was a cargo? How quickly would it reach its destination (realistically, not in some abstract, frictionless scenario)? How much of the cargo would be intact or spoiled? It was nearly impossible to answer these questions—accurately and reliably—with any precision. Planners might want answers whose tolerances could be measured in minutes, not hours. Yet such tolerances were a part of someone else's world; the world of moving trucks and ships was subject to too many variables to manage with greater precision.

Today, all that has changed. The answers are there, in that rushing stream of data. We just need tools with which to make the most of it.

That's where smart logistics fit in.

## Smart logistics

We have long used computers to manage the moving parts associated with logistics. We know all the train cars, containers, trucks and planes. We know where they're supposed to be. We know when they've arrived and when they're in transit. We can keep track of what they contain, who the goods belong to, where they're supposed to go and to whom to send the bills. We can even connect the dots, slotting this ship in that berth, scheduling this drayage firm on that loading job and placing this container on a train or that one on a truck.

Smart logistics solutions add a whole new dimension to logistics management. It's not just that smart logistics enable you to capture more information that is relevant to your operational needs—from the innumerable sensors on the transports you use or from internal and external data feeds about weather, road construction, shipping lane traffic and more. It's also that a smart logistics solution enables you to understand and act upon this information in ways that have never before been possible.

Think of the pharmaceutical company mentioned earlier: What if you could be alerted the moment the temperature in a container threatened to raise above the critical 40F mark? You might be able to intervene before the product was affected. What if your logistics system triggered actions automatically when receiving an alert indicating that the temperature was steadily rising?

A smart logistics system might identify the truck's location, analyze the cause of the change in temperature (discovering that the engine had been switched off to save fuel) and cause a text message to be sent to the driver telling him to provide power to the refrigeration unit. The system would continue monitoring the sensors and know whether the power had been restored—and could escalate the issue if after a specified period it had not been restored.

The essence of smart logistics lies in this combination: the ability to ingest information and gain insights from a wide and ever-expanding set of data sources coupled with the ability to act upon those insights quickly and effectively.

Reconsider the example of seaport operations. A smart logistics solution might enable a port operator to know exactly where a given vessel is, what it's carrying and whether it needs any special support when it enters the port. It might proactively communicate with a ship when that ship is still days from port, telling it to reduce its speed, for instance, so that the timing of its arrival in the port will coincide with the departure of another ship (and the release of the berth that the other ship had been occupying). With full insight into the cargo that the ship is carrying, a smart logistics solution might be able to consolidate and prepare any paperwork that the ship's captain might need to complete—and send it off to the captain before the ship even reached port. The end result is a streamlined operation for the operators of the port and the ship. Every logistics provider involved interacts more efficiently and effectively, which eliminates waste and increases margin for everyone.

**A smart logistics solution enables you to understand and act upon logistics information in ways that have never before been possible.**

**Smart logistics requires tools that can analyze data streaming by in real time, predict what will happen as a consequence of the event expressed in the data and then act upon it when that information is uncovered.**

Ultimately, the ability to capture, analyze and act upon the data that is specific to your operations enables logistics providers to operate more efficiently and effectively—whether you are tracking the progress of the goods you are shipping or tracking the movements of the assets conveying goods on behalf of a client. The ability to work with accurate, real-time data and to factor in many, if not all, of the variables that are likely to influence the movement of goods can make it possible to act with greater certainty and to plan with greater exactitude. Instead of knowing only that a ship will be arriving sometime tomorrow morning, the insights enabled by a smart logistics solution can enable a port manager to know that that ship will be arriving at precisely 9 a.m. With smart logistics, that arrival time could have been predicted five days earlier, too. You can schedule your crews precisely and eliminate the costly wait times and congestion that, in the past, have seemed inevitable.

## Adding the smart to smart logistics

Each of the scenarios outlined above may involve information arising from different sets of sensors and sources. Some of the data may come from mechanical control and GPS systems, while other data comes from streaming information feeds that might be managed by virtually anyone. The challenge of data capture is not a new one. Companies have been struggling to bring data from one machine or service into another throughout the history of data processing. With increasing reliance on open or industry standards (such as the MQTT or AMQP protocols), an increasing number of devices are capable of producing data for consumption by other machines (and vice versa). Even data from sources that are more or less unstructured can be drawn into the analytical mix. There are conventions and tools that can help the consumer of such feeds understand how to integrate the data in those feeds into a smart logistics infrastructure.

Yet the “smart” in smart logistics requires more than a framework for integrating data feeds from ships and trucks, trains and planes. A smart logistics solution requires tools for data analysis—and, indeed, not just any kind of data analysis. Smart logistics requires tools that can analyze data streaming by in real time, predict what will happen as a consequence of the event expressed in the data and then act upon it when that information is uncovered.

Go back to the truck for the pharmaceutical client again. A logistics provider may have hundreds or, more likely, thousands of such trucks on the road at any given time, and information from sensors and systems on each of those trucks could be pouring into your organization in real time. Add to that the real-time feeds about weather systems around the country, local road construction hazards, traffic delays and the like, and it quickly becomes apparent that the stream of data is deep and rushing by quickly—too quickly for any individual to spot the exceptions that might prompt action. There may be only one truck in 100 with a cooling compartment that fails—but you do not want that event to be lost in the information that otherwise indicates that all is well. You need tools designed to analyze those data streams and to respond in real time when problems—or opportunities—flash by.

That last point brings up the final element that makes a smart logistics solution smart: the ability to operationalize action as a result of analysis. A smart logistics solution can prompt something to happen when this or that event occurs, is projected to occur or, for that matter, does not occur. If the truck carrying the critical medicines does not arrive at its destination by a certain time, for instance, the fact that it has not arrived (a non-event, if you will) should also be able to prompt a smart logistics solution to initiate an action. If your smart logistics solution predicts that the position of a truck makes it unlikely to reach its destination on time, you gain the ability to act well in advance of its expected arrival time.

That action can be varied. Some events may simply raise an alert for the operator, who may have to consider what action to take. Others may trigger a complex automated response—from rerouting a truck to dispatching a repair crew, to some other response entirely. What may be most important is that a truly smart logistics solution gives you the flexibility to respond in whatever way your business needs and customer expectations demand.

## A platform for enabling a smart logistics solution

When described in this manner, it becomes clear that a smart logistics solution requires an underlying platform or architecture that has been designed to facilitate interaction with a wide range of data sources and applications. For this reason, a smart logistics solution from Software AG is built on an underlying architecture that Software AG has developed to meet the needs of enterprises interacting with the Internet of Things.

Figure 1 shows how a smart logistics solution from Software AG builds on and takes advantage of the underlying services that support an overall IoT architecture.

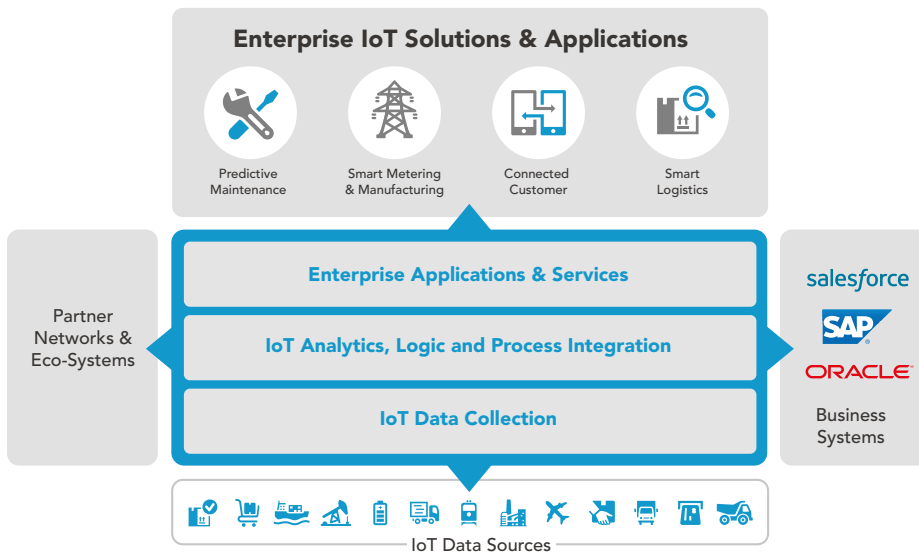


Figure 1: Fundamental Pillars for a Smart Logistics Solution

In this figure, the data sources providing the real-time insights sought by logistics managers can be found on the lowest level of the stack. These could be virtually any input source from the IoT. They interact with the data collection components that act as ingestion points for the smart logistics system. Above that, real-time analytic applications scrutinize the data streaming through the data collectors. When the real-time analytic applications encounter an event, they trigger a response in the enterprise applications and services at the top of the stack. Business systems from SAP®, Oracle® and others can connect in through integration points in the upper levels of the architecture, as can other tools and industry-specific solutions from the broader ecosystem.

It is also worth noting that while this description focuses on how data moves through the IoT architecture to feed into a smart logistics solution, this same IoT architecture ensures that the smart logistics solution can interact and integrate with an organization's other enterprise solutions as well. Thus, the same underlying architecture that enables an organization to use smart logistics to manage cargos, conveyances and crews more effectively also ensures that these logistical activities can be tied into the organization's billing and accounting systems, ERP and CRM systems, maintenance systems and more.

## Making your logistics smarter

With access to real-time data—about the movement of trucks and ships, trains and planes, the factors influencing transport and other elements that can help a logistics provider plan more effectively—and with tools designed to capture, make sense of and act upon that data in real time, you can manage complex logistics operations in a much more streamlined and precise manner. You can plan more effectively, predict events more reliably and respond to events faster.

All these benefits can contribute to lower costs, higher profits, greater reliability and greater customer satisfaction. Our solution incorporates:

Software AG can help you make the most of smart logistics. We offer the solution components needed to ensure performance and flexibility—and an architecture designed to handle not only today's but also tomorrow's challenges. Our solution incorporates:

- Best-of-breed integration technology to access internal systems and external data sources, bringing together all the context needed for interpreting and reacting to sensors and data feeds at high speeds
- Award-winning, optimized streaming analytics for high throughput and low latency
- Visualization tools to move, manage, analyze and visualize logistical data in real time
- Tools to link real-time insights and predictions with context-aware actions and resolution processes to enable a proactive response to logistical situations
- A high-performance, in-memory data fabric that connects all the elements supporting your smart logistics solution and that ensures that organizations of all sizes can take advantage of the solution

The smart logistics architecture from Software AG can be tailored to support any logistics scenario, and the rich range of data collection tools and ecosystem partners ensure that it can help any organization build out a powerful smart logistics solution. At the same time, Software AG's smart logistics experts can help you build out that infrastructure in a modular, staged manner that takes into consideration the realities of your existing infrastructure investments as well as your evolving business and financial plans. You can build on what you have to get where you want to go.

## A world of greater insight

Ultimately, smart logistics will enable you to make better decisions and to act on them more efficiently and effectively. With the technology, you can leap past the limits of what we have known and make better use of what you can know—and there is much more that we can know these days than at any time before now. However, smart logistics doesn't merely enable us to ingest more information, in real time, from more sources. It also provides a set of analytical tools that enable us to gain insight into that expanded volume of information and then to act upon it, in an appropriate manner, with the expedience that the situation demands.

The results? A better use of resources, a better use of time. Lower costs, higher profits. Reduced risk and greater customer satisfaction.

## Recommended resources

For further information on Software AG and smart logistics, check out:

1. [Internet of Things – Hype? Video featuring Forrester analyst Mike Gualtieri](#)
2. [Tailor Your Customer Experience Video featuring Forrester analyst Mike Gualtieri](#)
3. [Software AG IoT Predictive Maintenance Solution Brief](#)
4. [The Forrester Wave: Big Data Streaming Analytics Platforms, Q3 2014](#)
5. [Apama Streaming Analytics on the Software AG website](#)
6. [Apama Streaming Analytics Fact Sheet](#)
7. [Speed in Apama Customer Experience Management Fact Sheet](#)

Contact your Software AG representative today to learn more about how Software AG can help you make the most of smart logistics while concurrently facilitating the transformation of your organization to meet the dynamic demands of the 21st century.

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## ABOUT SOFTWARE AG

Software AG offers the world's first Digital Business Platform. Recognized as a leader by the industry's top analyst firms, Software AG helps you combine existing systems on premises and in the cloud into a single platform to optimize your business and delight your customers. With Software AG, you can rapidly build and deploy digital business applications to exploit real-time market opportunities. Get maximum value from big data, make better decisions with streaming analytics, achieve more with the Internet of Things, and respond faster to shifting regulations and threats with intelligent governance, risk and compliance. The world's top brands trust Software AG to help them rapidly innovate, differentiate and win in the digital world. Learn more at [www.SoftwareAG.com](http://www.SoftwareAG.com).

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