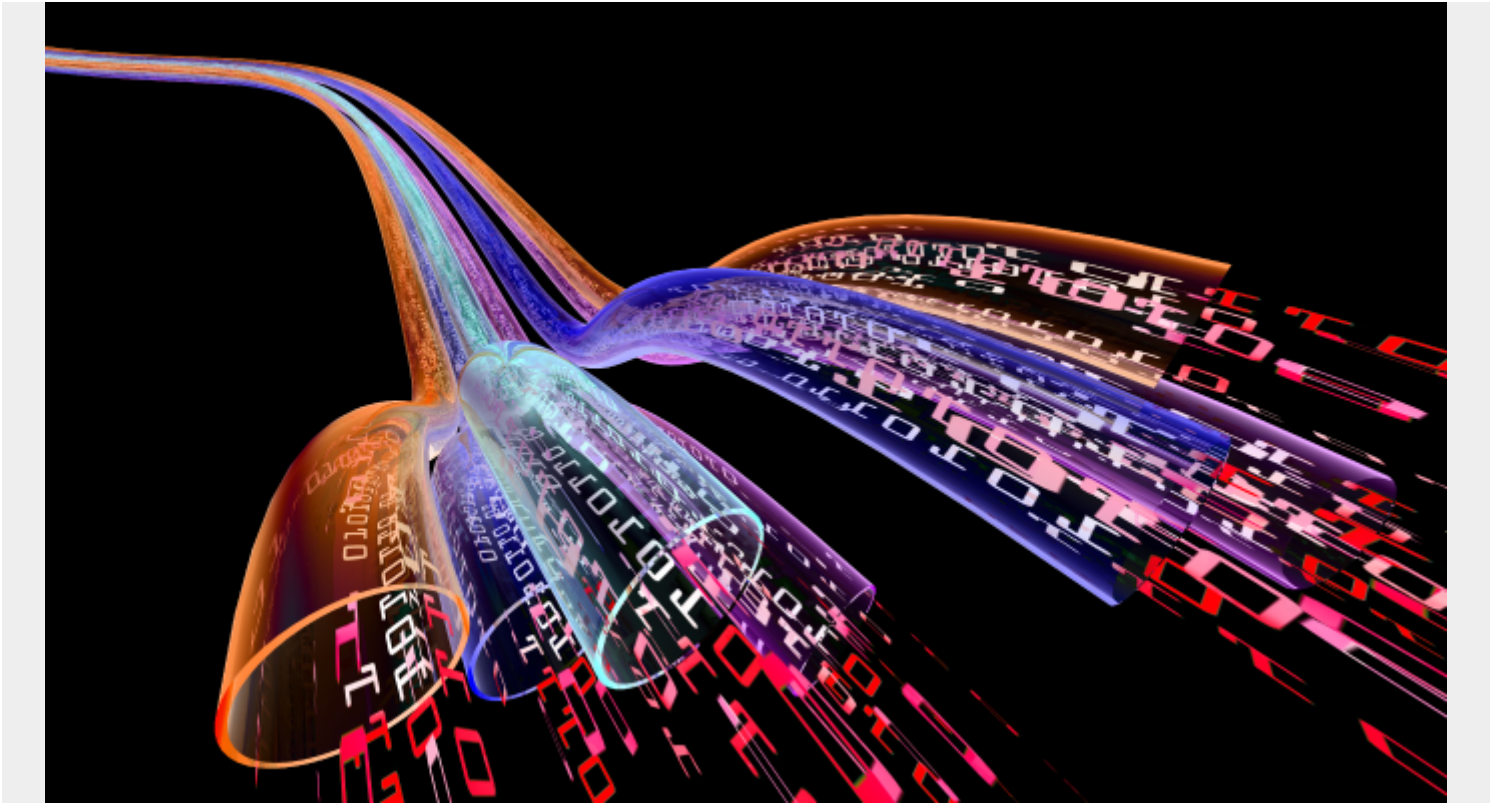


WHAT IS STREAM PROCESSING? EVENT STREAM PROCESSING EXPLAINED



As we continue to rely more and more on data that is generated from our phones, tablets, thermostats, and even cars, the need for it to be analyzed while still streaming only increases. One way that Internet of Things data can be evaluated while it is in motion is with event stream processing. For those in the IT community who utilize event stream processing (ESP) on a daily basis, it may seem like a puzzle for why others aren't so quick to adopt it as it has many advantages over other alternative concepts.

One of the biggest reasons ESP isn't as widely used by those in the industry, however, is due to the fact that there are so many vague definitions and conflicting statements about it. Even seasoned software architects and experienced developers offer varying opinions regarding ESP. That's where we come in. We have put together some of the most important definitions and explanations so you can finally have event stream processing explained.

What is event stream processing?

In order to have solid understanding of event stream processing, we need to break it down into its simplest terms: event + stream + processing.

An *event* is anything that happens at a clearly defined time and that can be specifically recorded. Not to be confused, an *event object* is any type of object that represents or records an event,

typically for the purpose of computer processing. Event objects usually include data about the type of activity, when the activity occurred, as well as its location and cause.

A *stream* is a constant and continuous flow of event objects that navigate into and around companies from thousands of connected devices, IoT, and any other sensors. An *event stream* is a sequence of events ordered by time. Enterprises typically have three different kinds of event streams: business transactions like customer orders, bank deposits, and invoices; information reports like social media updates, market data, and weather reports; and IoT data like GPS-based location information, signals from SCADA systems, and temperature from sensors.

Processing is the final act of analyzing all of this data. So, putting all three of these together, you could say that *event stream processing* is the process of being able to quickly analyze data streaming from one device to another at an almost instantaneous rate after it's created. The ultimate goal of ESP deals with identifying meaningful patterns or relationships within all of these streams in order to detect things like event correlation, causality, or timing.

As ESP is a real-time processing technique, companies will want to utilize it if:

- The events you want to track are happening frequently and close together in time
- The event needs to be detected and responded to quickly

Strong examples of when ESP would be necessary are in the areas of ecommerce, fraud detection, [cybersecurity](#), financial trading, and any other type of interaction where the response should be immediate.

How does event stream processing work?

While traditional analytics applies the process after the data is stored, event stream processing completely changes the order of the entire analytics procedure, allowing for faster reaction time and even providing an opportunity for proactive measures before a situation is over. Processing data in this way is extremely advantageous as the system doesn't have to remember many events thereby using very little memory.

The secret behind event stream processing is its utilization of applying mathematical algorithms to the event data. The system receives information from push-based continuous intelligence systems or pulls in multiple data streams from various sensor-enabled devices where they can be transformed and then joined for analyzing. Predictive models can also be brought into the ESP to provide valuable insights and rules to the data.

While there are obviously many benefits to analyzing and processing data in real-time, there is one constraint with event stream processing that should be noted: the system's long-term output rate must be as fast or faster to the long-term data input rate otherwise the system will begin to run into storage and memory issues.

What challenges does event stream processing solve?

Event stream processing is a smart solution to many different challenges and it gives you the ability to:

- Analyze high-velocity big data while it is still in motion, allowing you to filter, categorize, aggregate, and cleanse before it is even stored

- Process massive amounts of streaming events
- Respond in real-time to changing market conditions
- Continuously monitor data and interactions
- Scale according to data volumes
- Remain agile and handle issues as they arise
- Detect interesting relationships and patterns

Where might event stream processing be used?

Although event stream processing originally found its first uses in the finance industry through the stock market, it can now be found in virtually every industry where stream data is generated, whether it be from people, sensors, or machines. As IoT continues to expand our technologies, we will also continue to see dramatic increases in the real-world applications of stream processing.

Some instances where event stream processing can solve business problems include:

- Ecommerce
- Fraud detection
- Network monitoring
- Financial trading markets
- Risk management
- Intelligence and surveillance
- Marketing
- Healthcare
- Pricing and analytics
- Logistics
- Retail optimization

While this list is far from exhaustive, it begins to show the huge variety of uses for event stream processing as well as how far-reaching it can go.

Conclusion

Overall, event stream processing is here to stay and will only prove itself more crucial as our data requires to be computed and initiated in real-time. ESP is a powerful tool that allows us to get closer to our customers, our companies, and our events in order to take our analytics to the next level. As our devices become more and more connected, having the ability to continuously stream and analyze big data will become vital. Will your organization be ready?