

What is Complex Event Processing?

And why you need it

Industry: Operational Intelligence (OI), Internet of Things (IoT)

Products and Services: Event data processing, Stream analytics

Challenge: Responding to critical business needs in real-time - automatically, reducing burden of hard-coding solutions

Complex Event Processing allows for real time processing of data to identify important information as it is received.

Complex Event Processing recognizes patterns, correlations, and historical context.

What is Complex Event Processing?

Complex Event Processing (commonly called CEP) is a method of taking data (called events) as it is created, usually from many different sources, processing it in real-time, and identifying important pieces of information based on some pre-defined set of criteria. Some general guidelines for the various kinds of criteria for identifying important pieces of information are:

- At least one event
- The latest state from multiple sources
- Changes in the data from a single source over some historical set of data
- A combination of the above - examining historical changes or aggregations of data from many different sources

The *Complex* part of Complex Event Processing is defined by:

- Multiple events with different schema potentially coming from different sources.
- Potentially looking at past historical events.
- Finding important information such as various correlations between different events (possibly of different schemas from different sources) over a varied historical period of time.

Cogswell.io is Aviata's Complex Event Processing solution.

Complex Event Processing allows you to identify valuable information and take action quickly.

An astonishing 90% of the world's data was generated in the last two years.

The above criteria separates it from Event Processing. Looking for patterns, correlations, and examining past historical events usually does not fall into the realm of Event Processing. Another important differentiator is how state is handled. CEP Engines are stateful (they are aware of the state of various devices, or historical context), whereas standard event processing is typically stateless and has no context.

Some example use cases

1. **An automated stock market trading bot:** This bot examines a lot of data from different sources, all in real-time, in order to identify important information that will be factors in deciding what stock market trades to execute next.
2. **A load monitoring system:** This system receives data about the health of various server infrastructures, perhaps even server log events, including network infrastructure data. It can then identify precursors and problems before they become an emergency. The system can either inform appropriate technical staff, or in a more advanced configuration, communicate with the infrastructure itself to take appropriate action. Such actions might include adding standby Virtual Machines to the production system and taking offline problematic virtual machines, or in a Software Defined Network, communicating with the network management system and telling it to add more network infrastructure to handle the incoming load - all seamlessly.
3. **A marketing system:** This system is monitoring customer behavior within a product (or website). It can consider and examine specific individual's historical behavior - IE they came to the store, added items to a cart, then abandoned the cart, and came back the next day to purchase those items. It can also consider historical data, such as past purchases from these individuals. Then, based on defined criteria, it can deliver timely marketing messages to the user (such as "Wait don't go! Take 5% off your order.").

What is a good fit for Complex Event Processing?

- A need to consider information from many different sources AND / OR a high volume of data
- A need to identify important information (needle in a haystack) from vast swaths of data
- A need to take action on this data in real-time / near-real-time

Summary

As the amount of data generated continues to increase sharply (90% of the world's data was generated in the last two years), we will have an ever growing need to identify valuable information and take action as quickly as possible. Complex Event Processing is the technology that makes this real-time evaluation possible, and will continue to be an ever more important piece of modern technology solutions.