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DRAFT Work in Progress

Proposed Event Processing Definitions

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Event Processing Definitions

- ***adaptive process management (n.)*** an element of resource and business process management, adaptive search and event processing. Sometimes referred to as “Level 4” event processing or process refinement.
- ***application concept (n.)*** a definition of a set of properties that represent the data fields of an application entity. An application concept can describe relationships among themselves. For example, an *order* concept might have a parent/child relationship with an *item* concept. A *department* concept might be related to a *purchase requisition* concept based on the shared property, *department id*. Application concepts can include an application state model.
- ***application state modeler (n.)*** a UML-compliant application that allows you to model the life cycle of a concept instance — that is, for each instance of a given concept, you can define which states it will pass through and how it will transition from state to state. States have entry actions, exit actions, and conditions, providing precision control over the behavior of an event processing agent. Transitions between states also may have rules. Multiple types of states and transitions maximize the versatility and power of the application state modeler.

Event Processing Definitions

- **derived event (n.)** an event that is created as a result of processing one or more other events.
- **complex event (n.)** an event that is a situation-entity abstraction of two or more simple, derived or other complex events,
- **complex event processing (n.)** CEP is a technology for extracting information from message-based systems. CEP is primarily an event processing concept that deals with the task of processing multiple events from an event cloud with the goal of identifying the meaningful events within the event cloud. CEP employs techniques such as detection of complex patterns of many events, event correlation and abstraction, event hierarchies, and relationships between events such as causality, membership, and timing, and event-driven processes.

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Event Processing Definitions

- **event (n.)** a instance of an *event definition*. It is an immutable object that represents a business activity that happened at a single point in time. Just as one cannot change the fact that a given activity occurred, one cannot change an event — events are immutable.
- **event aggregation (n.)** the aggregation of simple, derived or complex events into higher levels of event abstractions.
- **event definition (n.)** a set of properties related to a given activity that represents an important or interesting change of state in a human, system or computational activity. An event definition includes event properties such as event priority, event time to live (TTL), and a description of the payload, which is comprehensive information related to the activity that occurred. Events expire when the TTL has elapsed, unless the event processing agent has instructions to consume them prior to that time.

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Event Processing Definitions

- **event channel (n.)** a communications channel in which events are transmitted from event source to event receivers, typically received as electronic messages. Each channel can have multiple destination and events can be configured to transmit to a default destination. JMS is an example of an event channel.
- **event cloud (n.):** a partially ordered set of events (poset), either bounded or unbounded, where the partial orderings are imposed by the causal, timing and other relationships between the events. Typically an event cloud is created by the events produced by one or more distributed systems. An event cloud may contain many event types, event streams and event channels. The difference between a cloud and a stream is that there is no event relationship that totally orders the events in a cloud.

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Event Processing Definitions

- **event-driven (n.)** the behavior of a human, system or computational entity whose execution or actuation is in response to events, typically received as electronic messages.
- **event-driven architecture (n.)** an architectural style for distributed computing applications in which some of the components are event-driven and communicate by means of events. **event processing (n.)** computing that performs operations on events, including modifying, creating and destroying events.
- **event-object (n.)** an software object that represents an event, generally for the purpose of computer processing, that exhibits both encapsulation, inheritance and polymorphism.

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Event Processing Definitions

- **event prediction** (n.) computational activity where the impact of events, complex events, and situations caused by events identified, including both opportunity or threat. Sometimes referred to as “Level 2” event processing, impact assessment or predictive analytics.
- **event pre-processing** (n.) computational activity where events are cleaned or normalized to produce semantically understandable data. Sometimes referred to as “Level 0” event processing.
- **event processing** (n.) computational activities on events dealing with the association, correlation, and combination of event data and information from single and multiple event sources to achieve refined identity and situation estimates for observed event objects, and to achieve complete and timely assessments of opportunities, threats, and their significance. Event processing is characterized by continuous refinements of event estimates and assessments and by evaluation of the need for additional sources, or modification of the process itself, to achieve improved results.

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Event Processing Definitions

- **event processing agent** (n.) an EPA is a computational entity that performs event processing.
- **event processing network** (n.) a set of event processing agents and a set of event channels connecting them.
- **event properties** (n.) data representation of an event, typically by name-value pairs of type string, integer, real, boolean or a complex data type.
- **event refinement** (n.) filter, identify and track events & make initial processing decisions based on association, correlation and state estimation. Sometimes referred to as “Level 1” event, or event-object, track and trace.

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Event Processing Definitions

- **event stream (n.)** a time-ordered sequence of events. An event stream may be bounded by a certain time interval or other contextual dimension (content, space, source, certainty), or be open ended and unbounded.
- **event stream processing (n.)** a time-ordered sequence of events. An event stream may be bounded by a certain time interval or other contextual dimension (content, space, source, certainty), or be open ended and unbounded.

Event Processing Definitions

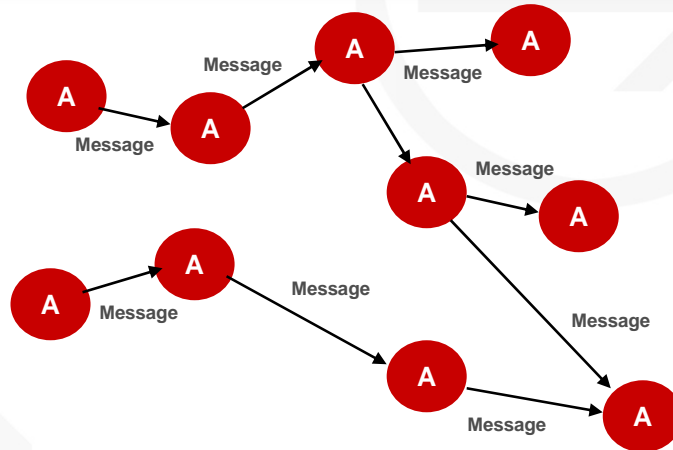
- **rule (n.)** defines what triggers unusual, suspicious, problematic, or advantageous activity within an event processing agent and what the EPA does when it discovers these types of activities. Rules execute actions based on certain conditions on events, instances, or a combination of both. A rule includes a group of condition-rule statements and action-rule statements. The condition statements instruct the EPA what to look for in events, and action statements instruct the EPA how to respond when conditions are met. If all the conditions in a rule are satisfied by events or instances or both, the EPA fires the actions. The action might be to execute tasks, create an event instance, modify property values in an event instance, create and send an event, or something else.
- **rules engine (n.)** a type of event processing agent that uses a declarative programming model to process events. Formally described as "an abstract structure that describes a formal language precisely, i.e., a set of rules that mathematically delineates a (usually infinite) set of finite-length strings over a (usually finite) alphabet". Informally, it can be any system that uses rules, in any form, that can be applied to data to produce outcomes

Event Processing Definitions

- *rule language* (n.) is an artificial language that is used to control the behavior of an event processing agent. Rules languages, like human languages, have syntactic and semantic rules to define meaning.
- *situation refinement* (n.) identify situations, or complex events, based on event clustering, event-event relationships and relationship analysis and context. Sometimes referred to as “Level 2” event processing.
- *simple event* (n.) an event that is not an abstraction or composition of other events.
- *virtual event* (n.) an event that is imagined, modeled or simulated.

Appendix and End Notes

EDA Visualized



Asynchronous, Decoupled, Not Orchestrated

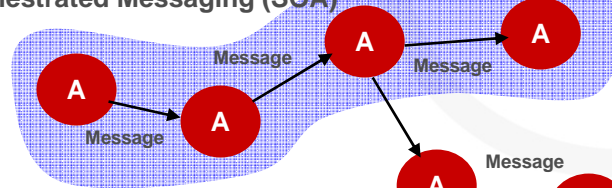
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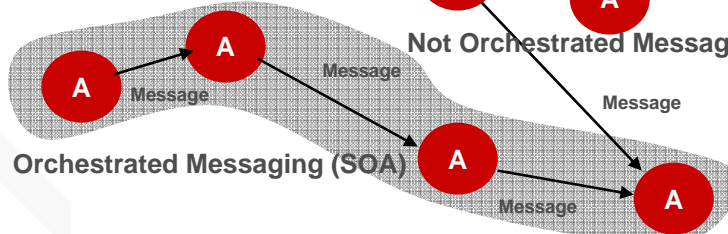
“Traditional SOA” + EDA Visualized

Orchestrated Messaging (SOA)



Note:
Request/Reply
Implied in
“Orchestrated
Messaging”

Not Orchestrated Messaging (EDA)



Orchestrated Messaging (SOA)

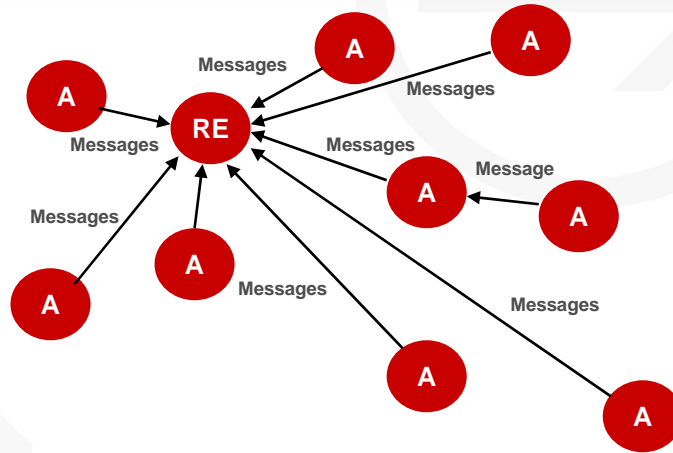
Synchronous & Asynchronous, Loosely Coupled & Decoupled, Managed, Orchestrated, Not Orchestrated, Consumer-Driven, Producer-Driven

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FYI: Event Processing (EP) and CEP Visualized



Many-to-One Asynchronous Events Processing with Rules Engine (RE)

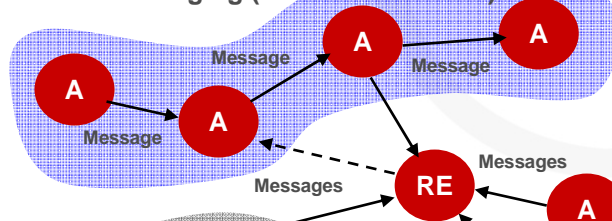
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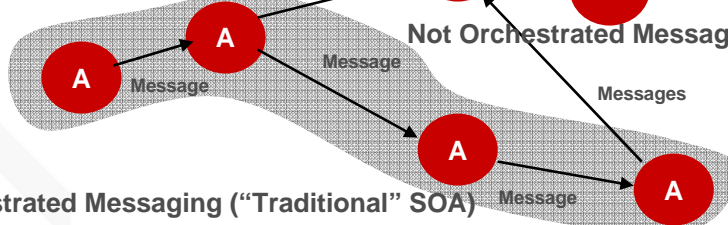


SOA + EDA + CEP Visualized (with Rules Engine)

Orchestrated Messaging ("Traditional" SOA)



Not Orchestrated Messaging (EDA)



Orchestrated Messaging ("Traditional" SOA)

Synchronous & Asynchronous, Loosely Coupled & Decoupled, Managed, Orchestrated, Not Orchestrated, Consumer-Driven, Producer-Driven

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End Notes

- Messaging technologies, like JMS or ESB, etc. are “assumed” in the illustrations by the words “messages”.
- Gartner and others have/are redefined/redefining SOA as “SOA 2.0” and “Advanced SOA” to encompass the entire domain of distributed computing services “based on service interfaces”.
- There are a number of “critics” to this “new definition of SOA” and the “jury is still out” on where all this new “SOA marketing” will lead.

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**Please Send Comments
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Thank You!

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[Complex Event Processing at TIBCO](#)