Decision Management At the Speed of Events

The power of rules, events, entities and analytics

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IBM

Biography

Dan Selman holds a BEng in Civil Engineering with Computing and an MSc in Artificial Intelligence.

He has been developing enterprise business rules engines for BEA Systems, ILOG and IBM since 1998.

Since 2013 he has been Chief Architect for IBM Decision Server Insights, a near real-time platform for situation detection that combines rules, Java and analytics.

Agenda

- Market context

- Decision automation

- Event-based situation detection
    - Decision Server Insights

- Analytics-driven decision automation

- Stream-based situation detection

- Big-data decision automation

Market context

We live in a moment of enormous possibility and digital transformation
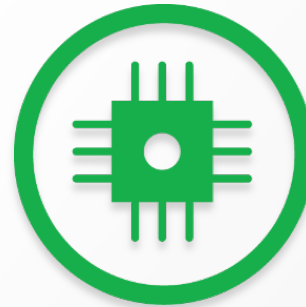
90%
Of the world's data created in the last two years.

4x
Increase in key business investments in Cloud over 2013.

100%
Of LOB apps will be built for mobile-first by 2017.

75B
Devices connected to the internet by 2020.

Alone, each of these has immense potential. Together, they can **change everything.**

Customers hold more power than ever and no one is immune to these changes

2/3 Of credit card fraud alerts resulting in denials that are actually legitimate purchases

**84%** Of companies believe service is important to their financial performance

59% Of companies say a customer service failure has had a clear, significant financial impact on their company

Decision automation

Empowers business users to automate repeatable day-to-day business decisions and react to emerging situations in real-time

- Codify business policies, practices and regulations in natural language instead of code embedded in applications

- Empowering business people to author and change operational decisions supported by easy-to-use governance of those changes

- Automating decision making at scale, with the fidelity of an expert

- Combined business rule and business event capabilities for a comprehensive decision management platform
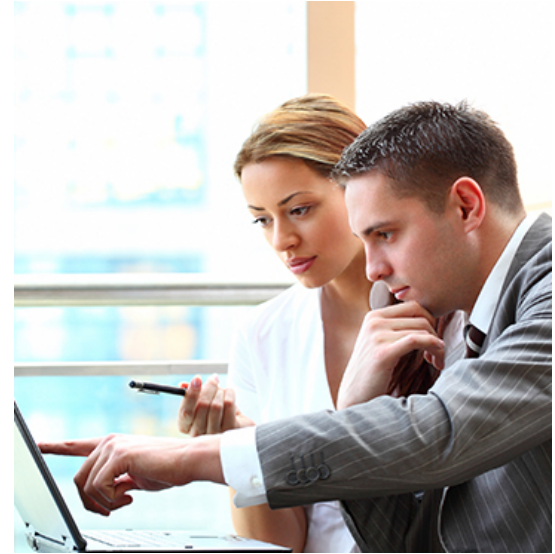
Transactional Decisions for business automation **+** **Situational Decisions** to detect situations and respond **=** **Complete** Decision Management platform

Types of decision automation

Transactional Decisions

- Invoked in context of a business process or application (request / reply)
- Use data from transactional records
- Stateless decisions
- Interactive or batch

DECIDE

Decision Server Rules

Whatever my action,
you are ready to respond

Situational Decisions

- Triggered by multi-channel interactions (event-driven)
- Use business event history, business context and analytics
- Stateful decisions over a context built over time
- At the earliest actionable moment (real-time)

DETECT & DECIDE

Decision Server Insights

Whatever my next step,
you have anticipated my needs

Examples

Transactional Decisions

- Should this loan be approved?
- What is the appropriate discount rate that should be offered?
- What are the restrictions that apply to this sale?
- What are the documents required by the regulation?

Decision Server Rules

Situational Decisions

- When a customer enters the store, if they have made more than 5 purchases in the last 6 months, send a discount
- When a customer logs into their account from their mobile app, if they have a high churn propensity score, offer them a free month of service
- Is this transaction fraudulent given the recent history and geolocation of the customer?

Decision Server Insights

Event-driven situation detection

What…

Find patterns continuously over an event stream and correlated entity data to detect opportunities, risks or threats.

What if…

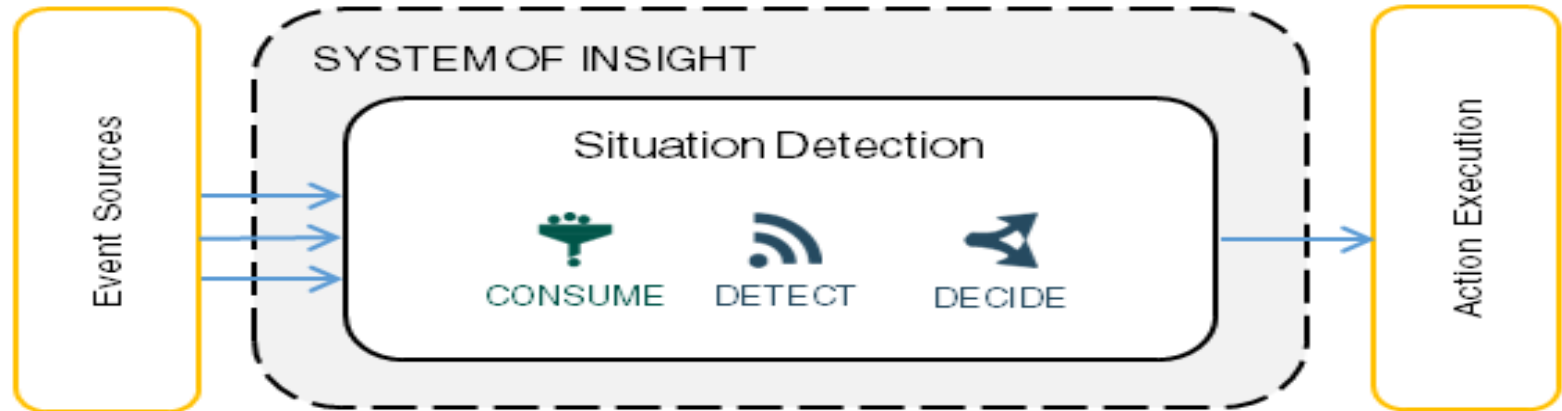An airline could optimize the traveler experience to address change and mitigate inconvenience on an individual basis in real-time?

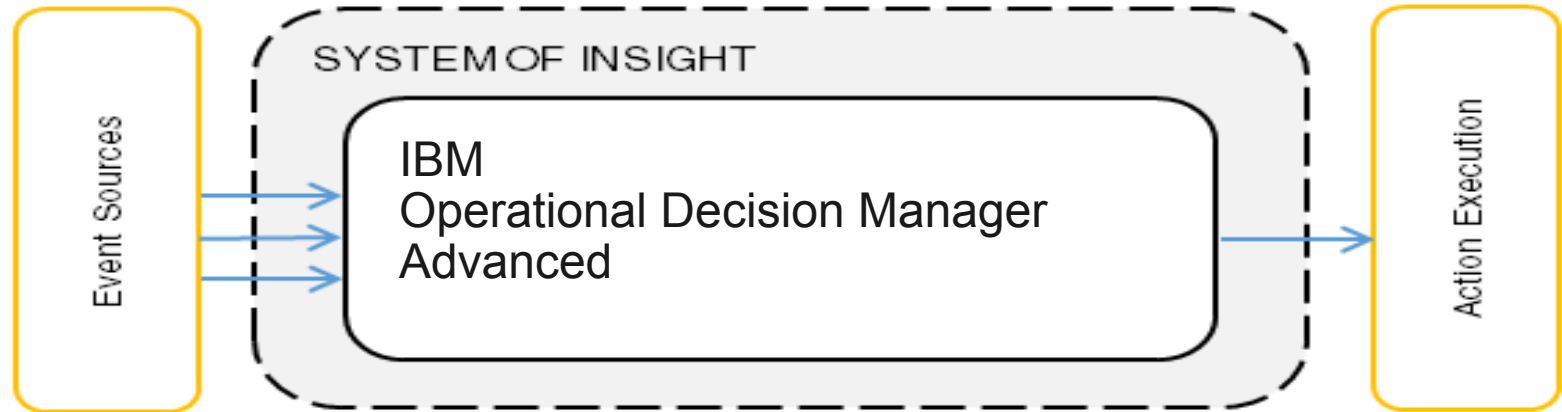A global financial services firm could make its advisors always-aware of client activities and needs?

An investment bank detects when trades go wrong decides automatically how to fix them?

Event-driven situation detection

Event-driven situation detection

SYSTEM OF INSIGHT

Event Sources

IBM
Operational Decision Manager
Advanced

Action Execution

Decision making in context

Processes

Social Media

Systems of Record

Data Warehouse

Sensors

Information Bus

Systems of Engagement

Mobile Devices

Business Events

Situation Detection & Action

Sense what is happening

Build your context

Situation Detection

Act quickly & consistently

Decide what to do
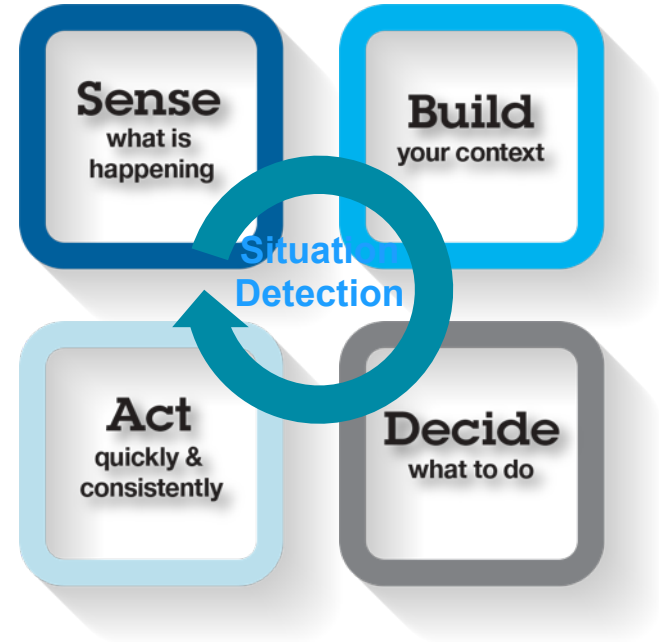
Turn insight into action to detect opportunities and identify risks

Sense what is happening

Capture events relating to entities of interest to the business

Build your context

Build and maintain context about those entities

At the time of interaction

Act quickly & consistently

Push actions to the participants, processes and systems most relevant to execute them

Decide what to do

Detect patterns and make decisions
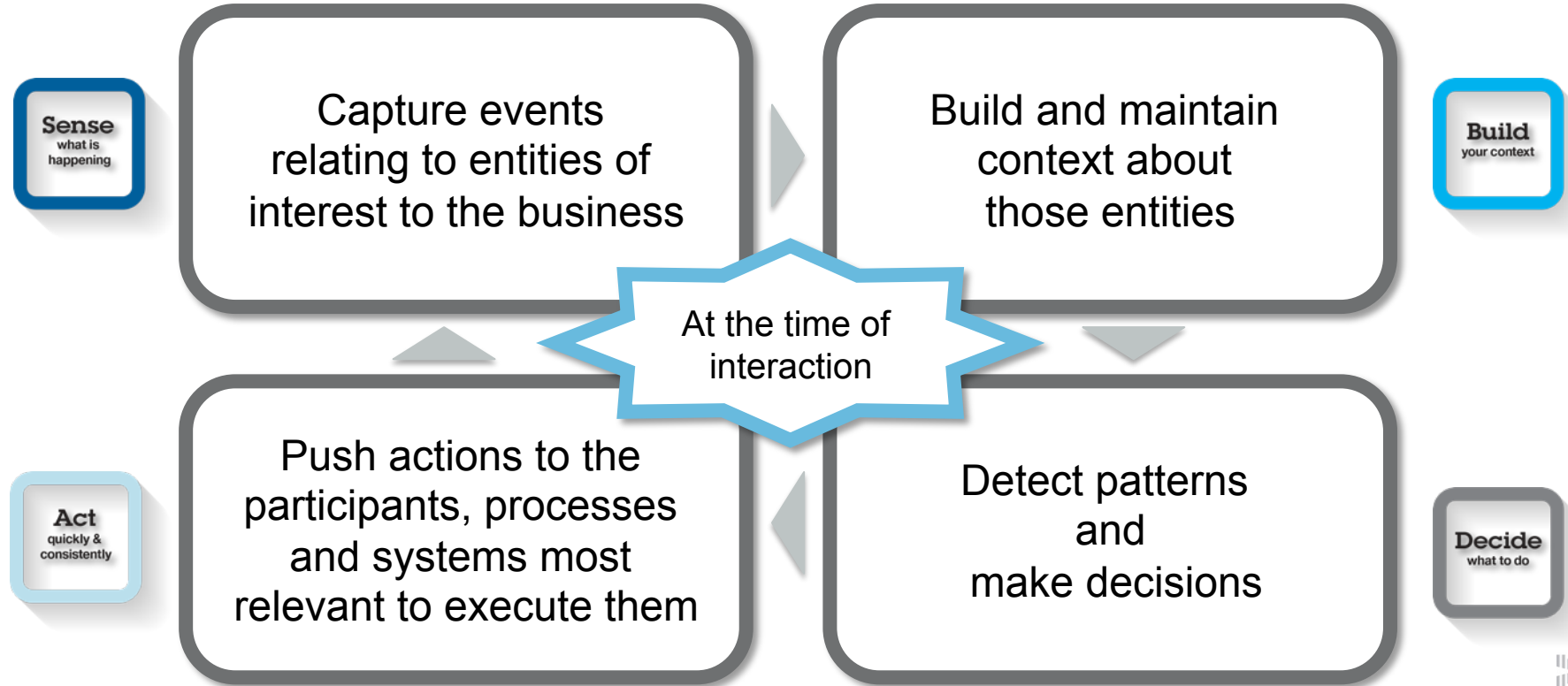
Context leads to greater understanding and enables personalized interactions

A **flexible modeling framework** that enables easy representation of the critical aspects of your business

Extensive support for **geospatial data and analytics** including geo-location, geo-fencing, spatial relationship and more

State

Geo-spatial

Historical

Predictive

Easily recognize meaningful patterns and trends in real-time, leveraging **long term historical contexts and powerful analytics**

Easy to **leverage the predictive models** that can help you make the difference

Real-time contextual decision making

Events

Detect patterns of events over the time

Applying Enterprise Policies

Policies

Leverage Predictive Models and other Analytics

Decision Making in Context

Leverage information from System of Record
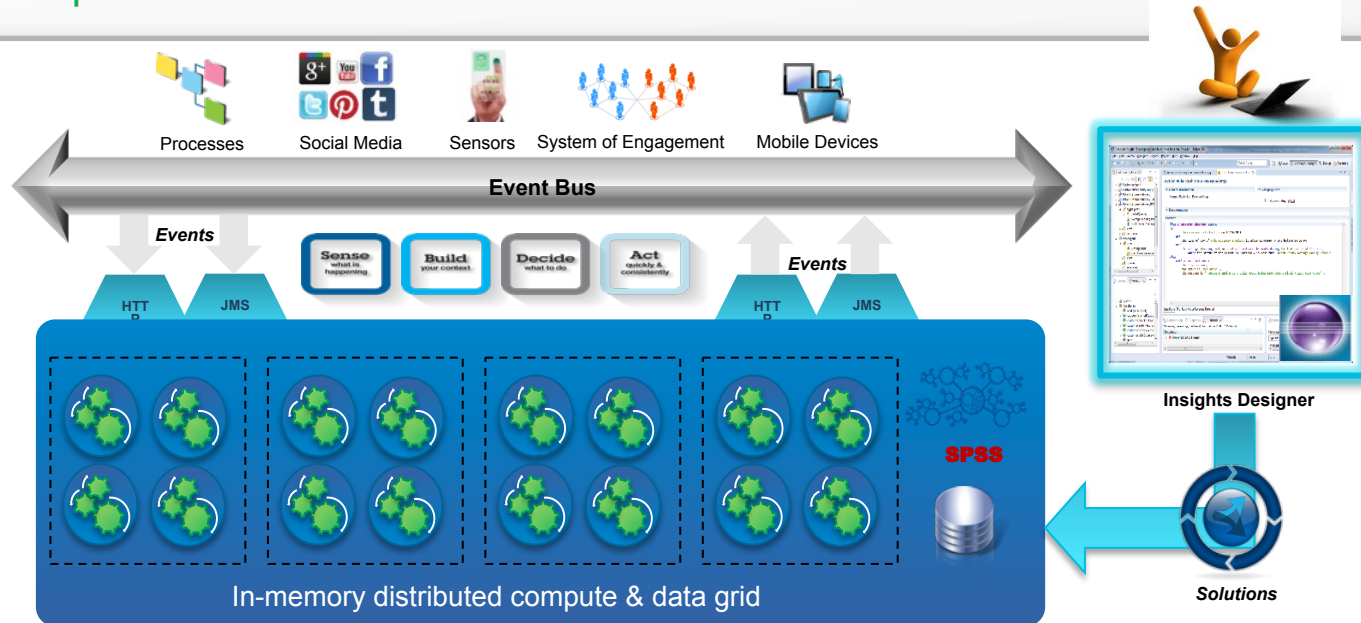
Analytics

System of Records
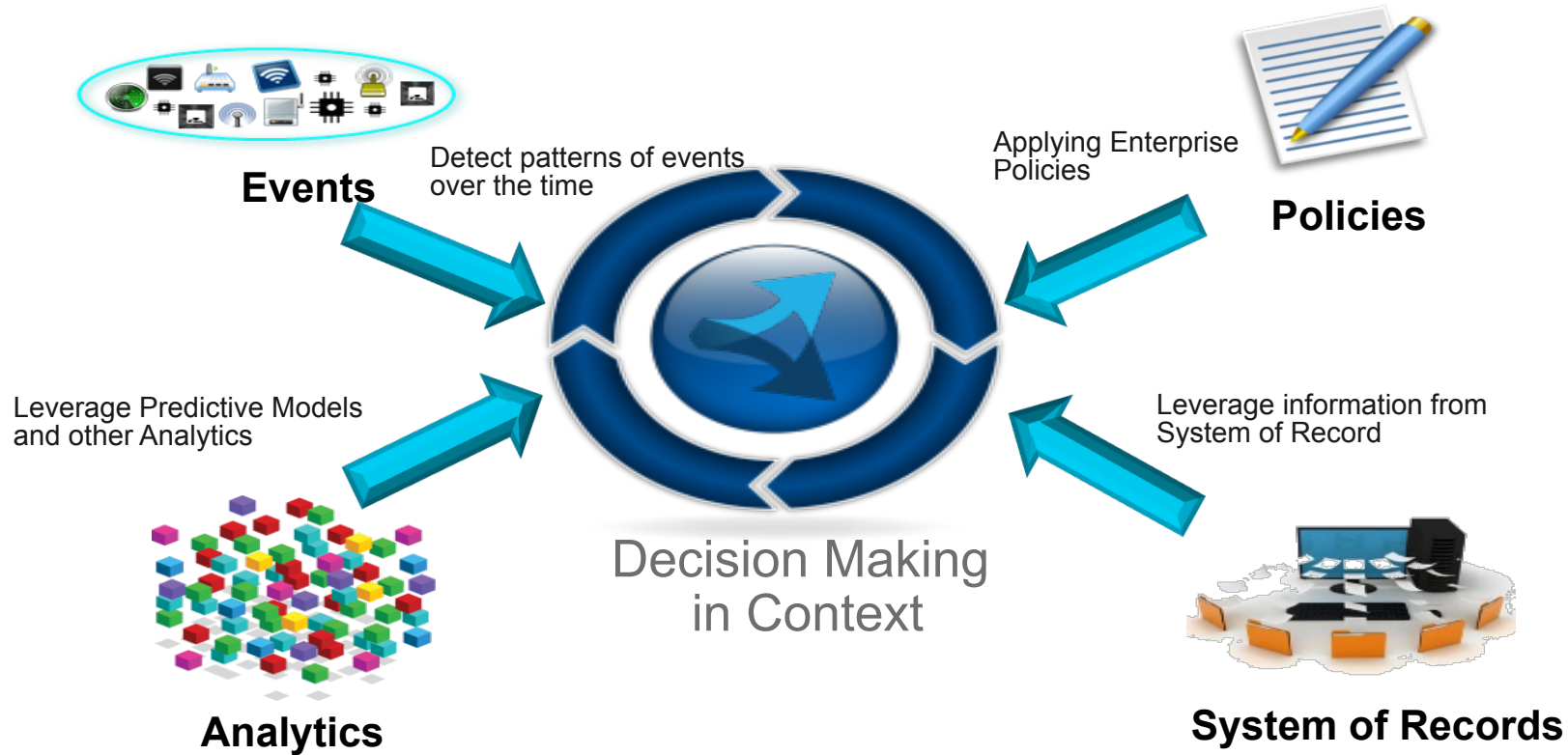
Decision Server Insights

An introduction to Decision Server Insights, part of IBM Operational Manager Advanced, which enables situational decision making for turning insights into action

Decision Server Insights at a glance

Decision Server Insights wraps business rules, events, predictive and real-time analytics in an integrated, easy-to-operate, elastic platform allowing continuous analysis and optimized decisions at the time of interaction leveraging the enterprise's up-to-date analytics models and business policies.

Processes
Social Media
Sensors
System of Engagement
Mobile Devices

Event Bus

Events

Sense what is happening
Build your context
Decide what to do
Act quickly & consistently

Events

HTTP
JMS
HTTP
JMS

SPSS

In-memory distributed compute & data grid

Insights Designer

Solutions

Insights Core Building Blocks

Sense what is happening

Build your context

Act quickly & consistently

Decide what to do

Event
Message representing something that happened

Entity
Some business relevant thing and related information

Agent
Business logic that is applied to an incoming event

How the Building Blocks Work Together

1 An event is related to one or more entities. Upon receipt by the system, the event is routed to those entities.

2 An entity stores basic data about the business entity, along with necessary event history

Event

Entity

Event History

3 Agents are bound to entities and process specific events.

Agent

4 Agents are logic fragments implemented in one of three ways

5 Agents may emit new events, either internal to the solution to trigger additional event-entity-agent bindings, or external to trigger system actions

Rules

Predictive Models

Java

Unified Business-Friendly Language

a customer **is a business entity** identified by a name.

a customer **has** a home country.
a customer **has** a propensity to trav
a customer **has** a current location u

a country **can be one of** : US, Franc

a credit card **is a business entity**
named the owner.

a credit card **has** a credit limit (n

a card level **can be one of** : Standa

Entity
Some business relevant thing and related information

a transaction **is a business event** time-stamped by a date related to a credit card.
a transaction **has** an amount (numeric).
a transaction **has** a location that is a country.

a transaction **has** a geolocation used as the default geometry .

a credit card activated event **is a business event** time-stamped by an activation date.
a credit card activated event **is related to** a credit card .

a customer notification **is a business event** related to a customer.
a customer notification **has** a message.

a fraud alert **is** a customer notification .
a fraud alert **has** a fraud level.

a fraud level **can be one of** : Low, Medium, High.

an offer **is** a customer notification **with** an offer type.

an offer type **can be one of** : New Product, Discount, Reward.

Event
Message representing something that happened

23

Unified Business-Friendly Language

```
when a transaction occurs
    where the location is not the home country of the owner of 'the credit card'
definitions
    set 'out of country transactions' to all transactions
        where the location is not the home country of the owner of 'the credit card' ;
if
        the propensity to travel of the owner of 'the credit card' is less than 0.25
    and
        there are more than 2 transactions in 'out of country transactions' during the last period of 2 days
    and
        the average amount of 'out of country transactions' is more than 500
then
    emit a new fraud alert where
        the customer is the owner of 'the credit card' ,
        the fraud level is Medium ,
        the message is "Out of Country Fraudulent Use" ;
```

Agent
Business logic that is applied to an incoming event

Analytics-driven decision automation

What…

Using analytical techniques to inform the design of automated decisions.

What if…

A retailer applies segmentation analysis to offer tailored promotions to their customers?

An intelligence agency detects security risks in real-time through analysis of passenger manifests?

Analytics-driven decision automation
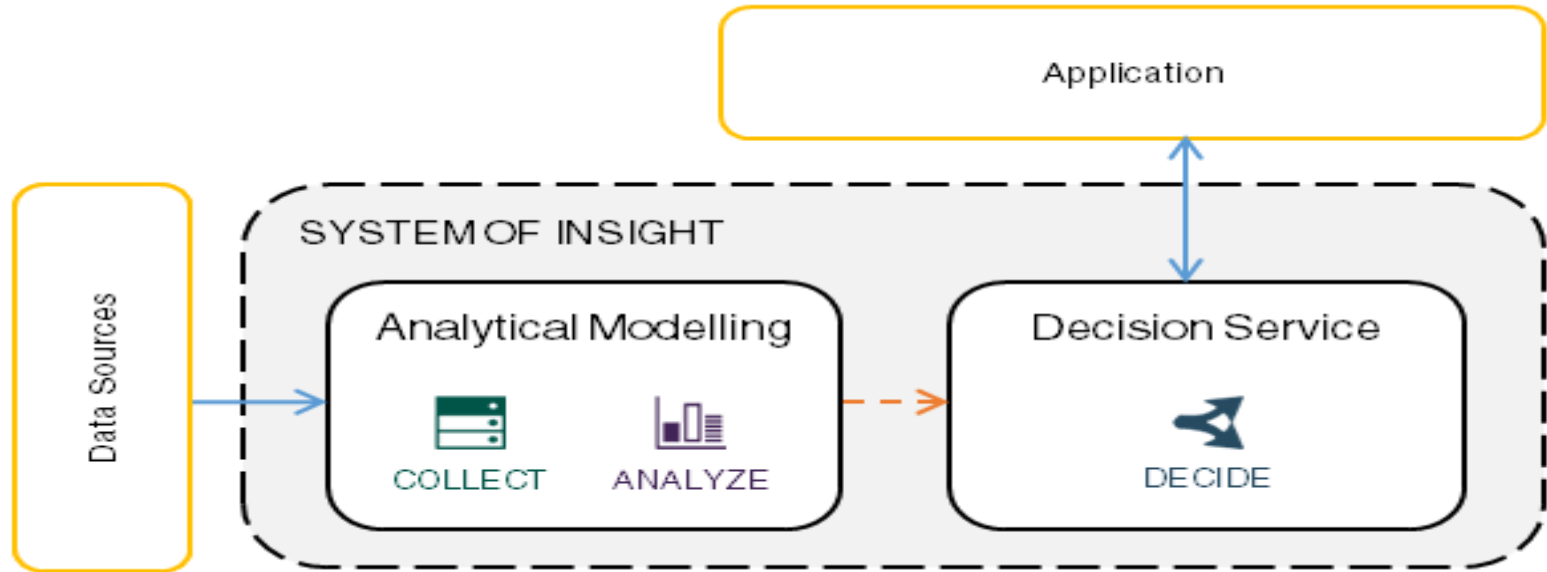
Analytics-driven decision automation
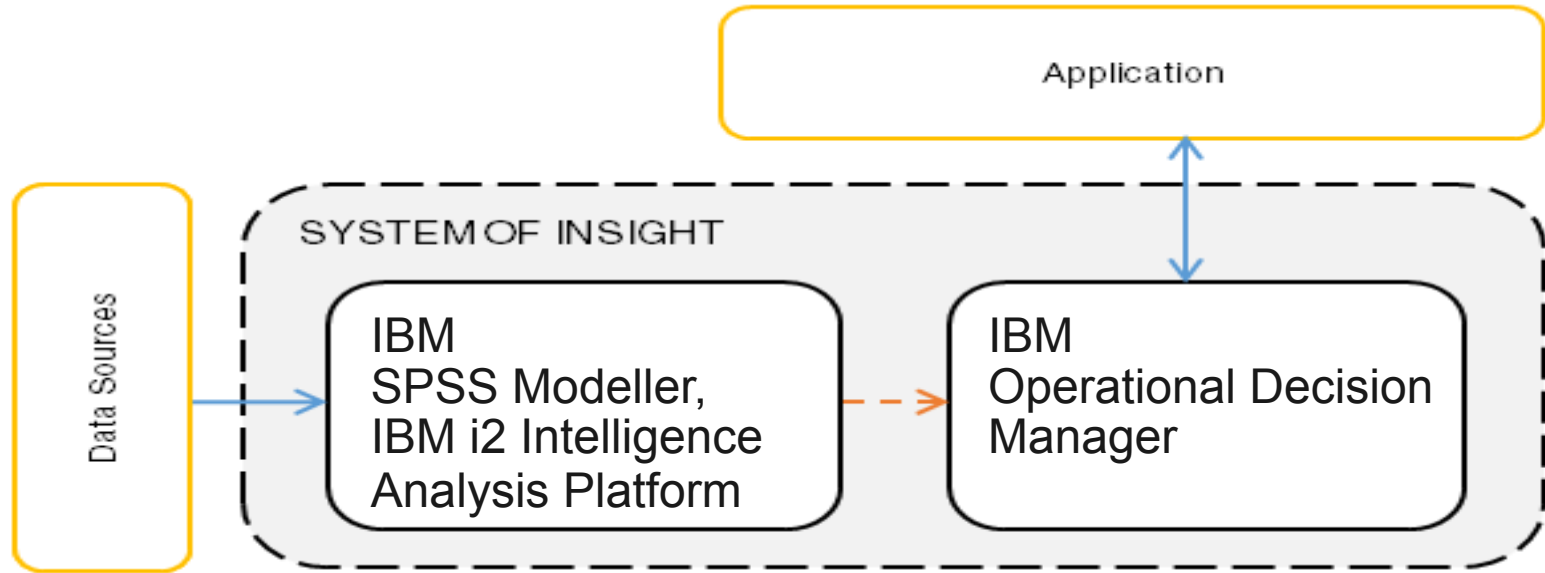
Stream-based Situation Detection

What …

Analyze data in motion providing sub millisecond response times. Structured and unstructured data sources.

What if…

A high-street retailer use weather reports and social media streams to decide what to stock in Edinburgh?

An insurer could analyze customer and / or prospect social expressions to identify events, needs & intent?

An airport could monitor the flow of people through check-in to predict delays to flights?

Stream-based situation detection
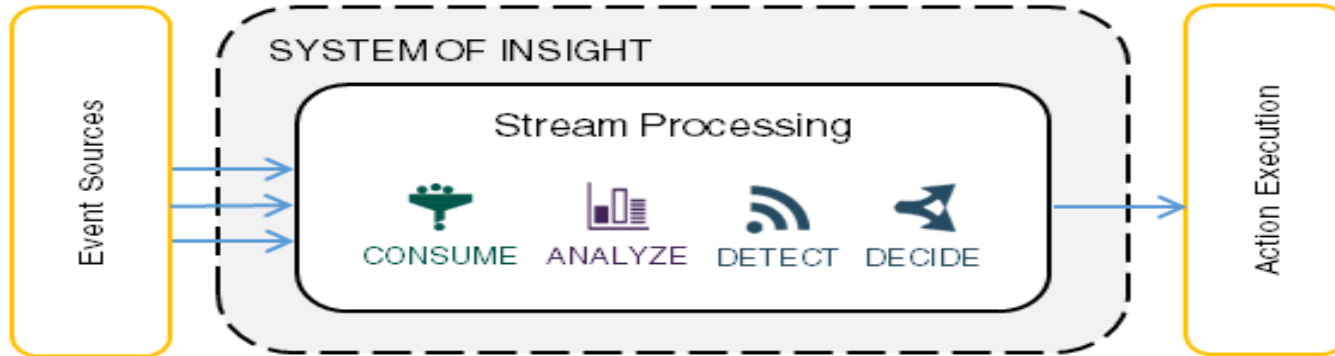
Stream-based situation detection

SYSTEM OF INSIGHT

Event Sources

IBM
InfoSphere
Streams

Action Execution

Stream-based situation detection
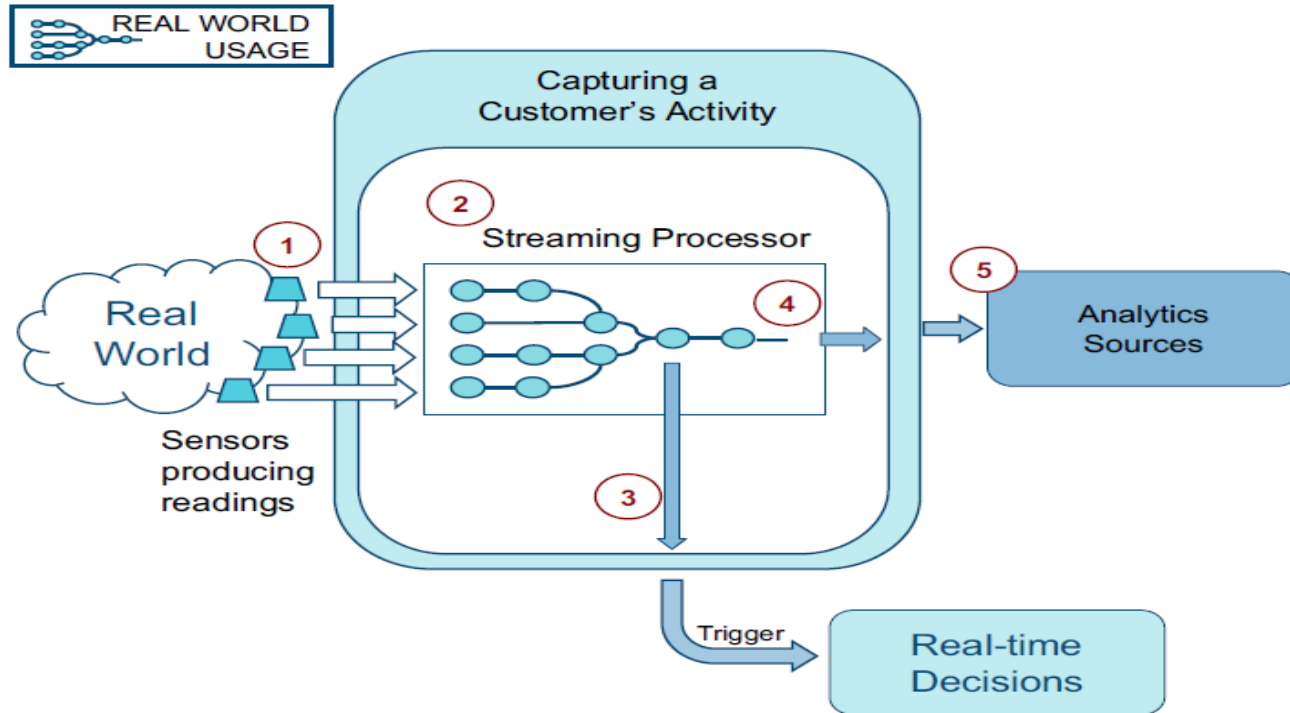
Stream-based situation detection
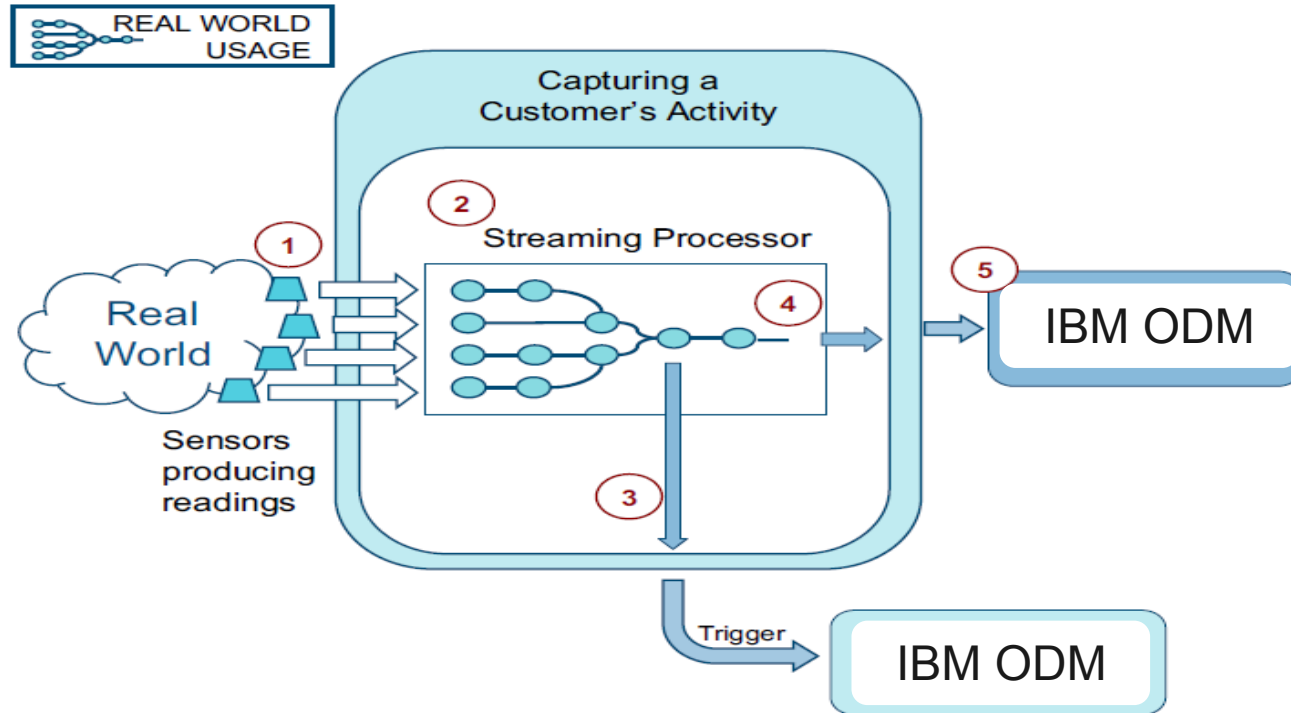
Big-data decision automation

What…

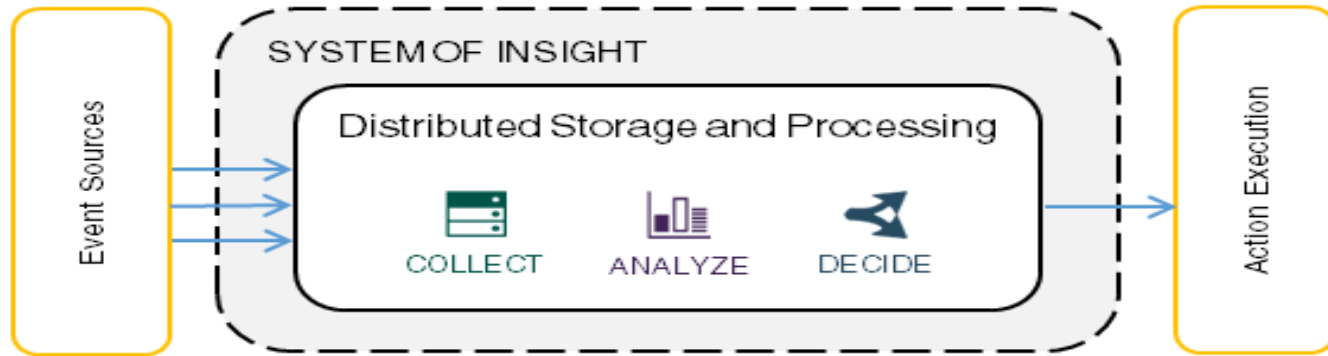Using decision automation to analyse large data sets.

What if…

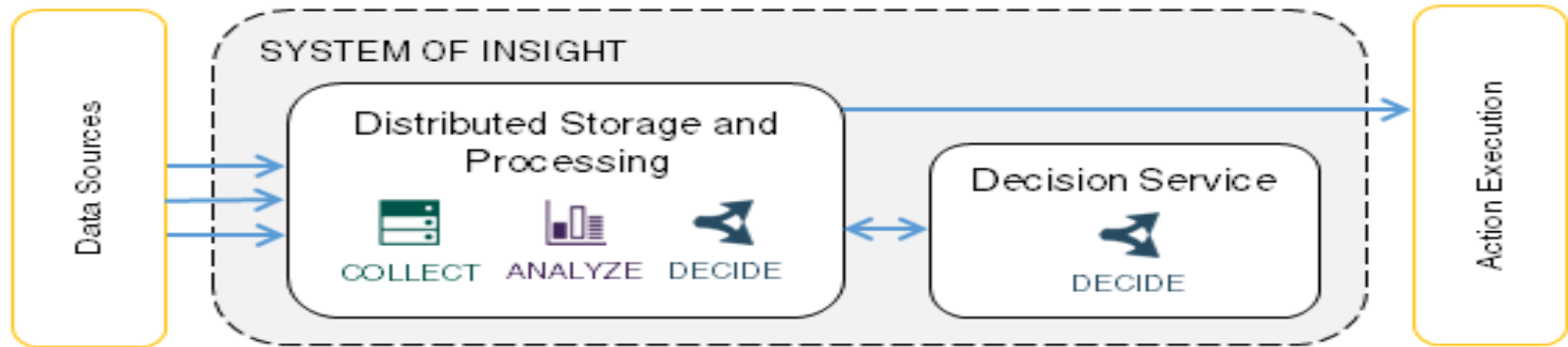A retailer applies segmentation analysis to offer tailored promotions to their customers?

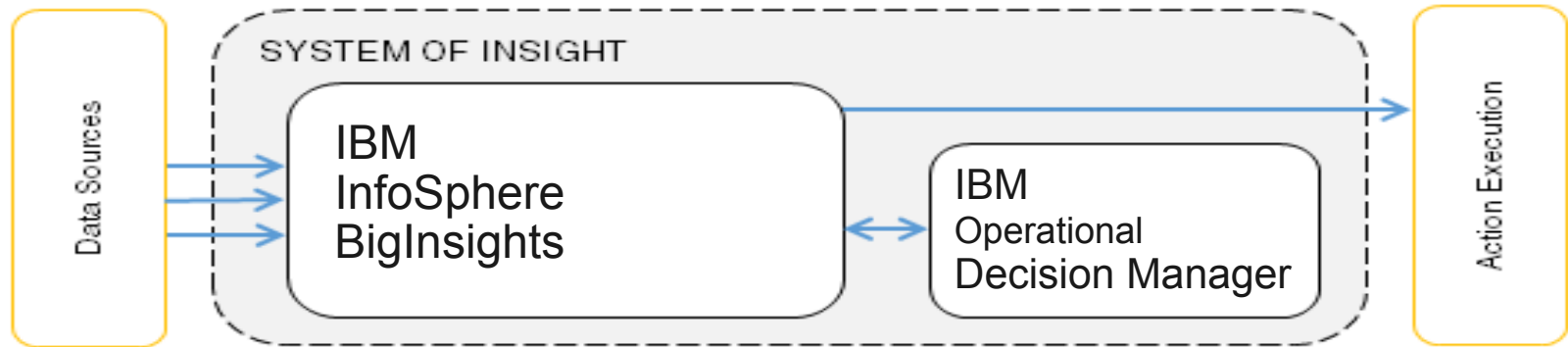An intelligence agency detects security risks in real-time through analysis of passenger manifests?
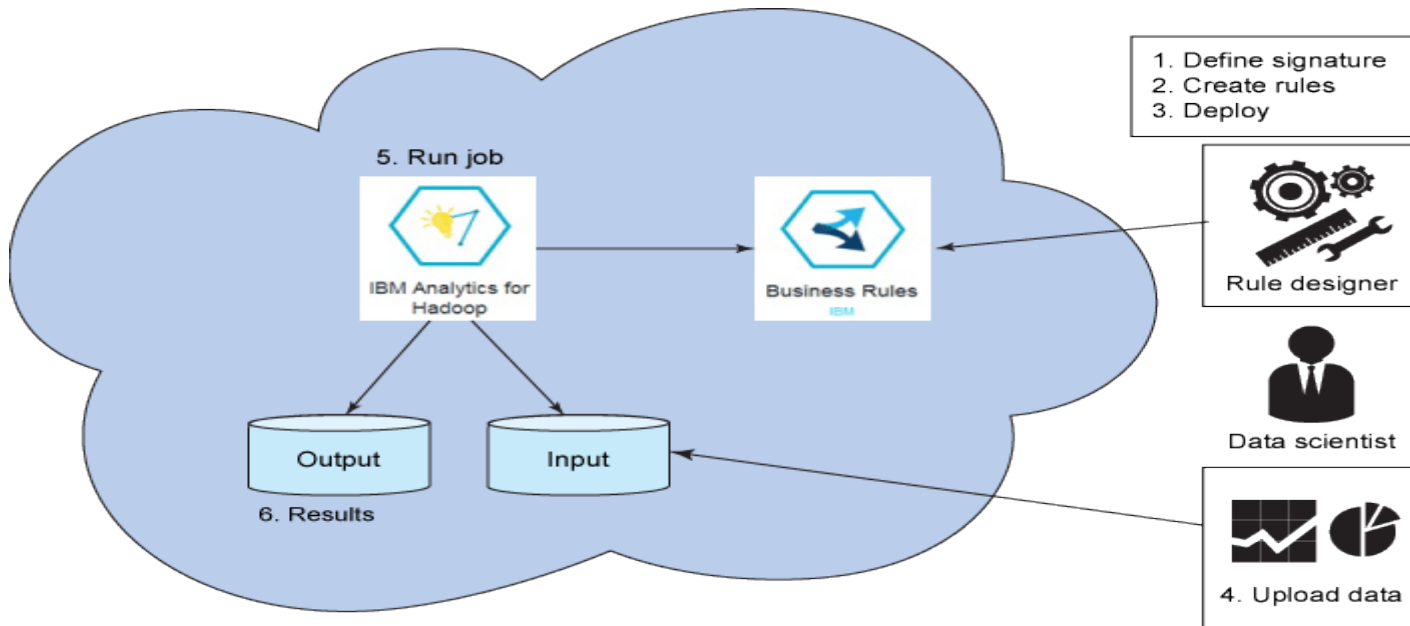
Big data decision automation

Big data decision automation

Big data decision automation

Big data decision automation

Think big! Scale your business rules solutions up to the world of big data
Build an app that uses Business Rules and IBM Analytics for Hadoop services on IBM Bluemix
http://www.ibm.com/developerworks/bpm/library/techarticles/1411_crowther-bluemix/1411_crowther.html

Thank you!

Want to know more?

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