Streaming Analytics - A Framework for Innovation

Jan Humble
Solutions Architect
Volume and Scale of Sensing Data

Can you TURN IT ON?

Can you Identify Insights in REAL-TIME?

Can you REACT and ENGAGE in REAL-TIME?

Will your infrastructure Costs outpace your servicing costs?
Summary: Where Software AG Streaming Analytics Shines

• Analysis of High Volumes of Streaming data with a minimal footprint...

• ...with the option of responding consistently quickly in context to multiple types of threats or opportunities. Context includes potentially correlating several sources of input or large reference state in memory.

• ...and there is a desire to quickly build an adaptable business solution with the following attributes:
  • Custom, Business relevant, real-time dashboards available on any device
  • Ability for business to adjust alerting/action rules on the fly
  • Integration with existing business process or transactional systems, correlated with high volume streaming data
Software AG Suite Conceptual Architecture

Business and IT Transformation

Intelligent Business Operations

Adaptive Applications

Integration

In-Memory Data Fabric
Streaming Analytics and in-Memory Fabric

**BUSINESS AND IT TRANSFORMATION**
- **ARIS**
  - Business Process Analysis
- **ARIS**
  - Governance, Risk and Compliance Management
- **ALFABET**
  - IT Planning and Portfolio Management
- **ALFABET**
  - Enterprise Architecture Management

**INTELLIGENT BUSINESS OPERATIONS**
- **WEBMETHODS**
  - Operational Intelligence
- **APAMA**
  - Streaming Analytics

**AGILE PROCESSES**
- **WEBMETHODS**
  - Business Process Management
- **WEBMETHODS**
  - AgileApps

**INTEGRATION**
- **WEBMETHODS**
  - Integration
- **WEBMETHODS**
  - API Management

**IN-MEMORY DATA FABRIC**
- **TERRACOTTA®**
  - In-Memory Data Management

**TRANSACTION PROCESSING**
- **ADABAS-NATURAL**
  - Enterprise Applications

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Streaming Analytics Architecture

- Business Dashboards
- Proactive Alerts
- Visual Analytics
- Real-Time Pattern Detection
- Complex Event Processing
- Continuous Real-Time Analysis
- Predictive Analytics
- Data Analytics
- In-Memory Data Management
- In-Memory Data Fabric
- In-Memory Messaging

Transactions, Events, Big Data, Fast Data
Available Now: Apama EDA Integration

Allows Apama to send and receive “EDA Events” through webMethods to any component in the suite.

The Bigger Picture: EDA Tooling Simplifies Integration with all suite components. *Available now:*

- Event Type Editor
- Event Persistence Framework
- Event Bus Console
- Event Governance
- Event Sending and Receiving

Roadmap:
Inbound Device Readings, Files, Transactions & Events

To S3

Enterprise Integration and Messaging
File Processing, Alerting, Business Process Management and Analytics

Analytics, Alerts, Service Requests

Closed-Loop Feedback

Streams Processing

Mashups & Visualization

In Memory Storage
Why Actionable Streaming Analytics?

• The compelling event
• The compelling non-event
• The compelling series of events
• The compelling aggregate of common and extraordinary events
• The compelling external event
• The compelling future event
• All of the above
Apama Supports **Complex Event Processing** (CEP)

- **Complex Event Processing** - Temporal, logical and spatial attributes and relationships between events can represent business patterns, including emerging opportunities & threats

Transaction over $1,000 for a customer who then closes their account within a day

**on** Transaction (customer = ID, amount > 1000) **followed-by** Account (customer = ID, Action = 'Close') **within** (1 * DAY)
Caution - this is getting too technical for sales people
James Wooster, 8/26/2013
Apama Delivers Real-Time Analytics with Complex Event Processing (CEP)

- **Streaming Analytics** - Continuous re-calculations on a continuously moving window of events matching a particular query

Calculate the 2 minute moving average of all transaction payments for this customer

```csharp
from t in Transaction (customer = ID) within (2 * MINUTE) 
select avg (t.payment)
```
Closed Loop Analytics: Integration of Apama and Optimize

BPM Process: Service Execution Escalation and Re-Route

Apama Rule: When trouble on equipment exceeds threshold and field service execution in any region....

Optimize Alert: “Field Service Execution in Kentucky is slower than normal”

Event Driven Architecture
Blend Advanced Location Analytics with your Data...

Capture Rate: How often did we draw them in?

Bounce Rate: How often did they come in, look around, and then leave?

But more importantly... what was the impact on sales? What types of customers had the most impact?
..and then Make it Actionable

But more importantly... can you continuously innovate with this data to surprise and delight the customer in new ways?

Detect long lines or crowding and immediately deploy staff

Send personalized offers when customers near specific areas or products
...all On a Single Pane Of Glass

Compare all locations across different location technologies, on one common view accessed through any device.
Why Actionable Location Analytics?

• Dynamically redeploy staff from one area to another in response to crowding and queue build-up in a given area

• Monitor and understand physical customer journeys in your stores in order to better plan and optimize layout, signage and merchandise placement

• Detect high-value repeat visitor to create unique and personalized experiences, either through direct customer engagement or indirectly through staff

• Tie the physical channel to the virtual channel such as web, ecommerce, or call center to create a seamless guest experience
Key challenges with location analytics in retail

- Which paths do my customers take and at which times of the day?
- Which areas have the most repeat visitors, and was there revenue impact for that day?
- Where are people dwelling the longest?
- Can I distinguish customers from staff?
- Can I take immediate action on the analytics to improve the customer experience?
- How do I monetize this location data?
Real-Time Location Analytics and Customer Engagement

Real-Time Location Monitoring

- See most traveled paths for a given date, time, and area

Advanced Location Analytics - Dwell time, Paths - in the context of your business

- Understand how customers actually navigate your property
- Notify staff when there are issues
- Engage customers with contextual offers and guidance
IBO Solution: Real-time Location Analytics & Promotions

In Memory Operational Data Layer: Loyalty Profile, Historical Data, Analytics

Data in Motion

Location, App Clicks, Social Media, Internal Systems

Inject Rules

Reservations, POS, CRM & Loyalty

Inject Rules

Visualize Analytics

Manage Rules

Alerts & Actions

Analyst/SME

Alerts, Notifications

Promotions
Key challenges with predictive maintenance

“The importance of an effective maintenance program cannot be overlooked because it plays such an important role in the effectiveness of Lean manufacturing”

*Steve Krar, Automation Magazine*

- How can I avoid corrective maintenance?
- Can I decrease costs while increasing customer happiness?
- What is my customers’ equipment availability?
- How are my field technicians performing?
- Where are my field based repair assets and are they on schedule?
- Can I meet SLA performance?
Why Predictive Maintenance?

• Decrease maintenance and technician costs by servicing just in time
• Improve equipment reliability by predicting and addressing failures before they happen
• Increase competitiveness of service contracts and offer new services by avoiding unnecessary maintenance and unplanned downtime
• Increase customer satisfaction by reducing and responding faster to corrective maintenance issues
Experience with M2M/IoT

Business Case:
GE Power monitors thousands of their Jenbacher engines to maintain compliance with their SLAs but more important to avoid losing power in the major factories and small cities which they serve.

Number of Sources:
Approximately 3,000 engines drawing data streams from Axeda which is an M2M solution attached to each engine to extract the data.
IoT: Predictive Maintenance Demo
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Apply Business Context

Raw, Real-Time Views of Sensor Data

...can you make the sensor data Business Relevant in Real-Time?
Streaming Analytics Platform for IoT

- Streaming analytics
- In-memory data fabric
- Real-time Visualization
- High-speed messaging

IoT Cloud Hub

Sensor Data

Axeda

REST

MQTT

Prop
Apama Streaming Analytics Platform

- Streaming analytics
- In-memory data fabric
- Real-time Visualization
- High-speed messaging

The most technically complete, business ready platform
1: Streaming analytics

Key capabilities:

- Rich analytics – aggregations, temporal, filtering, and location
- Supports extreme scale and performance
- Blending of real-time and historic data for deeper, richer analytics
- Business level tooling
- Rich push-based visualization and visual analytic tools
- In-memory architecture
- Complex event processing
- Support for predictive analytic models
- High performance messaging to mobile, Web, IoT

The most technically complete, business ready platform
Apama is a Complete Event Processing and Real-Time Analytics Platform

Unified Productivity Tooling

The Correlator: Apama Run-Time Engine

Scalable, high-performance “Correlator”

Integration with Live and Static Data Systems

Cache integration e.g. BigMemory

Integration with any data source/sink or library

Rich, intuitive development environment for developers and business analysts

Analytics, Patterns and Applications are deployed into the Correlator

Real-time output streams feed Apama’s real-time, interactive, dashboards or any external system

Apama is a Complete Event Processing and Real-Time Analytics Platform
Apama Queries

- Horizontally scalable applications
  - Powerful declaratives for pattern matching across (long) shared time windows
  - Inherent horizontal scalability with support for high availability using a Terracotta BigMemory
  - Suitable for non low-latency use cases such as IoT

- Tooling for Business Analysts & IT developers
  - Easy to use development environment with support for round-trip between the GUI and language (code) view
  - Supporting both IT & Business Analyst in same environment

- Correlate events between multiple processes
  - Optimize & de-dupe events (e.g. avoid multiple field tech dispatch)
Apama Queries: Event Based Rule Modeling

Sensor Data Analytics

Active Sensors

Sensor Alerts

Design Source

Get There Faster
2: In-memory data fabric

• Store existing application and historic data in-memory for ultra-fast enrichment, context and analytics
• Unlimited storage across all available memory
• Robust resilience to machine failure

Enterprise Class In-Memory Data Management
3: High-speed messaging

- Capture & deliver data from any device with low latency to the point of use
- Ultra-high performance data streaming
- Clients
  - Web: Java Script / HTML 5, Flash, Flex
  - Java, .NET
  - Protocols: HTTP, HTTPS
  - IoT Protocol: MQTT

One paradigm for low latency messaging
4: Real-time Visualizations

- Provide visual analytics for real-time and historical data
- Native mobile device support
- Combine data analyzed with other enterprise and external live data sources (e.g. mapping)
- Open and Pluggable Visualizations with HTML5

Mashup and visualize live and historical data
Spatial Support

#1: Already Available: Location is a native data type in Apama, provides instant matching within geographical areas.

#2: Presto allows “custom apps” to easily extend integration and custom user interface components

Open ESRI Example up on GitHub for Presto Extensions: https://github.com/jackbe/presto-extensions/tree/master/visualizations/esri.

#3: We will work with you to get stronger integration into the product
Relationship of Streaming Analytics to Hadoop and "Big Data"

Sift Through High Volumes of Data in Motion

- Real-Time Analytics - What’s Happening Now
- Real-Time Engagement with Customers
- Allow Applications to make Quick Decisions
- Proactively Notify someone to Intervene

INGEST

Sift Through Petabytes of Data at Rest

- Historical Analytics - What Happened last Month
- Discover Patterns of Customer Behavior
- Analyze Lots of Data to Make Off-Line Decisions
- Learn the Patterns of Predictive Maintenance

BATCH RESULTS AND DISCOVERED PATTERNS - CLOSE THE LOOP!

Your Big Data Strategy is not complete without Streaming Analytics
Software AG Ranked as a Leader in the Big Data Streaming Analytics Market

“The beating heart of Software AG’s streaming platform is Apama, an asset they acquired from Progress Software in 2013. It is not surprising that Software AG has the highest ‘current offering’ score.”
