

Scenarios for Message and Event Monitoring; an architectural perspective



Quis custodiet ipsos custodes?

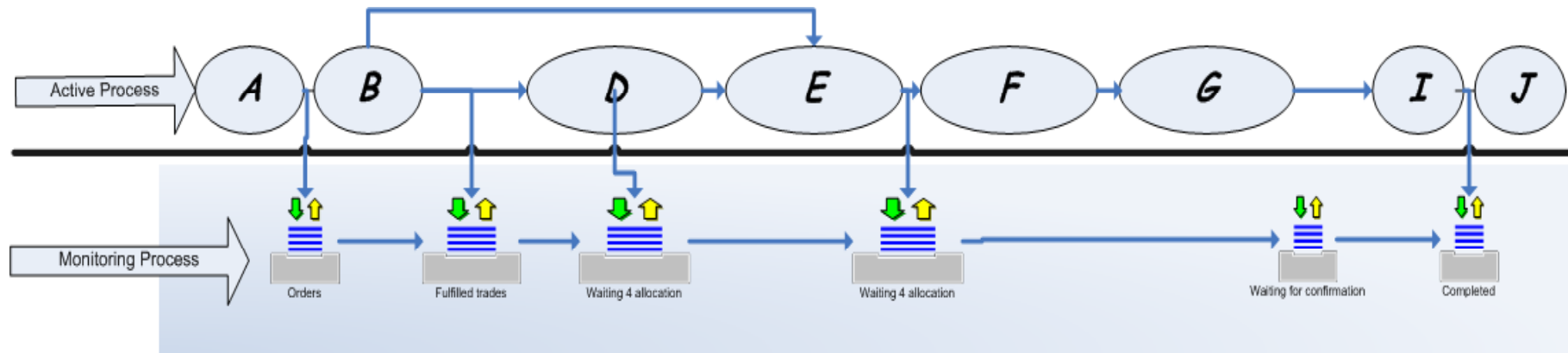
Agenda

- **Introduction**
 - **Richard Whyte; IT Architect working with messaging solutions**
 - **The importance of event monitoring**
- Building a monitoring solution
 - Basic guiding principles
 - Six steps to a BAM solution
- Two scenarios using events to capture monitoring data
 - Business process monitoring using WMQ, WMB, WebSphere Monitor
 - Monitoring a transport system using WMQ, WMQTT, WMB, WBE

"What scares me about this is that you know more about my customers after three months than I know after 30 years."

Lord MacLaurin, Chairman of Tesco(1994) commenting on the Tesco clubcard.

The importance of event monitoring



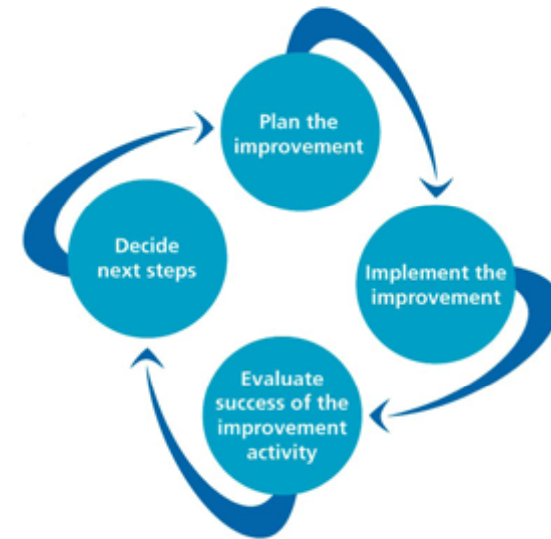
- **Business monitoring is the act of continually observing an active process.**
 - The active process is responsible for actively processing work-items
 - The monitoring process observes and makes predictions as appropriate
- **Delivery of data to monitoring must not slow or endanger the active process.**
 - Sufficient decoupling is provided by asynchronous store and forward technology
 - Failure or slowdown of monitoring is not critical to the active process
 - Feedback is not required
- **A monitor that feeds results to the active process becomes part of that process**
 - Design complexity and cost of the monitoring solution increase
 - Impartiality is lost and synchronisation affects slow the active

Monitoring a greater scope improves usefulness.

- **Business is more integrated than ever**
 - Stove-pipe approaches are acknowledged to be inefficient
 - SOA and service bus architecture is accepted
 - Monitoring black holes are problematic
- **Existing solutions tend to focus on particular applications or domains**
 - Require correlation, ordering, and interpretation and domain knowledge (the process)
 - Bespoke solutions for specific purpose with esoteric data
 - Data contained, used and discarded by specific systems
- **A Mediated event model provides isolation and flexibility**
 - Monitor esoteric formats and transports; more systems can contribute
 - Intervention adds value
 - Summarisation: Reduce traffic volumes
 - Correlation: Construct high value information from disparate events
 - Temporal: Present events in an order expected by users
 - Interpretation: Conversion of domain knowledge to a canonical representation

The importance of monitoring

- Operational decisions (Fast response)
 - See it – Fix it
 - Don't expect repeats
- Tactical decisions
 - See it again – fix it for now
 - Get more staff, work later
- Strategic
 - Evaluate impact: change the process
 - Open a new shop, take on more staff



- Real-time Monitoring provides **actionable OPERATIONAL, TACTICAL information**
 - Provides an objective view of what is happening
 - Provides evidence
 - Delivers understanding of the current situation
- Offline data-mining provides **actionable TACTICAL, STRATEGIC information**
 - Provides understanding of history
 - Trend and segmentation analysis
 - Optimisation analysis
- Independent and without the assumptions or distractions of the active process
 - Don't duplicate active logic. Monitor inputs and outcomes.

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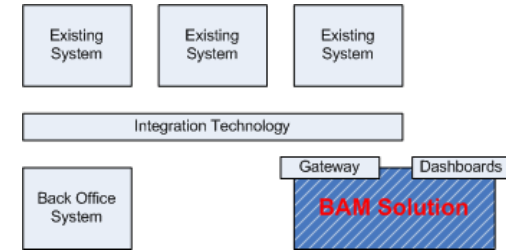
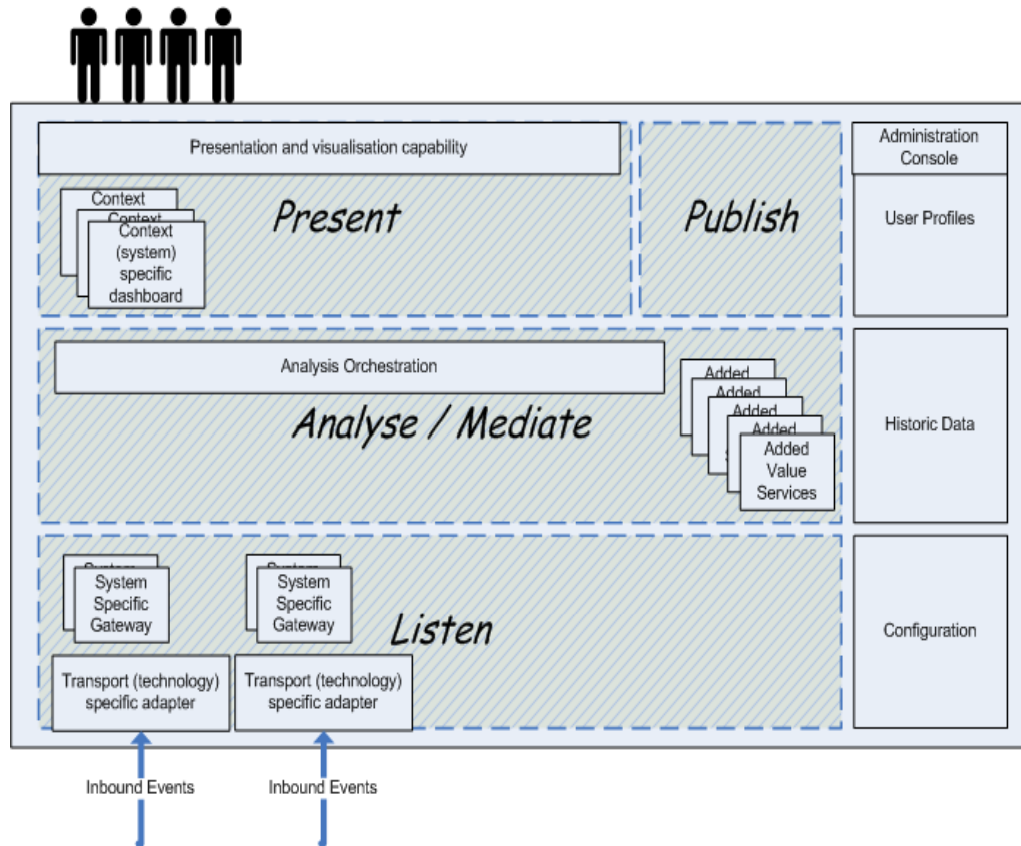
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Basic principles can inform the design process

Principle	Tactic	Benefit
Independence <ul style="list-style-type: none"> ✓ Do not become part of the action ✓ Small point of integration ✓ Passive listener ✓ Don't re-implement activities 	<ul style="list-style-type: none"> ✓ Monitor input and output from a series of black boxes ✓ Never feed results directly into an active process [1] 	<ul style="list-style-type: none"> ✓ Cost ✓ Stability ✓ Accuracy ✓ Impartiality
Actionable information <ul style="list-style-type: none"> ✓ Delivered fast-enough for action ✓ Known accuracy & capture time ✓ Known scope/limitations ✓ Focused on important details 	<ul style="list-style-type: none"> ✓ Avoid batching data (mostly) ✓ Aim for real-time ✓ Understand monitoring scope ✓ Intelligence in the monitoring solution to filter information 	<ul style="list-style-type: none"> ✓ Control ✓ This is what we are here for 😊 ✓ Usability
Minimal impact <ul style="list-style-type: none"> ✓ Minimise testing, maintenance ✓ Monitor existing / available data 	<ul style="list-style-type: none"> ✓ Avoid point in time synchronisation with active ✓ Read only data PUSHED to the monitoring solution ✓ No connection between monitoring and active process 	<ul style="list-style-type: none"> ✓ Cost ✓ Time to value ✓ Impartiality ✓ Accuracy

References: [1] Turing (1950), "Computing Machinery and Intelligence"

Six steps to BAM: Reference Monitoring Architecture



6 Steps to a BAM solution

1. Build an extensible, scalable common platform
2. Modify applications and middleware to emit events
3. Configure listeners and mediators for the events
4. Build a monitoring model to represent the process
5. Build a dashboard
6. Publish events in a common format for others to use.

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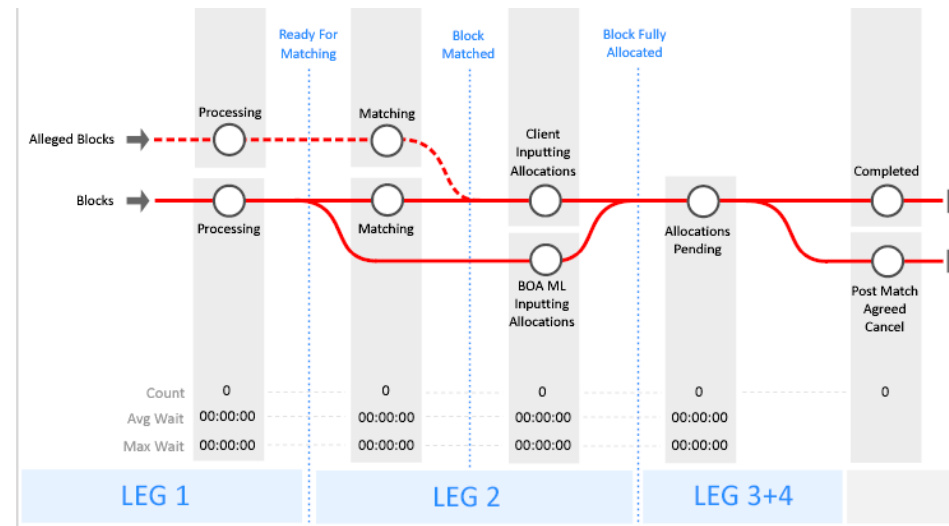
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Scenarios: Business process monitoring

- Pensions buy millions of equities at a time
 - A purchase of 1m IBM shares on the market requires a seller
 - A purchase of large volumes affects price
- Banks mediate these sales
 - They take an order for 1m shares and place 500,000 buy instructions for 2 shares each.
 - Reduces market affects, obscures trading behaviour, and makes it more likely to find sellers
- Once purchased shares and fees must be allocated to pension funds and trading accounts
 - Trading blocks are processed in a number of stages/leg
 - Each block is matched to equities and allocated before reaching a pending status
 - Allocations are approved and the trade is completed
 - Some trade allocations are processed quickly; others require intervention and longer to process
- External bodies rate banks on their efficiency
 - Late settlement costs money
 - Manual steps in the process



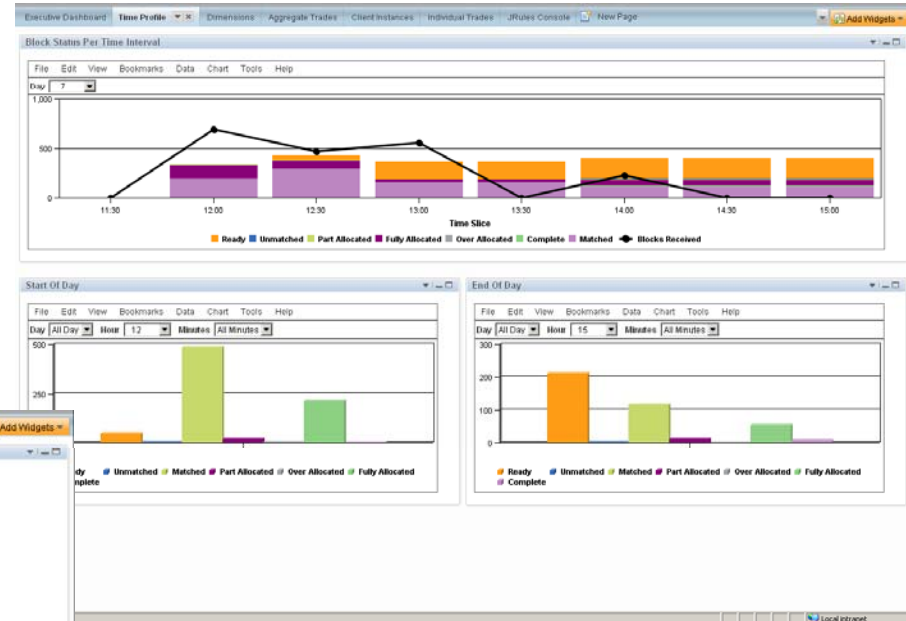
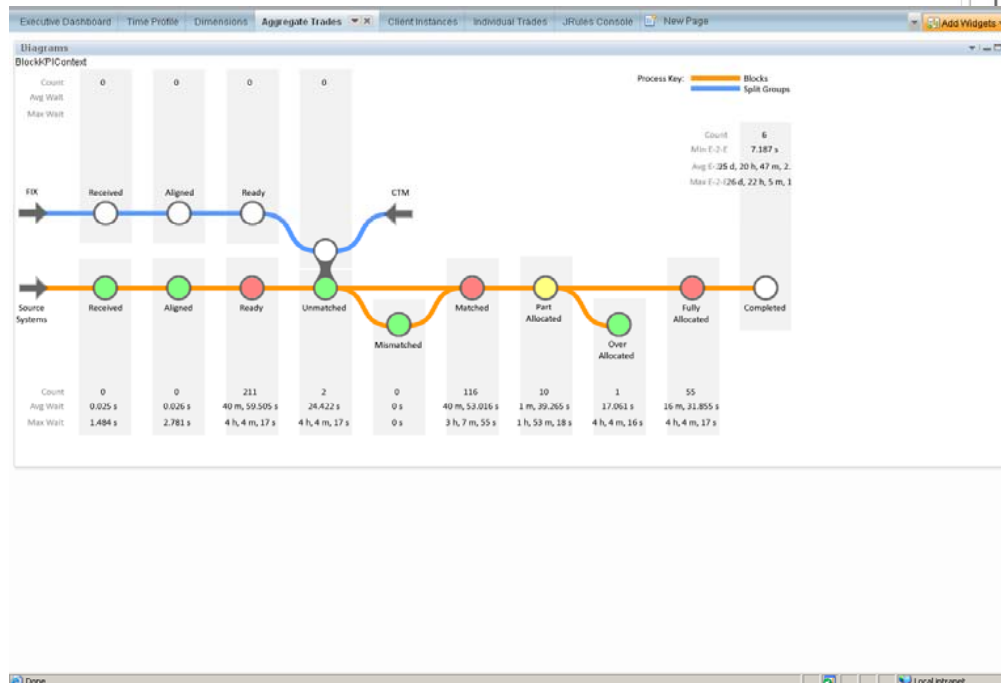
Scenario takes data from many systems and presents it as a railway.

- Trades progress
- Exceptions are highlighted
- Metrics are calculated

Scenarios: Business process monitoring

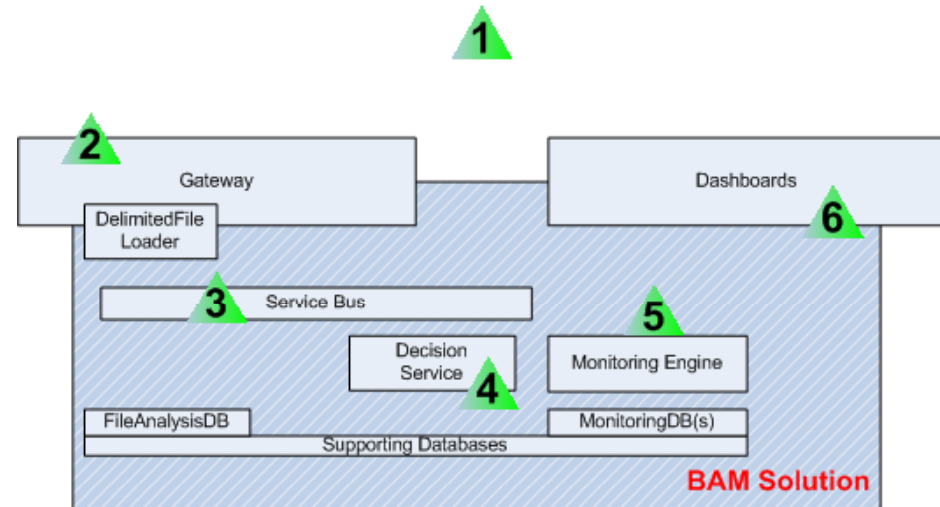
- Data fed from multiple systems using events
 - Each event has a coordinated time stamp
 - Data moved to canonical “Monitoring Format on entry

- Display information in multiple ways
 - Focus on important aspects
 - Don’t be afraid of experimentation



Solution components

- **User and management guides (1)**
 - Scalability model and capacity plan, guidance as to the characteristics of a BAM project suitable for hosting, and guidance for new dashboard users.
 - Helps new projects to build or reuse the BAM4 platform
- **Gateway and service bus (2,3)**
 - Capability to accept many different transports and formats into the BAM platform
 - Ability to prioritise, reformat and convert data to internal format; providing further isolation and consistent handling of data
 - Routing based on source; each hosted project has its own interface point, which allows its events to be separated from co-hosted applications.
- **Decision service (4)**
 - Repository for configuration information for the BAM projects: examples routing, transforms, and file formats
 - Repository for business rules to be applied to events as they enter the BAM environment, for example prioritisation, service levels, and thresholds
- **Monitoring engine (5)**
 - Contains and manages “monitor models”. This is where monitored events are aggregated and analysed. It is also where the dashboards get their information
- **Dashboards (6)**
 - Each dashboard exposes various aspects of a monitor model using visualisation support built into the IBM Business Space, or added by the project.



Software

1. .
2. Message broker
3. Message broker
4. WebSphere iLog jRules
5. WebSphere Business Monitor
6. WebSphere business space

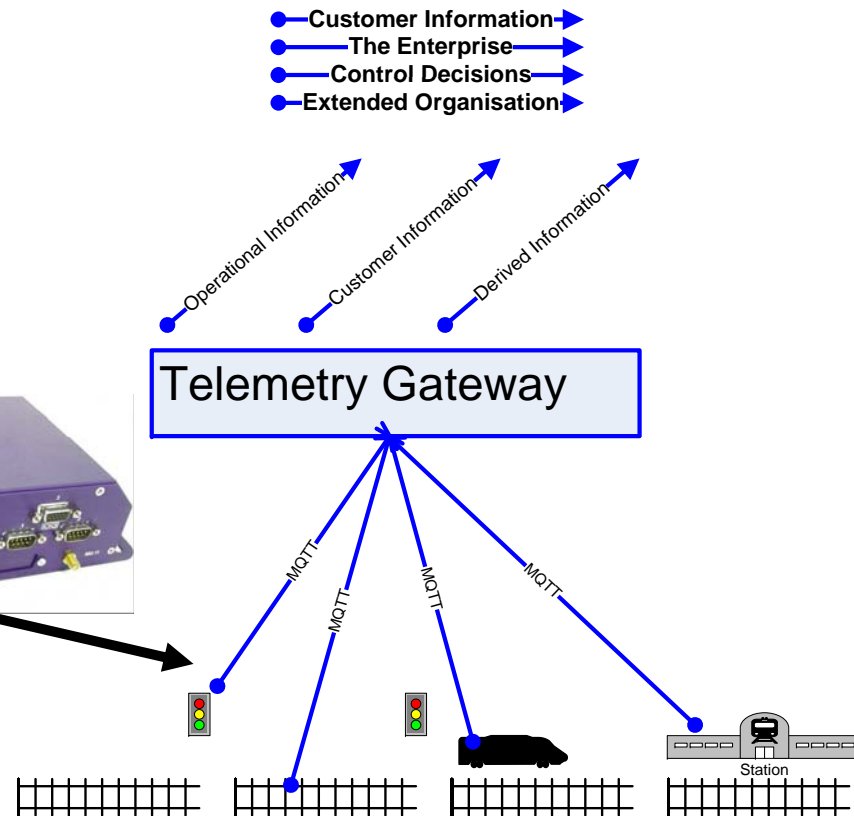
Added Value Real-time Services

1. SPSS Predictive Analytics
2. iLog Optimiser
3. WebSphere Business Events

Scenarios: Monitoring a transport system

A vision for improving the quality and usefulness of raw telemetry data to make it significantly more accessible to enterprise systems.

- Data is fed from equipment to a central point
 - One stop shop for telemetry data
 - Added value services: Correlation, Prediction, Analysis, and History
- Separation of concerns
 - Facilitates application development
 - Reduces complexity
- Mediation
 - Applications not concerned by data acquisition
 - Complex correlations already performed
 - Agnostic of telemetry environment
- Low latency event based solution
 - Use for real-time decisions and display
- **Added value services** can be plugged in:
 - envelope alerts
 - Advanced predictions
 - Pattern recognition
- The basis for innovative devices and decision making



Thank you

■ Monitor to:

- Understand business
- Inform decisions

- Collect evidence
- Demonstrate compliance

- Deliver customer services
 - Portfolio tracking
 - Package tracking
 - Trade tracking

■ *Quis custodiet ipsos custodes?*

- *Who watches the watchmen?*
- *Don't forget to monitor the monitor...*

- Abiding in the midst of ignorance, thinking themselves wise and learned, fools go aimlessly hither and thither, like blind led by the blind.
(Hindu treatises 800BC)

- Let them go, they are the blind leaders of the blind. With one blind leading another, they fall both in the ditch.
Matthew 15:14 - from Miles Coverdale's Bible, 1535

"Who will guard the guards themselves?"

The Blind Leading The Blind: <http://www.phrases.org.uk/meanings/67150.html>