

## **‘Total Insight’ Customer Experience Management**

### **Vantify Experience Centre Whitepaper**

*This whitepaper considers the increasing importance of Customer Experience Management as both a core competence and differentiator for network operators and service providers. The term ‘Customer Experience’ is increasingly applied to functions, roles and even departments within these organizations. WestGlobal’s approach to Customer and Service Experience Management based on an innovative combination of Business Activity Management and Complex Event Processing technology is described.*

#### ***It’s Tough Out There***

Competition, regulatory requirements, saturated markets and increasingly well-informed sophisticated customers, not to mention the hard-to-predict effects of disruptive ‘Internet’ technologies, demand that network operators and service providers devote increasing levels of attention to ensuring consistently excellent customer service across all touch-points in order to maximise customer satisfaction, retention and growth.

The term ‘touch-point’ is deliberately used to emphasise the need to consider not just traditional quality factors such as call set-up time, dropped calls and voice quality, but the complete spectrum of interactions with current or potential customers; for example sales order process and activations, user self-care (top-ups, balance query etc.) and customer care. It is the sum-quality of all these interactions from the end-user perspective that are reflected in the term ‘Customer Experience’. The concept possesses the unfortunate asymmetry of requiring consistently excellent service over a substantial period of time to build a good experience, while requiring very few incidents or bad experiences to damage – potentially at significant cost if leading to customer loss. It is the cost inherent in this asymmetry that underlies the extreme importance of being able to measure and optimize in terms of ‘Customer Experience’ and not just from the perspective of the individual IT systems, network elements and processes contributing to the experience.

#### ***Measuring Customer Experience***

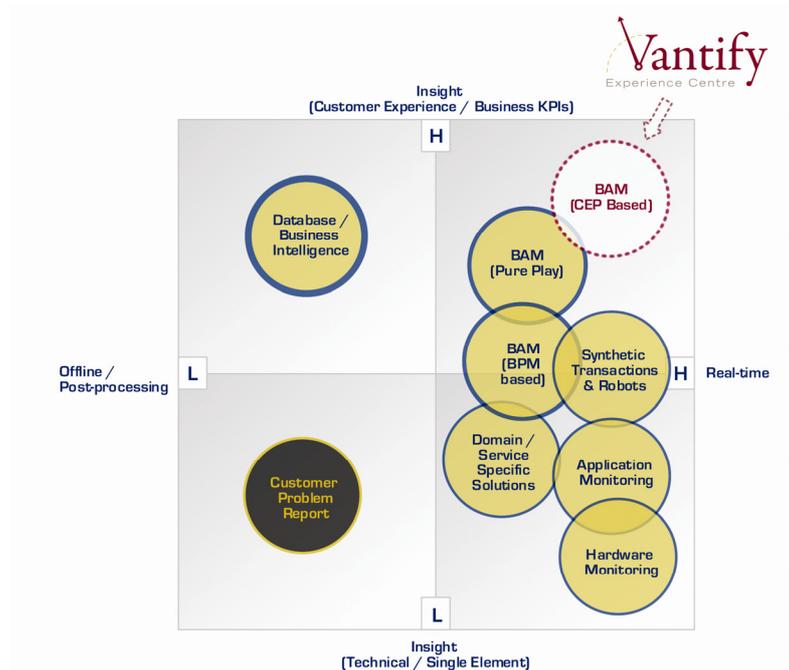
Accepting that continuous improvement in Customer Experience is essential, the associated challenge is how a somewhat abstract metric can be measured in a systematic, repeatable and quantifiable manner. Measurement is of course key to providing a reference or baseline against which improvement targets can be planned and measured. Such measurement is also very much in line with service assurance standards and frameworks such as ISO20000 and ITILv3.

Before describing WestGlobal’s approach to Customer Experience measurement, there are some general characteristics that should be associated with any measurement method:-

- **Insightful** – The measurement of Customer Experience should be at a Business or Service Activity level. The measurement should be relevant and aim to reflect accurately the way the customer uses or interacts with a service or business activity. By way of analogy, a modern car is packed with a huge number of sophisticated sensors that actually tell you very little about how great the driving experience is!
- **Timely** – without exception the best way to reduce the cost of a customer-impacting incident is simply to ensure it does not happen. Behind this obvious statement lies a serious requirement on the measurement process, specifically that it should be in real-time and avoid off-line or post-processing of data. Furthermore, the measurement process should provide clear insight into any deterioration of Customer Experience allowing proactive action before customers are impacted, or at least minimizing the number of affected customers.
- **Real** – It is important to measure actual customer activity rather than simulated transactions. While simulated transactions can predict 'probable' Customer Experience, the approach has limitations that are described in more detail later in this paper

#### ***Towards Experience Management – Approaches to Monitoring***

Figure 1 below illustrates a number of approaches to monitoring, positioned in terms of three key dimensions or characteristics. The horizontal axis indicates the ability to provide immediate or timely insight, key to allowing proactive management and avoidance or minimisation of customer faults. The depth of relevant insight in terms of how closely the measurement method represents the Customer Experience is modelled on the vertical axis. The lower end of this axis represents approaches aimed at monitoring the health and performance of individual elements, applications or IT services. Travelling north represents a deepening of the Customer Experience insight provided by the monitoring approach. Finally, the thickness of the circle's outline indicates the depth of support for multiple viewpoints, meaning how easily the user can 'slice and dice' the monitoring data to support different viewpoints.



**Figure 1 - Approaches to Monitoring**

The purpose of this positioning exercise is not to indicate that one monitoring approach is superior to any other. Each approach has merit when used appropriately and any limitations or assumptions are clearly recognized. For example, approaches positioned in the lower right quadrant do not measure Customer Experience although they do allow the behaviour of services and business activities to be inferred to a limited extent. BAM based approaches in the upper-right quadrant explicitly measure business or service activity and as a consequence their output is closer to the Customer Experience. While the exact positioning of each method on the chart is of course somewhat subjective, the underlying positioning principles are sound.

- **Customer Problem Report** – A customer-impacting incident has led to an expensive call to the Call Centre. The customer is likely to be angry, navigating the Call Centre IVR and spending time on hold has done little to lift their mood, and they are telling their friends. It is west on the timeliness access because by the time the call is received, it is too late – the damage is done. Insight is also low as the customer is unlikely to be providing useful diagnostic information.
- **Database / Business Intelligence (BI)** – Located in the upper left quadrant, these monitoring solutions provide high levels of insight due to their ability to collect and correlate data from virtually any source. Multiple user perspectives are easily supported through the flexible definition of new reports and views. From a Customer Experience perspective, the limitation of this approach concerns timeliness. Most database solutions are based on processing log files and connection data records after an event has occurred. Also, BI approaches are not typically designed for use within an operations environment, limiting their value as a means of proactive incident management.

The right side of Figure 1 reveals a number of monitoring approaches all offering good real-time performance but with varying levels of support for the 'insightful' and 'real' requirements.

- **Hardware Monitoring** – Generally based on an automated script or robot that periodically monitors server availability through a 'ping' type process. While benefiting from simple implementation and low cost, it is very low in terms of relevant insight. The server may be running with 99.999% availability but this provides virtually no information regarding the health and performance of applications or services relying on that server.
- **Software Monitoring** – Adds some 'smarts' to hardware monitoring to interrogate the application or services running on the hardware. If the application responds consistently and within expected performance limits it is reasonable to infer the underlying hardware is in good shape. Customer experience insight remains low however as most business activities rely on multiple applications or services operating collaboratively. Therefore monitoring the state of a single application has low relevance and yields limited insight into how the end-to-end service is perceived by the customer. Business Service Monitoring (BSM) is similar to Hardware and Software monitoring but includes an indicator for the business activities potentially affected by any failure.
- **Domain Specific Solutions** – This category, covering solutions such as Network Management and Web Analytics, provides a more end-to-end view of all the systems within a domain or closely related services. For example, a number of solutions provide excellent insight into the performance of Web or Mobile Internet based services including the ability to track individual user trails through Web sites. But they are very much focused on a single domain – the best network management or Web Analytics system will tell you little about degradation in the performance of a retail sales activation process. As always, point solutions demand a trade-off between value and the complexity of having to manage multiple point solutions focused on different services or domains. These solutions also score lower on the timeliness scale compared to software and hardware monitoring solutions as many are based on log file analysis while the hardware and software monitoring solutions are fully real-time.
- **Synthetic Transactions and Robots** – Monitoring systems based on this approach attempt to directly emulate and measure user interaction with a service and are therefore positioned to the north of previous approaches. They also operate generally in real-time as they are based on generating actual transactions, even if the actual analysis of the transaction is a post-processing function. Examples in this category include automated voice callers and Web robots generating requests to check page availability and reap dead links. Two aspects of this approach limit the ability to provide an accurate Customer Experience measurement. Firstly, by definition, the transactions are artificial and therefore may not identify issues that are irregular but nevertheless having a serious impact on Customer Experience. While this can be compensated to a certain extent by increasing the rate of synthetic transactions towards the real customer transaction rate, this clearly has implications for dimensioning the network and IT applications providing the service. The second limitation is that some artificial transactions may need to be terminated before completion. For example, synthetic testing of a prepaid top-up based on credit card may not be able to fully exercise the payment part of the transaction due to the absence of a real bank or credit card account.

In general, evolution of network and IT architectures towards a more open and distributed model creates new challenges for monitoring solutions. While these architectures provide greatly improved opportunities for innovation and service creation, the flip-side of the coin is that monitoring becomes more complex than with a single monolithic transport and service platform. This further drives the requirement for effective monitoring to be independent of any specific underlying technology and to focus instead on the business activities and services operating over those technologies. Against this background, WestGlobal believe that monitoring approaches known collectively as Business Activity Monitoring (BAM) will become increasingly important.

The term 'Business Activity Monitoring' was originally coined by Roy Schulte, a Gartner analyst, to highlight a new breed of software intended to provide executives with near real-time information on their critical business activities. The primary objective is to enable executives to make faster and better decisions by providing them with key information in one place. For example, a dashboard could display the value of all sales orders currently being processed, the most popular sales lines over the past 5 minutes, and generate an alert if any of the top ten customers had orders in progress that were taking too long to complete processing. If any of the underlying IT or network elements providing this service were failing or not meeting performance targets, this would be seen in terms of the impact on the business activity – a level of abstraction much closer to the customer's own experience. Therefore the ideal monitoring solution for Customer Experience would combine the real-time business-level insight of BAM with the ability to immediately notify and support root-cause-analysis when things go wrong. It is this approach that WestGlobal has taken with the Vantify Experience Centre but, first, a look at some different approaches to BAM implementation.

Figure 1 identified three broad categories of BAM solutions, all of which operate within the top-right quadrant preferred for Customer Experience monitoring and management, but which are differentiated by the level of relevant insight offered. Each variant is considered below, followed by a more detailed focus on CEP enabled BAM, an approach WestGlobal believes to enable the most effective implementation of Customer Experience management, an approach that we have termed '**Total Insight**'.

- **BPM Based BAM** – One of the core challenges facing the original BAM concept was the timely interrogation and analysis of the many sources of data within an organization required to provide insight into business activity performance. The favoured approach was to couple the BAM application with Business Process Management (BPM) software. The rationale for this approach is that it is much easier for an application to monitor an activity or process if it is controlling that process, or at least very tightly coupled to the controlling application. However, this approach did have some important limitations. Firstly, it often required re-engineering of existing activities and processes to support process orchestration by the BPM solution – an expensive, disruptive, complex and high-risk endeavour. The second limitation was that it reduced the number of data sources to one, namely the BPM application. This reduced flexibility and made extension to support new activities, processes and services particularly difficult.

- **Pure-Play BAM** addresses the constraints identified for BPM-based BAM by decoupling monitoring and control functions. A pure-play solution is more flexible in allowing integration with multiple sources of data from any technology. This flexibility can come at the cost of some efficiency as the more heterogeneous mix of data sources can no longer be guaranteed to be in a form suitable for immediate processing. If, for example, one of the required data sources is a file of Call Data Records, there may well be a delay imposed due to awaiting file closure or mediation collection. Thus the immediacy requirements of Customer Experience Management are not fully satisfied. An additional limitation is support for the detection of activity failure or performance degradation based on detecting irregularities in patterns of events, potentially from multiple sources and over an extended period of time. This more holistic insight is a major strength of the CEP approach described below.
- **CEP Based BAM** provides the benefits of BAM in general while addressing the limitations of BPM-based and pure-play BAM. It is this approach that is used by WestGlobal's Vantify Experience Centre as described in more detail below.

**Vantify Experience Centre – ‘Total Insight’ Experience Management**

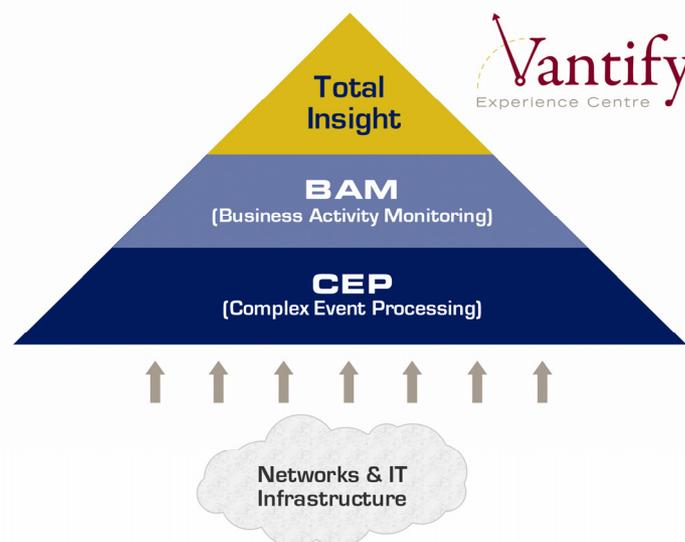
Vantify Experience Centre (VEC) combines Business Activity Monitoring and Complex Event Processing (CEP) in an innovative approach to Experience Management. This offers a number of advantages over earlier approaches and fully meets the core ‘Insightful, Timely, Real’ requirements expressed earlier in this paper.

The key to understanding Complex Event Processing is to consider the technical infrastructure underlying a network operator or service provider as an ‘event cloud’. Every business activity and customer interaction can be associated with a set of events that are created, modified and consumed by the underlying systems.

At any given time, this infrastructure may be generating thousands of events per second. Events may be related, as in a transaction, or may be completely independent. Some events may trigger a cascade of new events; for example a provisioning request leading to provisioning operations on multiple network and IT servers. Events related to the same transaction may be spatially proximate or separated by thousands of miles; imagine, for example, a roaming user in Africa connecting via a visited network in Kenya to check their e-mail via WAP to their German home network provider. This is the ‘event cloud’ - the low-level native language of interactions that encapsulates the total current and historical knowledge of all technical activities within an enterprise.

CEP provides the mechanisms to capture, analyze and interpret the event cloud in real-time and at any level of business activity or technical detail.

WestGlobal’s Vantify Experience Centre combines CEP and BAM technology to provide previously unattainable levels of insight into a network operator or service provider’s business activities from Customer and Service Experience perspectives; the distinction is described below.



**Figure 2 - The Vantify Equation: CEP + BAM = Total Insight**

Advantages of the CEP based BAM approach include:-

- **Immediate Assurance** – What is happening in the enterprise now!
- **Enhances Proactive Operations Management** – Maximises the probability of detecting service degradation before the customer is impacted. Many failures are the consequence of a gradual degradation in performance, for example a provisioning server’s response time may increase as disk fills or available memory reduces. In such a case, the ability to identify and resolve the failure before it becomes customer affecting is critical.
- **Decoupled** – Does not need to orchestrate the activities being monitored.
- **Independent** – Supports events from any technology.
- **Multiple Viewpoints** – The availability of events relating to every aspect of a transaction allows that transaction to be viewed from many perspectives.

Figure 3 below presents the high level architecture of the Vantify solution with a short description of the key modules following the diagram.

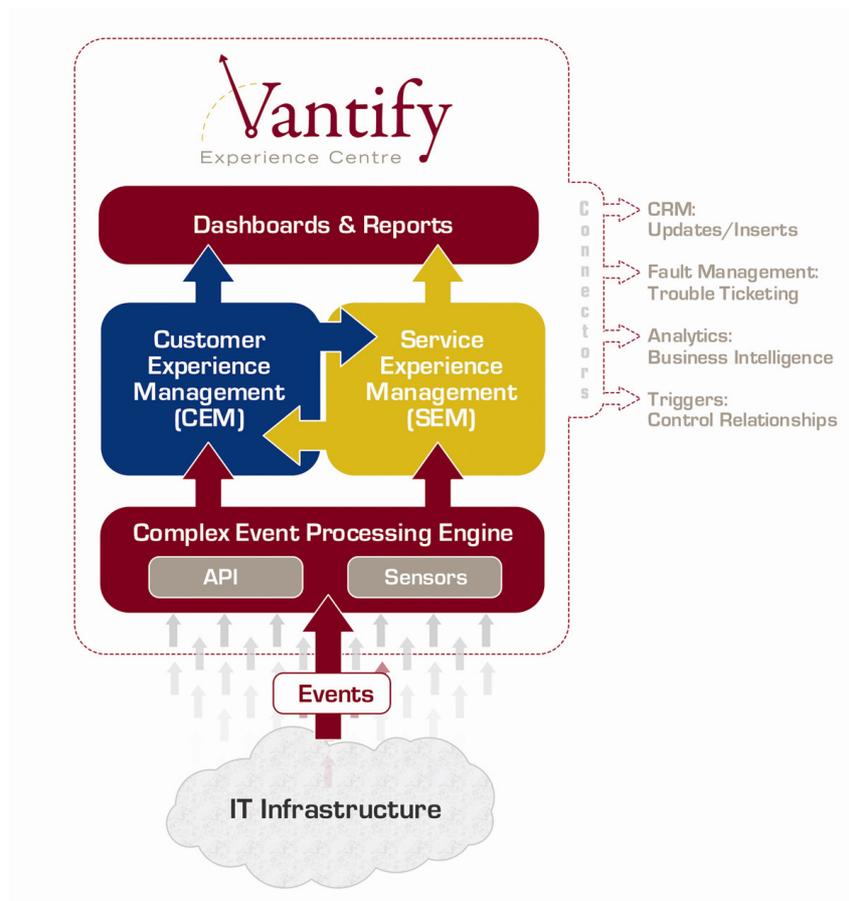


Figure 3 - Vantify Experience Centre

**Complex Event Processing Engine** – This module provides CEP capabilities as described earlier. It is able to efficiently process many thousands of events per second and apply a set of CEP operations such as filtering, aggregation and enrichment to serve the overlying Customer and Service Experience modules. Vantify provides a number of models for integration with event sources including open APIs and a library of adaptors for common middleware such as TIBCO™, .NET™ and JAVA™. Where native events are not available, other approaches including SNMP and log-file parsing are supported.

Vantify provides a set of templates allowing users to very easily define the event trigger conditions that should invoke some form of notification or alarm on the dashboard or via external interface.

**Customer Experience Management(CEM)** – CEM provides the ability to monitor, alarm and analyse service delivery or business activities from the perspective of *an individual or group of customers*. For example, a CEP template may be defined to generate a notification if an end-to-end provisioning operation exceeds a certain target time for a configurable number of customers. When this event occurs, CEM will present provisioning performance data associated with the MSISDNs that are outside the required range. The Vantify user may then visually ‘drill-down’ to inspect events and data associated with the underlying operations (e.g. provision HLR, provision Voice Mail ...) to determine where the operation failed or was delayed. It is this use of CEP that enables business activities to be investigated at any level of detail.

**Service Experience Management(SEM)** – SEM provides the ability to monitor, alarm and analyse service delivery or business activity from the perspective of *the service provider or business activity owner*. Data presentation tends to be based on aggregated performance, for example presentation of average ‘end-to-end’ and ‘per-system’ provisioning time over a 24 hour period. As with CEM, templates allow the user to rapidly define performance related triggers that will be signalled visually via the dashboard and optionally via external connectors as described below.

**Dashboard** – A real-time visual display presenting the CEM and/or SEM data for the monitored business activities and services. As mentioned earlier, Vantify allows the user to drill-down to an arbitrary depth to investigate the performance of IT or network elements underlying the high level business activity or service.

A number of connectors are shown in Figure 3 enabling integration with CRM, Trouble Ticketing and Analytics / Database systems, in addition to the ‘Trigger’ interface. These connectors allow records to be created or updated in external systems in response to detection of configurable trigger conditions. For example, a user who attempts an IVR top-up of their prepaid account 3 times in 10 minutes could lead to an incident record being automatically created in their CRM account history. This enables very proactive management, for example the notification could be used to prompt a call to the user or possibly a bonus top-up. The ‘Trigger’ adaptor supports control rather than data connections to external systems. For example, a load-balancer could be directed to re-route traffic to a standby system in the event that failure or reduced performance of the primary system is detected.

## **Conclusion**

This paper has described Service and Customer Experience Management as increasingly critical in the face of the very challenging and rapidly evolving commercial environment faced by network operators and service providers. The ability of various monitoring systems to provide true Experience Management has been considered and the case made that only the combination of Business Activity Monitoring and Complex Event Processing technologies provides the functionality, immediacy and flexibility to meet the requirements for a complete Experience Management solution. It is this innovative combination of technologies that has been adopted by WestGlobal's Vantify Experience Centre, a unique solution providing deep and relevant insight into service performance as experienced by the Customer or the Service Provider.