Quality of Customer Experience

Real-Time Insight Reduces Churn and Increases Revenue
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The economic landscape for communications service providers has changed dramatically over the last two decades, ever since the beginnings of the IP revolution. The single dialtone operators of yesterday have evolved into multimedia service providers that operate across multiple networks and devices while facing increasingly aggressive new competitors and increasingly demanding customers. This ongoing evolution has involved a painful and a major transformation for the operators’ infrastructures, which were originally designed to support dial-tone and simple voice services only. The circuit-switched world of yesterday has largely been replaced or is on its way to being replaced by a packet-switched world where IP has replaced the dial tone as an operator’s core competence.

While going through this transformation, business has continued, and new services have been created and deployed at a mind-blowing pace on top of the existing infrastructure, while expanding it and replacing some components of it. In order to stay alive and remain competitive, the old model requiring months and sometimes years of creation and testing of a new service have been compromised by super fast development cycles that have put the quality of these new services in jeopardy. Operators have had to walk the thin line balancing time-to-market and traditional carrier grade service quality.

This paper examines how communications service providers can gain real-time insight into the quality of customer experience to improve customer satisfaction and service quality, reduce customer churn, improve revenue, and reduce operational costs.

1. The Evolution of Service Trends

The chart below depicts service trends of the last decade for a typical U.S. household. Consumers want high-speed internet access, TV service, mobile access, and many services built on top of them, such as downloadable content and the delivery of multimedia messages. The next several years will see an explosion of consumer demand for ever-more-sophisticated and targeted communications services. This new landscape has completely transformed the profile of traditional phone and cable operators, who are now engaged in probably the fiercest battle the industry has witnessed to-date.
But merely providing a flow of new innovative services will not be enough by itself to help service providers stay competitive. They need to create new services in days and weeks and sometimes on a one-off basis — for example, providing mobile content for a single occasion such as a sporting event.

Providers also need to get their services “first time right” because customers have less patience and more choices than ever before and are likely to cancel their orders if the services don’t work as advertised. Providers need to present all their services to their customers as a seamless whole, from delivery to billing, and to cross-service features, such as allowing customers to download ring-tone content based on an online commercial they are currently watching.

Standing in the way of achieving all of that is the service provider’s current underlying infrastructure and monitoring based on individual service domains or set of application domains. Typically, service providers have had to add services one at a time on a piecemeal basis, in essence bolting each new service onto an existing set of technologies. Each service functions in its own service domain, and respective applications run within their set of application domains, tied to their own legacy systems. These systems were not built with requirements to communicate with one another. Mix this with different network domains, and large
service providers have literally hundreds of billing services, for example, each serving a unique purpose. This leads to a variety of problems, from a less-than-optimal quality of customer experience to billing problems, customer support issues, and more.

2. The Challenge: A Subscriber and Service View of the World and End-to-End Operational Visibility

In a typical service provider’s environment, each service lives in its own service domain/network and is tied to its own legacy systems for billing, provisioning, network deployment, customer care, and so on. Each silo has its own separate system for monitoring and management, workflow, business process management, and similar processes.

While this has worked in the past for a few offerings, it is no longer viable as providers package converged services as single compelling offerings. Providers also have to realize that monitoring individual system availability and uptime does not provide them with any insights into how the customer might experience the service. A typical customer doesn’t view his services as individual components. Instead, he sees them as a single service, representing a single brand comprised of multiple features, and he expects that all the services will work in concert with one another.

Let’s look at one example of the consequences of isolated systems not working together. Imagine that a customer is calling the same number from his mobile phone five times within three minutes. This is not the typical user behavior but could happen for user-oriented reasons. However, the most common cause for this type of occurrence is simply bad reception quality, with the user redialing the same number in the hope of getting a better connection! Regular monitoring systems would measure that five calls were completed within three minutes, and billing services would log these for processing. The net result is the customer is billed for services not performed. The dire end result of this for the operator is customer churn!
Examples like these illustrate the challenges facing communications service providers:

- Every service network/domain produces invaluable subscriber and service relevant information that has its specific meaning to that particular domain but does not represent how a service is performing all the time.

- The new world of federated OSS/BSS systems built over state-of-the-art integration platforms were not meant to address the operational visibility of service performance and subscriber experience.

- Gaining a single complete subscriber and services view across these networks is a necessity for understanding and improving the quality of customer experience.

Quality of the customer experience can be greatly enhanced by leveraging a platform that can deliver, at minimum, the following functionality:

- Measure service performance for the individual subscriber and provide end-to-end operational visibility across service/network domains and subscriber segments.

- Support complex event processing (CEP) – correlation of multiple events within split seconds, unique patterns, and responses between services and subscribers.

- A service activity bus through which network, OSS/BSS, and subscriber events can be made available to the correlation engine implementing the CEP.

The resulting CEP implementation is not a passive monitoring system but instead an active and dynamic platform with proactive capabilities that provides real-time understanding of underlying events, patterns, and trends – all based on user-configured business rules.
3. Measure What Matters: CEP and Quality of Customer Experience

Every day, operators collect massive amounts of information about network events for billing purposes, device events for performance and throughput, customer care calls for service satisfaction, and the list goes on and on. It is becoming increasingly clear that what makes an operator more competitive and differentiated is not what kind of information it has access to but what it can intelligently extract from this information in real time and apply to its business advantage. Technology makes it possible to correlate events from a wide range of network elements, and the information collected is potentially useful to a much broader set of OSS/BSS applications beyond billing. CEP is becoming a highly strategic technology, because it provides operators with the intelligence they need to see how all the parts of their business are functioning together in order to provide a high quality experience.

Such a system will not do away with the infrastructure that actually delivers the services. Rather than eliminate legacy systems used by organizational silos for delivery, provisioning, and maintenance of services, it provides real-time, operational visibility into all the events taking place on the network, correlates all these events, and based on a set of business rules developed by the service provider, automatically takes proactive actions. The system captures events from multiple services and systems, filters out events that are not relevant, focuses on those that are, and then takes proactive actions based upon what it finds.

Such an approach is significantly and fundamentally different from traditional system monitoring platforms that were typically designed to provide visibility into specific service or application domains. A CEP-based platform greatly distinguishes itself from these traditional monitoring systems in these ways:

- System monitoring provides only limited statistics and summaries within specific service and/or application domains.
- Current silo systems (service domain or application domain) were not built to exchange and/or provide insight into operational events across other domains.
- A service uptime of 99.95% might look good on paper but does not provide an indicator, for example, of an increased issue with SMS delivery and customers who are thinking about switching as a result of this.
A CEP-based platform addresses the mission-critical operational challenges in an operator’s environment, such as:

- Automatic detection of problems and proactive alerting mechanisms before they happen
- Gradual degradation of performance
- Individual subscriber and service incidents
- Insight into the entire chain of a process as viewed by the service and/or the subscriber

Such a solution, based on CEP, aggregates and correlates information from various event sources in real time. These event sources include networks and other service provider operational systems. These events are applied into a service model that specifies what constitutes a successful service for a subscriber, whether that would be a completed call, a completed ring-tone download, or an SMS/MMS that has been sent successfully. Through this approach, the subscriber’s expectation and experience are placed at the heart of service execution. An effective quality of customer experience solution blurs the traditional boundaries between the business support systems, operational support systems, and the network, because it correlates events from all domains and can provide responses into any.

4. How Does Such a System Work?

The fundamental underlying principles of this CEP-based approach are:

- Event-based monitoring
- A non-database-centric approach
- Non-intrusive integration into existing business and network assets, i.e., no code changes to existing components to collect monitoring data
- Flexible composition of process monitoring and multiple business process correlations
- Decoupled monitoring logic and presentation layer
Here are some sample scenarios for applying these capabilities into a mobile service provider’s operational platform:

- Provide real-time key performance indicator (KPI) data to monitor service level agreements on business and network process levels, e.g., the average process duration for authorization of a process.

- Enable alerts at the individual business and network process level, to enable operations to intervene on short notice, e.g., send alert/information when customer gets three call drops in the last 15 minutes.

- Provide real-time insight into business and network process performance, e.g., how many products have been activated per channel so far today.

From there, events can be displayed in customized dashboard views or can be forwarded to trigger automated business processes, or simply execute mechanisms such as sending an email.
5. How TIBCO’s Software Helps Organizations Deliver a High Quality of Customer Experience

TIBCO’s CEP-based solution addresses the challenges of providing a high quality of customer experience while leveraging existing assets.

1. Agents capture relevant information from the various systems that execute the service and send it to the service activity bus. Typical examples of these systems are:

- Network elements (via PARLAY)
  - GGSNs
  - WAP gateways, MMSCs/SMSCs
  - Intelligent Networks
- Application containers (via JMS, Log4J)
  - J2EE Application Servers
  - SCIMs/ServiceBrokers
Operational systems (via SNMP, LDAP)
- HP OpenView
- Subscriber Profile

Charging systems (via PARLAY and others)
- RADIUS
- DIAMETER
- Payment Gateways

2. Service Activity Bus provides a normalized means for transporting these events in real time to the CEP engine so that the events can be filtered, correlated, and analyzed. This bus is already being used by many operators to tackle similar problems.

3. QCE Event Processor receives and filters these events and applies them to instances of service models (an example for a ringtone service download is shown below) to build up the various views, from the perspective of both the subscriber and the service.

![Figure 4. Service model for ring-tone service](image)

The received and filtered events can be combined into views that can then be aggregated and sent out as several external events, for example:

- **Response and Repair**: The views can have rules applied to them to decide whether an automated response should occur. These responses are typically
sent out as events to the service executing systems. Alternatively, if enough information regarding the failed service is known, there is the potential for the operator to decide whether to automatically re-instantiate the service (e.g. silently re-start the download or switch to another HTTP server).

- **KPIs:** The views can be used to calculate both service and subscriber KPIs. Examples of service-centric KPIs might be Service-Lifetime or Average-Errors-Per-Service. Examples of subscriber-centric KPIs might be Service-Failures-Per-Day or Charging-Compensations-Per-Service.

- **Service Impact:** To accurately determine whether an additional service can be offered, it is important to have a complete view of services currently being used by a subscriber. Having a complete service overview of the customer will help to determine eligibility for further upgrades or cross-sells. For example, a customer with a low speed bandwidth should not be signed up for IPTV or VoIP for the whole family with various simultaneous connections.

Consider the example given earlier in this paper about the repeated calls to the same number within a few minutes. If the service provider had deployed a quality of customer experience solution, a repeated occurrence of this dial pattern would be captured by the system and processed according to the rules defined by business analysts. This could mean a simple system alert on the operational dashboard or after a pre-defined threshold of repeated occurrences, sending an SMS message to the customer with a promotion of extra minutes to use and the promise to investigate the problem.
6. Conclusion

Quality of customer experience has emerged as a mission-critical challenge for communications service providers who need a service and subscriber view of their operations more than ever in a world of ever-increasing service complexity. The main mission of a quality of customer experience solution is to provide real-time, end-to-end operational visibility into all the events taking place on the network, correlate and analyze these events, and, using a set of business rules developed by the service provider, automatically take proactive actions.

Such a system increases awareness of what is happening across the network and how customers perceive the services they use. This insight enables proactive service improvements and customer interaction, leading to improved customer experience, greater customer satisfaction, reduced customer churn, increased revenue, the ability to attract new customers, and lower operational costs.

TIBCO offers all the required and desired parts of such a solution, whether it is an enterprise service bus or a complete service-oriented architecture in combination with business process management. TIBCO BusinessEvents™ is a unique CEP tool that correlates events, identifies patterns, and applies rules in real time. It can easily be integrated with other TIBCO software or your existing infrastructure. The end result is an improved customer experience and customer satisfaction, reduced customer churn, increased revenue, and lower operational costs. Please check out our website at http://tibco.com/solutions/industry/commedia/telecom.jsp.
7. About TIBCO

TIBCO Software Inc. (NASDAQ: TIBX) is a provider of infrastructure software for companies to use on-premise or as part of cloud computing environments. Whether it’s optimizing claims, processing trades, cross-selling products based on real-time customer behavior, or averting a crisis before it happens, TIBCO provides companies the two-second advantage™ – the ability to capture the right information at the right time and act on it preemptively for a competitive advantage. More than 4,000 customers worldwide rely on TIBCO to manage information, decisions, processes and applications in real time. Learn more at www.tibco.com