The Aspect® Unified IP®
Five 9s Environment

Technical Overview

Aspect Unified IP 7 is a next-generation customer contact solution that enables companies to interact with consumers through the channel of their choice – voice, email, chat, instant messaging (IM) and short message service (SMS). As a mission critical application for an enterprise contact center, Aspect Unified IP 7 is architected to deliver high availability (HA) and reliability up to 99.999%.

High availability is not merely a function of software design, but also includes the overall system architecture, implementation planning, and best practices for operations and maintenance. IT managers understand the complexities of today’s real-time communications and Web 2.0 technologies and approach these system design challenges using the best practices for distributed/service-based architectures. A key design approach for highly available distributed systems is the use of parallel service/systems operations. Ensuring that systems are able to meet the high standards for availability begins by designing for redundant component architecture that is resilient to isolated component failures and service disruption.

Aspect Unified IP is architected with this level of resiliency to ensure that:

- No active conversations between agents and customers are dropped
- No customers on hold in queue are dropped
- Contact statistics are retained for reporting

High availability is a design and implementation approach for ensuring a system meets a certain level of operational performance. Five 9s or 99.999% availability is the benchmark standard for mission critical applications, and equates to no more than 5.26 minutes of unscheduled downtime per year for a given computer system. To achieve Five 9s, modern next-generation systems are designed with redundant components and they load balance traffic to minimize the impact of any isolated failure. An HA configuration for Aspect Unified IP ensures the system is resilient to common failure scenarios and isolated network disruptions, and the automated recovery processes support an availability standard for Five 9s. Unsurpassed reliability of contact delivery, contact routing and data integrity – enhanced by increased fault tolerance automation – helps to achieve and maintain optimum performance levels.

Hardware vs. Software-based Configurations and Other Technology Differences

The HA configuration for Aspect Unified IP 7 differs from legacy proprietary hardware-centric systems that rely on firmware models with extensive internal hardware redundancy to achieve Five 9s. HA in legacy platforms is also limited to the physical switch where the legacy application, such as an automatic call distributor (ACD) is in operation. Remote locations and users beyond the reach of physical connectivity to the legacy hardware-centric platforms do not benefit from the same level of resilience.

Aspect Unified IP 7 leverages real-time software architectures and distributed system models to deliver Five 9s. Because these hardware- and software-based approaches differ considerably, direct comparisons are not valid but each basis brings its own benefits and limitations.
The Aspect® Unified IP® 7 HA configuration complies with the Microsoft SQL Server industry accepted design standard for HA. A primary database, redundant database, and “witness” component are considered the best practice for database integrity and reliability.

Aspect Unified IP 7 leverages specific fault tolerant processes to support Five 9s availability, and can proactively address a service interruption to a system component issue to minimize overall system impact. Automated inter-process communication enables each component to maintain critical state information in the event that a primary or load-shared component fails. Notification of a failed component is communicated through an alert mechanism, which determines the sequence of recovery actions to bring backup components online, redirect operations to another available system component, or both. System alerts are created and logged to record all failure and recovery events.

The HA architecture of Aspect Unified IP provides Five 9s availability for a system and ensures continued operations under typical failure conditions such as:

- Physical server failure
- Virtual server failure
- Database failure
- Software application failure
- Network congestion or short-term interruption
The Importance of Redundancy to Five 9s Recovery and Availability

In order to achieve Five 9s on Aspect® Unified IP®, a redundant profile is required with a primary/backup or N+1 strategy for each core component.

The following diagram reflects an HA architecture of Aspect Unified IP 7, which leverages three physical servers and supports a capacity of 2,000 concurrent agents per system. Within each physical server are virtual servers – virtualized with either VMware or Microsoft HyperV – that house specific primary and HA software processes in the Aspect Unified IP architecture.

- The primary datamart is the main database of the Aspect Unified IP platform and contains the user permission information and active data tables required for normal operations.
- The reporting datamart is the historical repository of the Aspect Unified IP platform where on-demand and scheduled reports can be accessed by users; it serves as the HA component for the database and takes over operations if the primary datamart fails.
- The recording datamart is the repository for logging contact and screen recordings in the system.
- The core server is the primary control server for the Aspect Unified IP platform that manages contact routing, self-service, outbound dialing and multichannel contact control.

Aspect Unified IP has specific failover recovery and redundancy standards that must be met for Five 9s:

- Redundant components take over processing responsibilities of the failed component according to the specific contact processing/routing and contact delivery scenarios that are affected.
- Telephony control devices, such as a digital communication processor (DCP) or telephony media server (TMS), are resilient to the failure of a non-call process impacting resources such as core servers, UCC servers or databases, enabling a customer call to remain intact during a server outage.
- The Aspect Unified IP Five 9s specification does not include loss due to a carrier or switch failure, therefore, Aspect recommends that customers deploy N+1 telephony components.
- Processes should be in place to support recovery and a return to full functionality to meet or exceed the 99.999% availability guidelines for the aggregate of all failed core components.

Aspect Unified IP 7 monitors for failed components and takes the appropriate recovery actions to ensure customer interactions are preserved for the best possible customer experience and with minimal user intervention. The system deployment design should accommodate no more than 20% capacity loss to maintain availability standards for contact center environments, so that impacts for accepting
new agent/supervisor logins during the failure/recovery period would be minimized. While a system or node scales to 2,000 concurrent agents, multiple Aspect® Unified IP® systems can be networked together to support enterprise contact center operations with 10,000+ agents. Enterprise Contextual Routing ensures that consumers are routed to the best skilled agents no matter what system they reside in. Unified Command and Control provides enterprise-wide administration and real-time and historical reporting, enabling companies to manage a network of contact centers as one large virtual contact center.

The following key customer contact interactions illustrate results achieved with the Aspect Unified IP 7 system designed for HA, and how those results benefit the business operations organization:

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<th>Contact Delivery and Routing – Key Interactions</th>
<th>High Availability Results</th>
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| Agent Connected Contact = contact that has been delivered to an agent | • All connectivity between the agent and the customer are preserved (voice, IM, chat, email) while the agent completes the customer interaction  
• The system maintains transaction statistics that align with the recovery period |
| Queued Contact = any contact receiving treatment such music on hold, announcements, scripted messages | • All connectivity is preserved between the system and the customer waiting in queue  
• The customer connection (voice, IM, chat, email) is maintained  
• The customer will continue to receive queue status updates if a recovery action occurs while maintaining transaction statistics and logging that align with the recovery period |
| Incoming Contact = any contact that entered the system but is not yet queued or receiving contact treatment | • All connectivity is maintained for new incoming customer contacts  
• The customer connection (voice, IM, chat, email) is maintained for new contacts and as appropriate, customers will receive a system status message allowing them to remain connected if a recovery action occurs  
• The system maintains transaction statistics and logging for contacts retained through the recovery period |
| Outbound Contact Being Dialed (manual or automated) = in-process outbound call that has not yet been connected to a customer | • In-process interactions are reinitiated, with outbound contact strategies preserved and statistics and logging maintained |
| Outbound Contact Connected = in-process outbound is connected but is not yet queued or treated | • All connectivity is maintained for outbound connected customer contacts  
• The customer connection (voice, IM, chat, email) is maintained for new outbound contacts and as appropriate, customers will receive a system status message allowing them to remain connected if a recovery action occurs  
• The system maintains transaction statistics and logging for contacts retained through the recovery period |
Support for Disaster Recovery with Aspect Unified IP 7
A facility-wide or environment-based outage requires resiliency beyond local HA. Aspect® Unified IP 7® offers this level of business continuity in a disaster recovery (DR) architecture involving two Aspect Unified IP systems in distributed locations. A DR configuration with two operational systems managed with Unified Command and Control® (UCC), an Aspect Unified IP 7 enterprise component, ensures that contacts and agents can transition to the DR system automatically in the event of a facility failure.

High availability and disaster recovery serve distinct purposes. HA utilizes a redundant system design to maintain functionality for failed components with limited or no impact to contact center operations. DR system design utilizes multiple distributed systems configured to take over, not maintain, operational functions for a failed site. Often customers will deploy both HA and DR configurations.

The DR architecture of Aspect Unified IP also provides the flexibility for customers to perform updates and upgrades with no downtime. Users can transition to one system while the other is upgraded and revert back once the upgrades are completed.

Customers running 24x7 operations should consider an enterprise DR deployment that allows for at least two systems to share the load for the environment, with one system taking over the load during scheduled maintenance windows. Without an enterprise deployment, some downtime is required to apply software updates to the system.

Conclusion
System reliability and availability has become even more important with the evolution of the next-generation consumer who is empowered more than ever by choice, influence and control. Even the slightest decrease in system availability can impact a consumer’s impression of a company. Aspect Unified IP meets these needs with an architecture that delivers Five 9s availability at a system level and a disaster recovery framework that provides business continuity even in the face of facility outages and natural disasters.