Maintaining Survivability in Unified Communications Networks

Enterprise communications have evolved rapidly over the past decade. Smart phones and mobile broadband have been instrumental in extending communications and productivity to multi-site environments and remote employees. Unified communications are a mission-critical function for these deployment models because loss of communications capabilities can result in decreased productivity, interruptions in service, and even lost revenues. As enterprises adopt unified communications (UC) solutions, it is imperative that these solutions have the ability to maintain communications and keep employees reachable in the event of network failures or overload situations.

Ribbon Communications has the solution to maintain communications survivability in UC networks with its Application Server (AS) and session border controllers (SBC) portfolio.

Ribbon Application Server

The Ribbon Application Server is one of the world's most widely-deployed UC solutions with millions of seats sold. This includes multiple enterprise deployments that exceed 50,000 seats. Universities, healthcare providers, financial services and government agencies (including secure Dept. of Defense deployments that require JITC certification) all depend on the Application Server for mission-critical environments.

Ribbon Session Border Controller

In today's multi-vendor networks, security and interoperability provides assurance that different networks (and different network elements from a variety of vendors) can securely communicate effectively with one another. Our SBC "Core" portfolio which includes the SBC 5000 Series, SBC 7000 and SBC SWe are designed and tested to provide the most robust SIP security and interoperability with legacy communications equipment, SIP providers, application providers and hold certifications such as JITC and Microsoft Teams, to name only a few. The

SBCs control and secure real time communications at network borders

Key functions
- Demarcation point
- Session control
- Security and Encryption
- Policy enforcement
- Interworking/Normalization

Analogous to a traffic cop
- Enforces rules
- Determines good traffic from bad
- Hides inner network specifics

Ribbon SBC Core portfolio provides all of the features you need in an SBC today—robust network security, sophisticated routing and policy management, overload controls, SIP normalization— plus the features you'll need tomorrow, like IPv4-IPv6 interworking, multi-modal communication, built-in media transcoding and assured performance and scale under heavy traffic. Ribbon' award-winning SBC Core portfolio meets all of the security, scalability, high availability, and management requirements of service providers and large enterprises. Today, both the Ribbon AS and Ribbon SBCs are driving the next generation of change toward unified communications, cloud services and beyond.
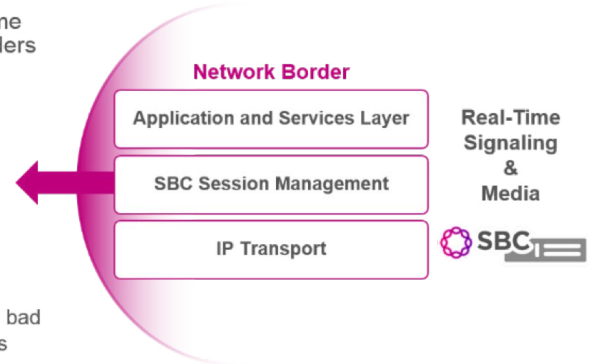
## Ribbon's Solution for UC Survivability

In the event of a complete loss of access to the Ribbon AS due to a cable cut, a network outage, overload on the call control infrastructure, or a multitude of other impairments that might cause interruption of communications, the UC Survivability mode on the Ribbon SBC Core portfolio will step in and provide basic call service continuity. The Ribbon SBCs have been designed to activate their survivability mode under the following conditions:
- If the IP connection to the AS hosting the registered subscriber is down or AS itself is down. These errors are detected via timeouts to SIP OPTIONS or INVITE requests.
- AS is overloaded and cannot process calls or registrations.

In these call impacting scenarios, the SBC survivability mode will be initiated for a calls or registrations from subscribers when the serving AS is either is down or overloaded. For inbound PSTN calls, the SBC forwards the request to the AS. If AS is not reachable or overloaded the survivability mode in the SBC initiates for inbound PSTN calls.

Specifically, as part of its survivability solution, Ribbon offers a multi-tiered approach based on certain network conditions affecting the Ribbon AS. These include:
- Registration Handling in Survivability Mode
- Call Handling in Survivability Mode
- SIP SUBSCRIBE/NOTIFY handling
- SBC Detection Mechanism for AS Overload Situations
- IP Detailed Record During Survivability Mode
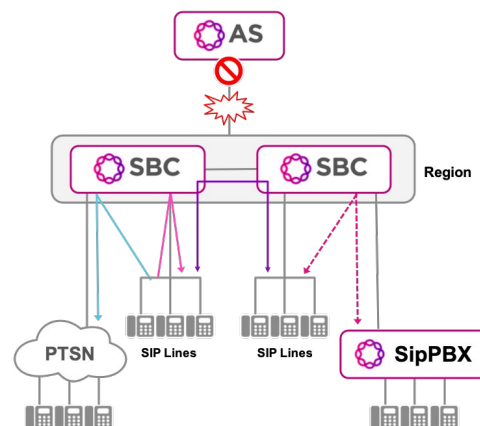
Registration Handling in Survivability Mode
In this scenario, when endpoints are already registered to the AS and there is a network outage, the SBC will act as a surrogate and process the registrations locally on the SBC by responding to refresh register requests with a "200 OK" on behalf of the AS. The SBC will not delete any registration for a subscriber whose AS is unreachable.

For new registration requests for the AS, the SBC will accept the registrations without authentication. In this scenario, there will be a configurable option to allow new registration. The default SBC behavior will be to reject any new registration requests with 503 when AS is not reachable.

Call Handling in Survivability Mode
In the event of a network outage between end-users and the AS, the Survivability mode of the SBC will be able to continue routing of calls between locally registered endpoints using a Local Registration Cache. In addition, the SBC in Survivability mode will perform the following:
1. Route calls originating from external gateways (PSTN or SIP) and terminating on locally registered endpoint using local registration cache;

2. Route calls originating from locally registered endpoint and terminating on external gateways (PSTN or SIP)

3. Continue to handle mid-dialog requests for existing calls to be routed to the AS if it is reachable even though the AS is overloaded.

SIP SUBSCRIBE/NOTIFY Handling
When AS is either in Overload or unreachable the SBC in Survivability mode will reject all SUBSCRIBE messages from end-user phones.

SBC Detection Mechanism for AS Overload Situations
In the event the AS rejects requests with "503 Service Unavailable" due to various overload levels, the SBC ARS (Address Reachability Service) function will process those requests as follows:
- Minor Overload: the AS starts rejecting SUBSCRIBE and NOTIFY messages with a 503 Server Unavailable. For this message the SBC will initiate a Retry-After "X" time parameter.
- Major Overload: the AS will keep rejecting SUBSCRIBE and NOTIFY messages and it will start to reject Instant Messages, SIP PUBLISH, and registrations with a 503 Server Unavailable. As before in the Minor Overload Scenario, the 503 message will contain a Retry-After "X" time parameter which indicates when the SIP message can be resent to the AS.
- Critical Overload: the AS rejects all new SIP transactions which are not emergency calls. Existing calls are allowed to proceed and complete as expected. However, no new sessions will be allowed and the AS will continue to respond with a 503 Server Unavailable with a Retry-After specified.

The SBC will stay in the survivability mode for the duration specified in the Retry-After header.
Note: The SBC in Survivable mode will continue to forward emergency calls to the AS if reachable even under critical overload.

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IP Detailed Record During Survivability Mode

When the AS is not reachable for calls or is in an overload situation, there are no IP detailed records (IPDR) created by the AS. For those affected calls, the SBC as part of it normal function and in "survivability mode" will generate call detailed records (CDRs) for reporting and operational functions.

Note:
- *Connect Ingress IPDRs are still generated if AS rejects call due to overload.*
- *Calls that start before AS is in overload, but are still processed to completion by AS while in overload, will generate normal ingress and egress Connect IPDRs.*

Summary

UC survivability is another hallmark feature of Ribbon AS and SBC solution set. It is imperative to provide a means for local call control in the event a complete loss of access to the AS due to a cable cut, a network outage, overload on the call control infrastructure, or a multitude of other impairments that might cause interruption of communication between the UC client and the call control infrastructure. The SBCs' Survivability mode can provide a local call control capability so that a service interruption is a seamless event, and down time remains next to zero.

Contact Us Contact us to learn more about Ribbon solutions.