

Talarian Corporation

Talarian Solutions for Content Networking Vendors

A description of Talarian’s suite of multicast solutions for vendors in the content networking market. These solutions allow the real-time replication, distribution, or exchange of data between any of the major applications for content networking, over any network type. They provide managed, guaranteed, scalable, and efficient delivery of control signals, content and application data.

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Talarian Content Networking Solutions

Introduction

Content networking vendors are faced with an exploding market and with dramatic scalability requirements for their infrastructure, as well as the need to provide support for new application types. They need to be able to provide a single integrated, managed solution for a wide range of content applications, which can drastically reduce the management costs of these applications, and demonstrate a rapid ROI to customers. Talarian provides a set of communications products that can be easily integrated with the products of content networking vendors, allowing them to replicate, distribute and exchange both control signals and data in a real-time, efficient, scalable, managed, fault tolerant fashion over any network type. Talarian's Content Networking Solutions can enable vendors to dramatically increase the global scalability and management capabilities of their content networking products, save money, and get next generation products to market more quickly.

Talarian's overlay networking software (also called publish/subscribe messaging) already provides these benefits to over 40 software vendors, such as Micromuse, BMC, Computer Associates, DoubleClick, Aspect, ABB, Novell, and many others. This white paper provides specific details on the features and benefits of Talarian's solutions for the content networking market, as well as showing how Talarian fits in to the content networking market. It is targeted at product managers, engineering managers, and product architects.

Talarian has two primary product lines that are applicable to the content networking market, SmartSockets and SmartPGM, as well as a set of services and additional capabilities. Talarian's SmartSockets software (alternately called either publish/subscribe or overlay networking software) provides the only globally scaleable, embeddable communications platform that allows thousands of servers to communicate in real-time over any network environment. With its unique "adaptive multicast" capabilities and its use of the standard PGM reliable multicast protocol, Talarian's SmartSockets products allow both many-to-many server replication, as well as efficient one-to-many reliable real-time data distribution, over any network. Proven examples of the scalability of this product include Micron, which runs its worldwide semiconductor manufacturing operations over SmartSockets—10 countries, 20,000 nodes, all connected in real-time 24x7x365. Credit Suisse First Boston has deployed Talarian to connect the thousands of computers of its equity trading systems across 30 countries, running 500 applications. Micromuse has built version 4 of its Netcool product on SmartSockets, allowing it to scale in any network environment.

Talarian's PGM protocol, co-developed with Cisco and leading academics, is now the de-facto standard for reliable multicast. It is the "TCP for IP Multicast", providing real-time reliable delivery and congestion control for any

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multicast data type. PGM, either as a stand-alone product, bundled with Talarian's FX multicast file transfer application, or bundled with Talarian's SmartSockets overlay networking product, allows efficient, reliable, managed one to many data distribution over virtually any multicast enabled network. It provides a particularly compelling value proposition over satellite networks, where it can provide customizable reliability and bandwidth management for both non real-time applications like multicast file transfer, as well as real-time applications like video streaming.

Talarian's consulting organization includes a number of the world's experts in content networking and reliable multicast, as well as 10 years of experience solving the hardest problems for customers like the American Stock Exchange, Barclays Bank, Southwest Airlines, New York Stock Exchange, and others. Talarian offers a number of add-on products, including database adaptors, application server adaptors, real-time caches, and management extensions. Between its best of breed products, targeted expertise and add-on products, Talarian can provide anything from pure shrink-wrap products to complete "content transport solutions", depending on the needs of the customer.

Market Segmentation

Content networking is an exploding market. With the Internet revolution, network service providers and enterprises have spent the last five years deploying content, applications, and services that allow unprecedented knowledge transfer both inside corporations, between corporations, and to consumers. However, this Internet (and intranet) revolution has been a victim of its own success, often resulting in inadequate quality and out of control IT costs. Video streaming and other live applications have quality far below that provided by standard broadcast networks. Internet service providers are finding their core "IP dial tone offerings" increasingly commoditized, and are eager to find ways to offer value added services. As enterprises are trusting more and more of their corporations' functioning and knowledge bases to Intranets and corporate applications, providing scaleable, guaranteed, managed quality of these applications is becoming increasingly difficult. There is constant pressure on IT departments to support additional applications and services, but widespread fears that bandwidth intensive applications such as video streaming, large scale content replication, distance learning, and software distribution will overly tax the networks and the staff managing them.

As a result, IT managers today are demanding integrated solutions that, while offering them more advanced capabilities, also demonstrate dramatic savings in the cost of managing and deploying the solutions.

The content networking market is growing at an exponential rate in response to these demands. As its fundamental value proposition, it allows network service providers and enterprise IT managers to take a wide range of core Internet and enterprise applications, and add guaranteed and managed quality,

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scalability, and efficiency to these applications. This allows better return on investment in network assets, the ability to offer higher value applications and services to both internal and external customers, and reduced management costs of these applications.

Initial solutions for this market concentrated on functionality and management capabilities. The second wave of products in this space, by vendors such as Cisco, Network Appliance, Inktomi, and Nortel, increasingly have to focus on scalability and robustness in the face of heterogeneous network conditions. Where initial customers deployed hundreds of servers, current prospects are demanding thousands of edge servers, distributed over worldwide networks, all with centralized management.

Figure 1 shows the driving applications for this market. The progress of this market is moving from left to right, because the newer applications demand scaleable real-time delivery, which is more challenging to provide. Talarian has helped hundreds of enterprises deploy custom business critical applications whose communication requirements span the technical requirements of all four application waves. Talarian is helping advance the progress of these new application waves, by providing a development environment that drastically reduces the development costs and time to market of distributed software, combined with proven, globally scaleable overlay networking infrastructure software.

Figure 2 shows the market segmentation for the content networking market.

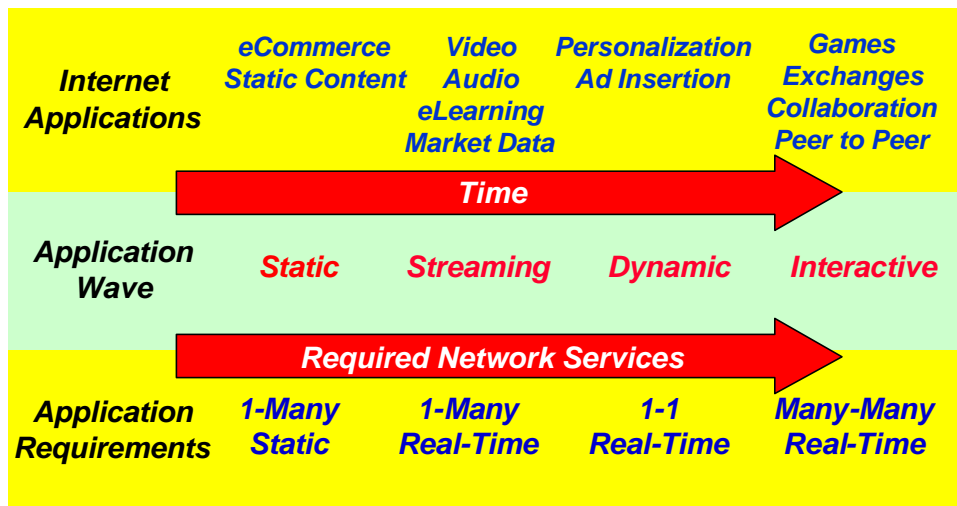


Figure 1: Application Waves

There are three levels of components in this market. At the highest level are the storage components responsible for caching and storing content at the edge of the network. At the middle level, all of the content networking components need to be unified in to a single management framework, providing centralized administrative control across up to thousands of globally distributed servers.

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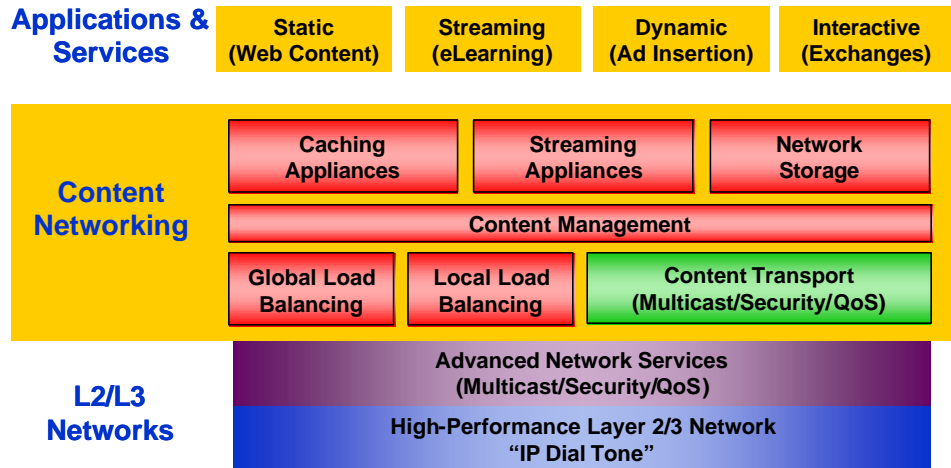


Figure 2: Content Networking Market Segmentation

At the bottom is a layer of “overlay networking” components. Local load balancers provide content and application aware switching within a single data center. Global load balancers are responsible for directing the client requests to the best data center given the current network conditions and a range of other content and business logic. Together, local load balancers, global load balancers, caching and storage components provide an optimized solution for allowing clients to pull data over the “last mile” of the network.

A fundamental value proposition of content networking is that all of the distributed servers (which provide storage, streaming, caching, load balancing and management) look like a single system from the perspective of the network administrators and users. Administrators need centralized access and control over all of the servers. Users need uniform access to content and data from any server. The content management system needs a “message bus” that provides a many-many control plane, tying all of the servers together in a fully fault-tolerant, real-time, globally scaleable fashion. The caching, streaming, and other application services require efficient 1-many or many-many replication of content between some or all of the servers, in a way that is also fault-tolerant, real-time, and globally scaleable. Both systems also require that the infrastructure that provides this capability be manageable by the content management system. The components that provide these capabilities are called *content transport solutions*.

In contrast to the components that support demand-driven “pull” of information over the last mile, the content transport component is responsible for real-time “push” of content from the original source to all of the appropriate distributed edge servers. It is also responsible for providing a distributed “message bus” for exchanging control and management information between the servers. Talarian is the first vendor to offer proven solutions for this content transport segment that can be embedded in the products of content networking vendors.

Architecture for Content Networking Integration

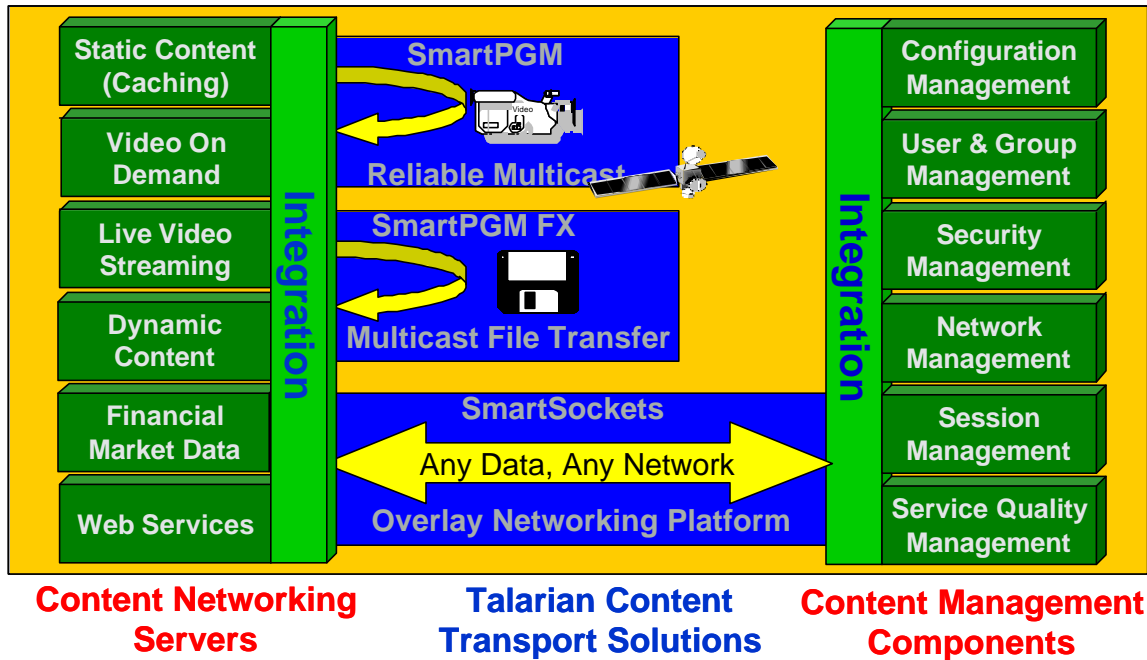


Figure 3. Talarian Content Transport Solutions

Talarian provides an advanced set of solutions for the content transport requirements of content networking vendors, allowing these vendors to offer more functionality, with global scalability, faster time to market, and less cost. These solutions are based on its SmartSockets overlay networking and SmartPGM reliable multicast products. The components of these solutions can be used in part or in combination, flexibly allowing customers to solve specific business problems they have today, while being confident that the solution set they have selected will scale to meet their needs of tomorrow. They can be used by themselves, or Talarian can customize them to meet a vendor's requirements, providing complete solutions with rapid time to market.

These transport platforms can provide efficient, real-time multicast distribution of virtually any type of data or control traffic. SmartSockets provides globally scaleable many-many delivery over virtually any two-way network, while SmartPGM is a lighter weight 1-many solution for networks that support native IP multicast. SmartSockets also provides support for SmartPGM with its unique Adaptive Multicast capability, automatically taking advantage of native IP multicast where it is available, providing content networking vendors with a graceful way to deploy multicast applications over any network, speeding the deployment of native IP multicast worldwide.

A complete content transport solution requires the integration of three components – the content networking servers, content management platform, and content transport platform. Talarian provides solutions for the content transport

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platform, and content networking vendors provide solutions for the rest. Integration can be done rapidly and for low cost, using Talarian's cross-platform, cross-language software development kits. Talarian can also customize these products as required, and provide consulting services to assist with the integration. Talarian has the expertise to provide complete integrated solutions, if desired.

Figure 3 shows this architecture.

- ? **Content Networking Servers.** These are the actual data servers that either source data in to the content network, or store and relay it at the edge of the content network. They can provide any of a wide range of applications, from any of the four application waves above. These are provided by the content networking vendor.
- ? **Content Management Components.** These are the management capabilities that need to be accessible from a centralized location, but be distributed over all the content networking servers.
- ? **Content Transport Solutions.** Talarian provides three core content transport solutions, detailed below. These can provide interconnection between the above components. The SmartPGM product provides a real-time reliable multicast protocol capable of 1-many delivery of any data type over any two-way IP multicast network. It is particularly well suited for video distribution over satellite networks. The SmartPGM FX product adds multicast file transfer capabilities on top of PGM. It is particularly suited for replication of static content over satellite networks. The SmartSockets overlay networking infrastructure provides a unified platform for the distribution of any data type (with the possible exception of live video) over any network type. It also provides a scaleable, "message bus" control plane that can connect thousands of distributed servers to the management components.

Content Transport Solutions

Talarian offers three primary products that can be used for content transport solutions – SmartPGM, SmartPGM FX, and SmartSockets.

- ? **SmartPGM for Native IP Multicast Networks.** If a network provides end-to-end support for native IP multicast, and a lightweight solution is desired, SmartPGM is most useful. With its small footprint, SmartPGM does not support security, is designed for one to many distribution, and does not provide

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other higher level features such as cross-platform data translation. If any of these features are required, or the network does not support end-to-end IP multicast, SmartSockets should be used instead. SmartPGM provides very high performance and scalability for native IP multicast environments. It is particularly suited for video distribution over satellite networks.

- ? **SmartPGM FX for Native IP Multicast Networks.**
SmartPGM provides a transport layer interface. SmartPGM FX builds on top of this, offering a multicast file transfer application, allowing efficient replication of files over any two-way native IP multicast enabled networks. It includes both a command line and a GUI interface. It is particularly suited for distribution of static content over satellite networks.
- ? **SmartSockets Overlay Networking for Any Network.**
SmartSockets provides application layer multicast, which provides scaleable, efficient distribution and exchange over any

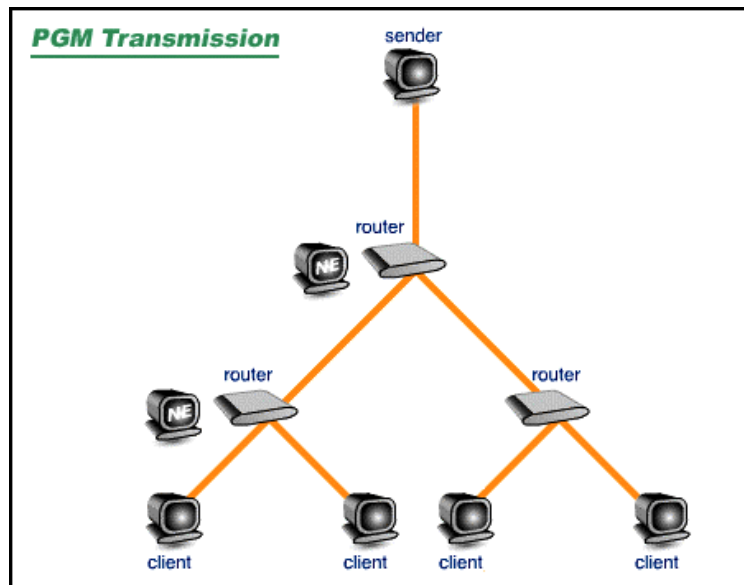


Figure 4: SmartPGM Architecture

network type. The set of connected SmartSockets “overlay routers” provide overlay unicast and multicast routing, creating efficient minimum spanning trees for each subject being delivered. With its support for SSL, TCP, HTTP, and other point-to-point protocols, SmartSockets can provide secure delivery, cross firewalls, and support a wider range of communication models, including many-to-many exchange of information. It also provides support for native IP multicast networks through its use of SmartPGM and adaptive multicast. This automatically adapts to the available network

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characteristics, using IP multicast where available, and using application layer multicast over unicast protocols where not. This version provides the most complete level of content transport functionality available in the market today.

Figure 4 shows the architecture for SmartPGM. Sender and receiver processes can run on a range of host machines. In addition, optional network elements can be deployed to increase scalability. PGM router assist components can run in Cisco or Nortel routers, providing scalability to many thousands of receivers. Alternately, SmartPGM network elements can be run on servers in the network, providing the same levels of scalability without having to upgrade router software (except for IP multicast). Note that each client can be either a sender or a receiver for a given group, providing primarily one to many or few to many content distribution, rather than many-many exchange of information. For more details on the SmartPGM product, please see the Talarian web site.

<http://www.talarian.com/products/smartpgm/index.shtml>

Figure 5 shows the architecture for SmartSockets 6.0 with optional SmartPGM. The core RTserver multicast content routers are software processes that can run on a wide range of servers, and could also be deployed as a stand-alone appliance if desired. They communicate among themselves using unicast protocols such as TCP, and each sending client uses a unicast connection to send information to its designated RTserver. RTservers are often distributed geographically, providing the ability to connect multiple LANs or administrative domains, even across firewalls. For server to client distribution, a client typically will have both a unicast and a SmartPGM multicast connection that it attempts to establish. If only a few of a RTserver's children are interested in a given

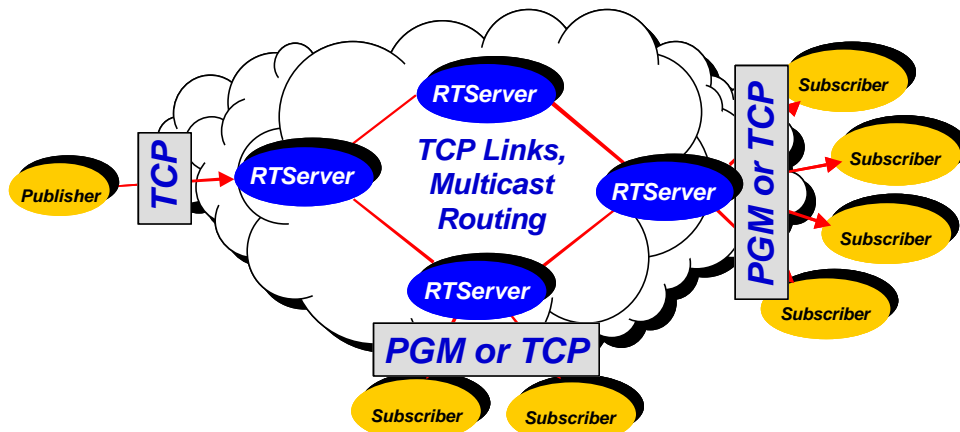


Figure 5: SmartSockets Architecture

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message, or if some of them do not support multicast, it will send it via unicast to each of these children. For cases where a larger number of receivers are able to receive via multicast, SmartPGM will be used for this server to client communication. This supports very scaleable and efficient communication over any network type, for both one to many, many to many, or peer to peer communication.

SmartSockets provides support for firewall tunneling, SSL based security for per-link encrypted communication, end-to-end encryption of data payloads, and a wide range of authentication mechanisms. It has hooks for customizable access control, where the server can limit distribution of certain topics to different groups of receivers. With the SmartSockets Gateway, administrative domains can be connected in a way that allows security and routing policies to be configured in a range of very flexible ways, providing even greater scalability, and a high level of failure isolation between domains. For more information on the SmartSockets product, please see the Talarian web site.

<http://www.talarian.com/products/smartsockets/index.shtml>

Mutual Features and Benefits

Both products provide the following features and benefits.

- ? **Global Internet Scalability.** Proven scalability to tens of thousands of simultaneous receivers, distributed over global networks, with highly heterogeneous network and host performance.
- ? **Performance.** Up to tens of thousands of messages per second, and up to tens of megabits per second, delivered to each client.
- ? **Real-time, Reliable Delivery.** Delivery is event driven and done in true real time, rather than being based on any type of polling system. Supported applications include both live applications like live video streaming, as well as reliable bulk transfer applications like file transfer. A range of reliable delivery semantics is supported, which can be selected on a per message basis. Traditionally, you have had to select either real-time, scaleable, or reliable delivery. With Talarian, you can have all three.
- ? **Fault Tolerance and High Availability.** As no single feature makes a product truly fault tolerant, the products include a wide range of dynamic fail over, state resynchronization, and other high availability features.

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- ? **Industry Proven.** Talarian has proven out these products over the past ten years with more than 350 customers. For example, they have been deployed in aerospace applications such as the Space Shuttle, financial applications such as many of the world's financial exchanges, telecommunications applications such as fraud detection, and in more than 40 embedded OEM and ISV applications. Talarian offers true enterprise and telecommunications hardened infrastructure products.
- ? **Cross Platform Support.** Talarian supports a wide range of host platforms, including Windows, Unix, VMX, VxWorks, and many others.

SmartPGM Features and Benefits

In addition, SmartPGM provides the following features and benefits when used stand-alone.

- ? **Lightweight Solution.** SmartPGM provides a smaller set of features, and assumes the availability of native IP multicast. This allows it to offer a lighter weight solution than SmartSockets. In its simplest form, it can be deployed simply with client processes on each host, without any multicast content routers at all.
- ? **De-facto Standard.** With support by Cisco, Nortel, Microsoft and Talarian, PGM is the de-facto standard for reliable multicast protocols. It is the "TCP for IP multicast".
- ? **Forward Error Correction.** SmartPGM includes integrated forward error correction, for increased scalability and lower latency delivery.
- ? **Special Support for Satellites.** SmartPGM has been specially designed to work in a wide range of satellite deployment environments, including one way satellite networks with terrestrial return paths.
- ? **Only Commercially Supported Host Side Implementation.** There are multiple experimental versions of the PGM host side available, Microsoft embeds a version in one of its products, and both Cisco and Nortel are supporting the optional router accelerator component, Talarian offers the only commercially supported, embeddable host side implementation. Talarian is a co-author of the specification, and continues to be the first to comply with each new version of the specification.

SmartSockets Features and Benefits

In addition, SmartSockets with SmartPGM provides the following features and benefits.

- ? **Guaranteed Message Delivery.** As one of the reliable delivery options, SmartSockets provides Guaranteed Message Delivery, which makes sure each subscriber of a given message will receive it, even if link or host failures occur, or will, after a configurable fault recovery period, notify the sender of the list of receivers that were not able to receive it. This very high level of reliability is provided with extremely high levels of performance.
- ? **Security.** SmartSockets provides a range of security options, which cover encryption, authorization, and access control.
- ? **Firewall Tunneling.** SmartSockets can use HTTP encapsulation, for automatic tunneling through firewalls.
- ? **Load Balancing.** SmartSockets includes an integrated local and global load balancing capability, which automatically redirects client requests to the least busy server. This can also provide fault tolerance, and round robin load balancing. This load balancing works within the SmartSockets “cloud”, and does not replace the need for global load balancing solutions.
- ? **Isolates Developer from Network, Host, and Language Dependencies.** SmartSockets isolates the developer from having to be concerned about a wide range of deployment issues. It handles automatic data format translation between different host and operating system types, and runs on over 30 host platforms. With its adaptive application layer multicast and support for a wide range of link level protocols, applications can run over many network types, including IP multicast, unicast, SNA, and SPX networks. SmartSockets clients include full native Java support, as well as native C/C++/ActiveX support.
- ? **Industry Standard API.** With its support for Sun’s Java Messaging Service (JMS) API, Talarian offers support for an industry standard API, freeing application developers from being tied to a single vendor.
- ? **Transactional Reliability.** For messages that need absolutely guaranteed delivery, SmartSockets offers transactional reliability semantics, through its SmartSockets MQ add on component.

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- ? **Seamless Bridging to IBM MQSeries.** SmartSockets MQ can seamlessly interoperate with IBM MQSeries, allowing interoperability with existing or legacy queuing deployments.

Example: Satellite Cache Replication

A specific scenario, in which Talarian has deployed solutions with a number of customers, is replication of caches over satellite networks. A large amount of the content that exists in the caches of network service providers and CDNs needs to be replicated across many caches. In particular, large video files and managed content need to be replicated efficiently to many caches at the same time, as the content is updated. While this could be done over terrestrial networks using either native IP multicast or application layer multicast, satellite networks offer a particularly compelling economic value proposition when the data needs to be transmitted to more than 10 locations at once.

The business requirements for such a solution include the following.

- ? **Cost Effectiveness.** In order to be economically compelling, the system must provide efficient, reliable delivery using the native IP multicast capabilities of the satellite network.
- ? **Scalability.** The system should be able to scale to up to thousands of simultaneous receivers.
- ? **Asymmetrical Network Support.** The solution needs to be able to handle asymmetrical networks which have a one-way satellite downlink for data transmission, and a terrestrial back-channel for control information.
- ? **Confirmed Delivery.** The network administrator needs to have confirmation that the desired updates are being delivered to all receivers.
- ? **Management.** Network management and content management need to be provided, to provide assurances that the business requirements on the content distribution are being complied with.

In order to provide a solution for this problem, a minimum of three components need to be selected and integrated: the caches or streaming servers, the content transport platform, and the satellite transmission system. The content transport platform provides the integration point for all three components. An example of this solution is the Talarian/Inktomi/Harmonic solution, which is described in more detail in a joint white paper. Please contact Talarian at sales@talarian.com for a copy of this white paper. The Inktomi TrafficServer caches store the content, and have been integrated using a file system interface.

When fresh content is generated at a given cache, it is written out to a special outgoing file directory on the server, where the SmartTransfer product reads the files, and replicates them using SmartPGM over the Harmonic satellite transceivers to all of the other caches running SmartTransfer. The files are placed in a special incoming file directory at each destination cache, where they are then read in to the cache.

Example: Scaleable, Integrated Content Management

Customers are increasingly demanding two somewhat contradictory requirements from their content networking systems: integration and scalability. They want all of their content delivery applications to be integrated under a single, globally accessible, easy to manage, easy to deploy management console. In effect, they want their entire content networking system to appear as if it was running on a single box. However, they also want this system to scale to their entire enterprise—up to thousands of edge servers supporting many tens of thousands of desktop clients. The core requirement for meeting these solutions is a scaleable “message bus” control plane. The business requirements for this control plane include the following.

- ? **Uniform Integrated Management.** Any management tool in the system should be able to seamlessly configure, monitor, and manage all of the servers in the content network. In addition, the control plane itself needs to be manageable.
- ? **Global Scalability.** The management capabilities should be globally scaleable to tens of thousands of servers distributed globally, without degradation in performance or increase in the amount of time it requires to do this configuration and management. The control plane must be able to tunnel through firewalls and gracefully deal with network congestion.
- ? **Reduced Management Costs.** A primary goal of improving the management capabilities is to drastically reduce the costs of deploying and managing the content networking infrastructure. Among other things, this means that the control plane itself needs to be extremely easy to configure and manage.
- ? **Real Time Event Replication.** All of the managed servers need to be able to communicate with each other, using point to point or group semantics, in real-time. When an alarm goes off, this needs to be pushed immediately to the devices it is relevant to.
- ? **Fault Tolerance.** If a failure occurs in the network, or in the management system itself, the control plane needs to seamlessly heal this failure and allow the content network to continue

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functioning. If this is not possible, it needs to allow for graceful degradation in the face of failures.

- ? **Flexibility.** As additional applications or management capabilities are added to the system, the control plane must be able to handle these requirements.
- ? **Loose Coupling.** The software components of the content network should be loosely coupled, so that changes to one piece of the system do not affect the others.
- ? **Security.** The control plane needs to support security sufficient to prevent unauthorized changes to the management and configuration of the content network.
- ? **Database Integration.** Configuration files and other management information is often stored in a replicated SQL database. This should be seamlessly integrated to the control plane API's. When information in the database changes, this should trigger updates to the appropriate edge servers automatically.

Talarian's SmartSockets product provides the core, globally scaleable control plane for many of the world's top network management vendors. In combination with Talarian's LiveDB database adaptor, it meets all of these requirements. Micromuse, Computer Associates, BMC, and Novell all have embedded Talarian's SmartSockets in their network management products, to help them solve the challenges associated with providing scaleable, integrated management capabilities.

Example: Live Video Streaming

Scaleable live video streaming over a global network is a particularly difficult application, given the inherent congestion of these networks, and the common failures of individual network components. If video servers are distributed throughout the edge of a given network, the last mile distribution problem can be handled relatively well by existing streaming servers from vendors such as Microsoft, Real, Cisco and Inktomi, particularly when coupled with global load balancing products. However, the real-time distribution of the stream from the original content source, across a large and unpredictable network, with near-broadcast transmission quality, is much more problematic. In order to be able to charge for video streaming services, service providers need to be able to solve the following server-server streaming problems.

- ? **Time Bounded Reliability.** The stream needs to be delivered with at least 99% reliability. A set jitter bound should be established for each stream (3 seconds for example), and

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recovery should proceed for up to this period of time on any given lost packet. If the quality of the stream drops below a given threshold, the jitter bound should be automatically extended, and alternate transmission paths should be explored.

- ? **Pristine Copy Delivery.** For video streams that will also be archived at an edge server, a fully reliable, pristine copy needs to be delivered to that edge server. The edge server needs to be able to simultaneously forward a stream with time bounded reliability to its clients, while also saving a pristine copy of this stream to disk.
- ? **Optional Redundant Transmission.** To provide optimum quality, a combination of forward error correction and multiple transmission paths can be used, to provide 99.9% reliability even in the face of high network loss rates. Depending on network conditions, this typically requires between 110% and 200% of the bandwidth that would be required for a non-redundant stream. Talarian's application layer multicast often allows this to be provided while still providing net bandwidth savings.
- ? **Provisioning.** Streams need to be isolated from each other, as well as from other traffic in the network. Internally, server and bandwidth reservations can be used to isolate streams from different vendors from each other. Externally, a combination of aggressive link level congestion control and traffic prioritization needs to be used.
- ? **Scalability and Efficiency.** As the number of servers receiving any stream increases, performance should not degrade.
- ? **Deployment Over Any Network Type.** Adaptive multicast, combining both application layer multicast and native reliable multicast, should be used, to ensure efficient delivery over any network type.
- ? **Availability.** If a failure or high level of persistent congestion occurs in the network, a redundant path should be used to deliver the video stream, all without a perceived break in the stream's transmission quality.

Today, the SmartPGM product provides a solution for the first five of these requirements. Talarian has also designed a solution that covers all of these requirements, based on the combined SmartSockets and SmartPGM adaptive multicast capabilities. Instead of using TCP as a link level protocol, the system uses an optimized unicast protocol on top of UDP. This allows the system to

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offer end-to-end time bounded reliability and congestion control optimized for video streaming. The system supports integrated forward error correction and multiple independent transmission paths. It may use a second path as either a hot backup or as a live redundant path. Provisioning is provided through internal controls in the multicast content routers, and through integration with network level differentiated services, as available. For more information on the complete video streaming solution, please contact Talarian.

Conclusion

This white paper has presented an overview of the Talarian Solutions for Content Networking Vendors. These solutions are based on two core Talarian products – SmartSockets and SmartPGM, as well as a set of additional adaptors, management tools, and consulting services. These solutions are the first to provide a complete offering for the content transport segment of the exploding content networking market.

These solutions allow the real-time replication, distribution or exchange of data or content between a wide range of major application types. They also provide a globally scalable control plane for seamlessly integrating thousands of disparate edge servers together. Using the industry proven Talarian products, these solutions provide managed, guaranteed, available, scaleable, high performance content transport over any host or network type. Talarian's unique adaptive multicast, which combines Talarian's de-facto standard PGM reliable multicast with its pioneering application layer multicast, automatically delivers content in the most efficient and high performance way over any network type. The solutions also offer security, firewall tunneling, fault tolerance, load balancing, data format translation, an industry standard API for integrating with custom applications, and guaranteed and transactional message delivery.

For more information on these solutions, please contact sales@talarian.com. For questions or comments on this white paper, please feel free to contact Brian Whetten, Chief Scientist, whetten@talarian.com, (650) 965-8050 x172.