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BAMBOO MEDIACASTING – DRIVING MOBILE MULTIMEDIA THROUGH INTELLIGENT CONTENT DISTRIBUTION

A Frost & Sullivan White Paper

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"We Accelerate Growth"

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OBJECTIVE AND SCOPE

The objective of this whitepaper on Bamboo MediaCasting's (Bamboo) SilverStripe solution is to analyze the effectiveness of the solution in addressing the major challenges faced by the next-generation premium mobile content industry participants. The suitability of SilverStripe in delivering an enhanced end-user experience and maximizing mobile data revenues is presented. Finally, a real-world case study is developed in support of the drawn conclusions.

STATE OF THE NEXT-GENERATION PREMIUM MOBILE CONTENT SERVICES MARKETS

Next-generation mobile content services primarily include offerings such as mobile video services and mobile music services. Mobile operators globally have deployed (or are in various stages of deploying) high-speed wireless networks which can be used to deliver multimedia entertainment and information content. The required infrastructure (next-generation mobile networks, advanced handsets, service delivery platforms, and efficient codecs) and content catalogs are in place, and the vision of pervasive mobile multimedia services seems closer than ever before. However, the user-experience so often promised in the early stage of the industry (and used to justify massive investments in next-generation networks) still remains undelivered. High content costs, limited content catalogs of mobile operators, inconsistent (or fluctuating) network speeds and others remain prime challenges. Improvement, if any, has to be holistic in scope. Solving a single (or a few) aspects of multimedia content creation and delivery may not be enough.

MOBILE MULTIMEDIA AND EXPECTATION OF VALUE-CHAIN PARTICIPANTS

Figure 1 shows the value-chain for mobile multimedia services.

Figure 1: Value Chain for Mobile Multimedia
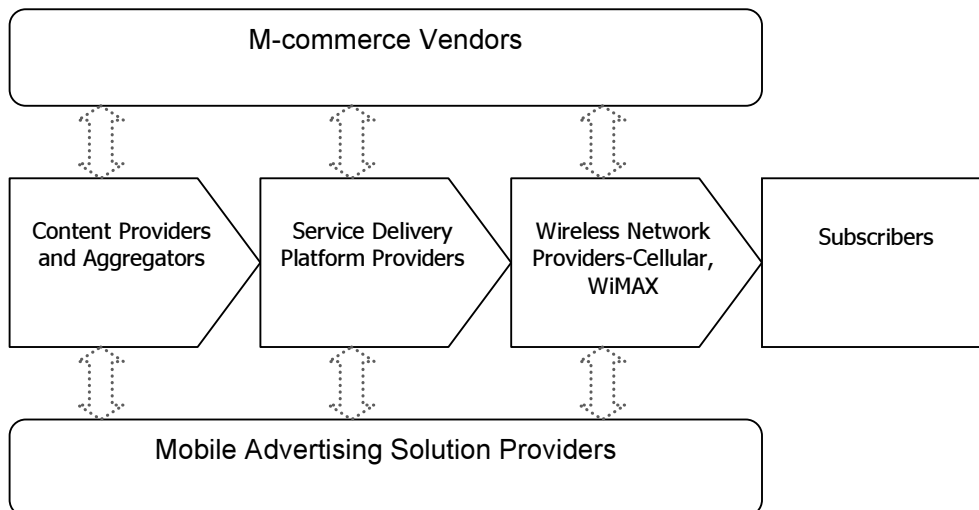
Source: Frost & Sullivan

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From a service delivery perspective, it is important to understand the expectations of the content providers and aggregators, mobile operators and the users.

Content Providers and Content Aggregators

The five most important expectations of the content providers and content aggregators from the mobile multimedia opportunity are as follows:

• Revenue enhancement by expanding market reach and ensuring repeat usage
• Delivery of high-quality multimedia content to subscribers
• Ability to deliver personalized services to target segment
• Cross-sell and up-sell abilities
• Participation in the mobile advertising opportunity

Mobile Operators

Mobile multimedia services have emerged as the primary tools available to the mobile operators for augmenting data revenues and sustaining (if not enhancing) their average revenue per user (ARPU). Compelling content and a satisfactory user experience are important requirements to achieving this objective. However, mobile operators also have to ensure that the bandwidth-intensive multimedia content does not consume large amounts of the limited network bandwidth and disrupt any other service running on the network at the same time. Regardless of the approach taken – limiting the multimedia bits on the network or giving higher priority to voice or other mobile content services- mobile operators operate under the constant risk of compromising the user experience.

It is important to understand the impact that multimedia content can have on the mobile networks. Taking the case of 3G mobile video streaming services, which are delivered at 150 to 200 kbps per user at best (with average of around 124 kbps), a total of around 10 simultaneous users within a cell can easily spoil the service experience for hundreds (if not thousands) of other users that may be using some other service within the same cell. Increasing the spectrum holdings and adopting efficient content formats are some ways to address this issue. However, spectrum is a highly scarce resource and development cycles for new codecs can be as long as 36 months. Increasing off-deck multimedia services put an additional strain on the networks. A fundamental shift in the way multimedia content is offered to the subscribers may be the only long-term solution to scaling mobile multimedia services without requiring huge network (and spectrum) investments.

Figure 2 shows the impact on infrastructural requirement for a mobile network operator over a time period of 5 years due to increasing number of simultaneous mobile video streaming subscribers (if this capacity improvement was treated as a Greenfield network problem).

Figure 2: Impact of Mobile Multimedia on Network Infrastructure Requirement

Year	Active Mobile Video Streaming Users	Average Bandwidth Required	Cell Towers Required	Price per Cell Tower ($ Million)	Total Cost for Cell Towers ($ Million)
1	50,000	150 kbps	3,300	0.12	396
2	100,000	150 kbps	6,000	0.12	720
3	170,000	150 kbps	11,000	0.12	1320
4	255,000	150 kbps	17,000	0.12	2040
5	320,000	150 kbps	21,000	0.12	2520

Source: Frost & Sullivan

Mobile operators also offer a wide range of other data services which directly increase the network infrastructure requirements. It is unreasonable to expect the subscribers to suddenly change their media consumption habits to solve the network issues. This change has to be a gradual process akin to people shifting away from watching live broadcast to viewing time-shifted content through their digital video recorders.

The major expectations of mobile operators can be summarized as follows:

- Maximize next-generation mobile data revenues by successfully targeting multiple customer segments
- Deliver a compelling (and personalized) user-experience
- Minimize impact on network resources
- Rapid deployment of new services
- Minimal operating costs

Mobile Subscribers

Mobile multimedia subscribers are increasingly demanding a wide range of content for their phones, and may not be satisfied by the limited content catalogs of the mobile operators. This is a key reason for their exploring the off-deck mobile content space; however, poor network performance and the often clumsy WAP experience can be a hindrance. Other expectations include quick media access and playback, high quality of content playback experience, inexpensive data pricing and ability to truly 'own' their content pieces.

Expectations of the mobile multimedia subscribers can be summarized as follows:

- Ease of search and use(including low session establishment periods)
- High quality service experience such as smooth content playback and consistent network performance
- Personalized experience
- Economical and transparent pricing
- Ability to search and view Web-based content

Mobile Advertisers and M-commerce Vendors

The prime expectation of mobile advertisers is to reach the right user, at the right time with the right message. The advertising message has to be clear and inline with the quality of the content it is served with. Interactivity is also an important element of mobile advertising. M-commerce vendors can also advertise on the mobile channel, and drive traffic to their storefronts.

Expectations of Mobile Advertisers and M-commerce Vendors can be summarized as follows:

- Dynamic targeting abilities
- Assured quality of ad playback and their brand integrity
- Real-time feedback and campaign optimization capabilities
- Subscriber interactivity
- Multiple advertising choices
- Integrated m-commerce capabilities

INTRODUCTION TO BAMBOO MEDIACASTING'S SILVERSTRIPE SOLUTION

Overview

Bamboo's SilverStripe is a white-label, end-to-end content delivery platform that enables scheduled delivery of multimedia content in the background – including during off-peak times (when the network usage is at its minimum). SilverStripe enables carriers and service providers to offer a channel-based subscription service using its proprietary Push-Store-Play^{TM} technology. The SilverStripe solution automatically delivers subscriber-selected episodic audio, video, news, movie trailers, music and other programming to the user's handset, where it is stored in the phone's memory for consumption at a convenient time.

Figure 3 shows an example of how the under-utilized network capacity can be used to deliver multimedia content.

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Figure 3: Mobile Mediacasting in Network Off-peak Times
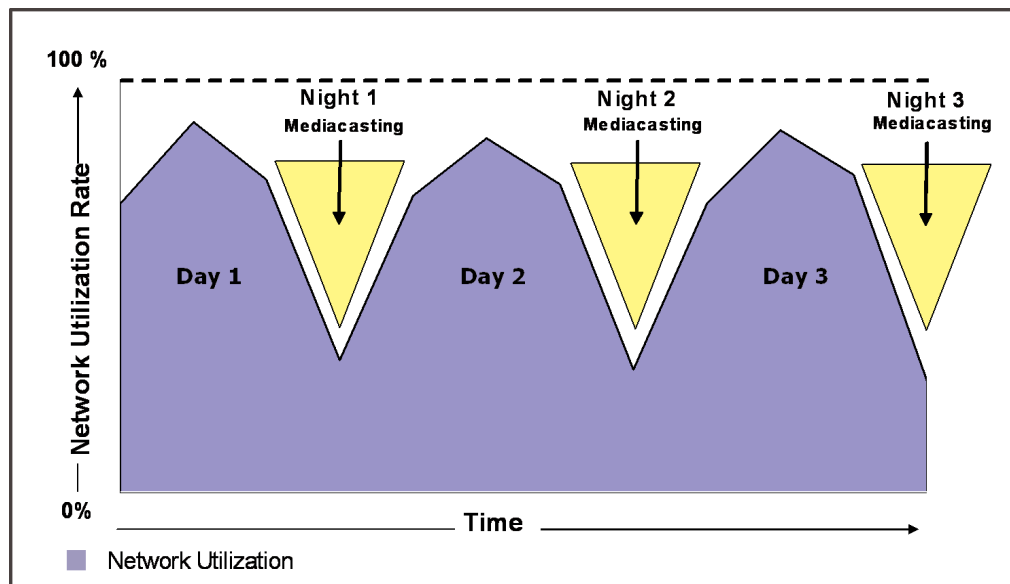
Delivery of multimedia content during network off-peak times (such as night times) is just one of the available options for content delivery with SilverStripe. The platform delivers content in the background, and can be pre-programmed to use different capacities in different times of the day (ie, SilverStripe is at work 24 hours a day). Additionally, the delivery of content is at a low priority, so, if the user makes a call the delivery stops and resumes after the user has finished the call.

Architecture and Implementation

Figure 4 shows the system architecture of the SilverStripe platform.

Figure 4: System Architecture of SilverStripe
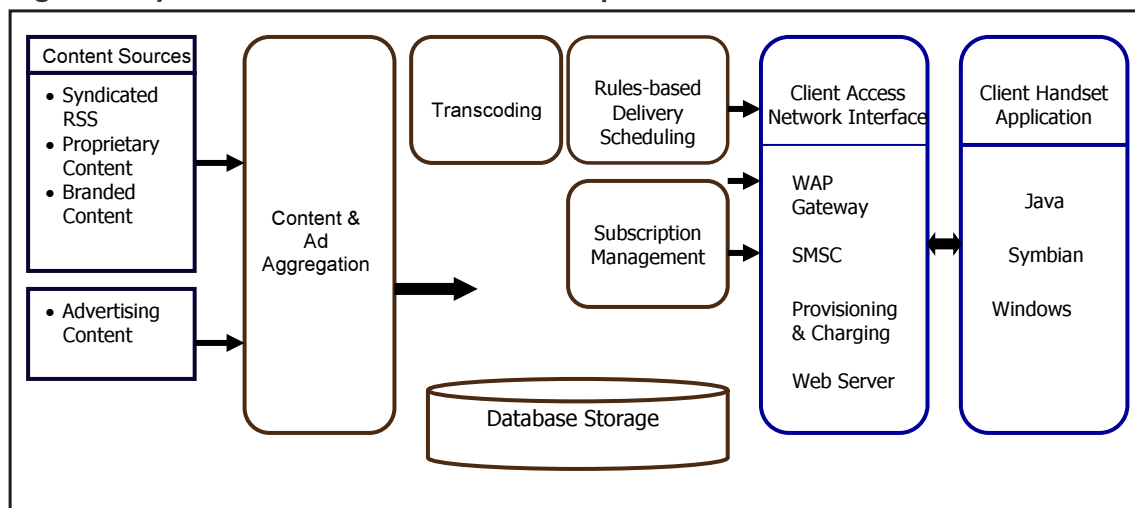
Key Benefits of SilverStripe

SilverStripe delivers tangible benefits to the mobile multimedia services value-chain participants. It is the only comprehensive implementation for push, store and play of mobile multimedia content for the mobile phones, and is multi-bearer, which allows the user to roam between different types of networks while maintaining the service quality.

Service providers are increasingly deploying wireless technologies such as WiMAX and WiFi. End-user devices on such high-speed wireless networks will inherently be rich-media capable. Subscribers will demand a consistent experience as they roam between different wireless technologies using their multi-band, multi-mode devices. The multi-bearer SilverStripe solution can be of significant assistance in enabling convergence by delivering a high quality of service (QoS) independent of the end-user's reception conditions. SilverStripe allows the service providers (owning and managing multiple wireless networks) to select the combination of network and geography to use for the background delivery of content, which is pushed to the subscribers' devices when they are in the specified coverage area. Content is stored on the device and can be viewed whenever the subscribers choose .This enables delivery of high QoS independent of the network the subscribers might currently be on. Subscribers also do not experience any service disruption as they move from one coverage area to another.

Benefit to Content Providers

SilverStripe allows content providers to deliver personalized, high-quality multimedia content to mobile subscribers as a habit forming experience that increases media consumption. The platform facilitates an easy access to content on the Internet and allows participation of a larger number of content providers in the mobile opportunity. Other benefits include a new method of content discovery on the mobile phones, integrated mobile advertising capabilities and up-sell and cross-sell ability.

Benefits to Mobile Operators

SilverStripe allows the mobile operators to achieve highly efficient utilization of their network for mobile data services. They can offer multimedia services to a large number of mobile subscribers without investing large amounts towards expanding the network capacity. This allows the operators to offer multimedia content at extremely attractive price points (since the investment in network infrastructure can be reduced significantly) and operators do not have to limit the number of simultaneous subscribers on the network as well. Streaming services, when used by multiple mobile subscribers at the same time can significantly impact the network performance. SilverStripe delivers content in the background, which is stored in the handset and played locally. The content itself is delivered at network off-peak times so as to not impact other services. This allows the mobile operators to scale their multimedia offerings exponentially, and also offer off-portal or Internet-based content on mobile.

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Operators can use SilverStripe to cross and up-sell other multimedia services including broadcast, streaming, premium channels as well as games and music (tagged to content). For example, after viewing a pushed clip, user can link and stream more information or tune to a live program. It is clear that the mobile operators do not have to remain 'dumb pipes' and can add real value to their mobile multimedia offerings with the help of SilverStripe.

Benefits to Mobile Subscribers

SilverStripe turns the mobile phone into portable media devices by delivering high-quality media and entertainment content to the mobile subscribers in a 'lean-back' manner. Content is automatically pushed to the handset and the solution works well in the relatively unpredictable wireless networks. Subscribers truly own their content, and can enjoy it at a time and place of their choice. One has to only look at devices such as TiVo and iPod to understand how great an impact subscriber control can have on media consumption.

Benefits to Advertisers

SilverStripe allows advertisers to deliver rich, persuasive and dynamic ads with economical frequency to a highly targeted audience. High-quality rich media advertisement is pushed like any other content, which guarantees delivery cost and quality of the ad. The fact that the ad is played "locally" from the handset itself assures the quality of the message and guarantees it's brand integrity – overcoming the perception of those reticent to join the mobile advertising space because of a lack of quality assurance. Interactivity can be built into the advertising messages, and traffic driven to m-commerce storefronts. The solution also offers dynamic reporting and feedback into the campaign performance.

Figure 5 summarizes benefits of SilverStripe to the mobile multimedia value chain participants.

Figure 5: Benefits of SilverStripe

Content Providers	Mobile Operators
• Ability to deliver a personalized, high-quality experience to multiple customer segments. • Deliver full-length content (and not short 'clips') • Benefit from integrated mobile advertising capability • Online content providers can easily participate in the mobile content opportunity • Leverage SilverStripe's up-sell and cross-sell platform for revenue maximization	• Deliver personalized, bandwidth-intensive multimedia content to at no extra cost • Efficient utilization of the network for mobile data services • Overcome limitations of the WAP experience • Create a habit-forming media consumption experience and get steady revenues • Bridge adoption to other media services • Participation in the mobile advertising opportunity
Mobile Advertisers	**Mobile Subscribers**
• Deliver Rich, persuasive ads dynamically • Highly targeted delivery of ads-ads can be targeted per channel or per content item • Guaranteed delivery and quality of mobile ads • Leverage in-built interactivity to drive traffic to storefronts • Dynamic reporting and feedback	• Mobile subscribers can watch multimedia content at a time and place of their choice • High-quality experience at lower price points • Immediate content playback – no session establishing time • Lean-back experience - subscribers can subscribe to multiple channels of their liking, which are automatically delivered to devices • One click access and repeat usage • Ability to watch Internet-based content on mobile phones

Source: Frost & Sullivan

COMPETITIVE ANALYSIS

Various competing implementations exist for background delivery of mobile multimedia content. For example, mobile datacasting is a possibility in the broadcast networks. However, transmission characteristics of such networks may prevent them from offering a truly personalized experience to a large number of mobile subscribers.

To illustrate further, if a terrestrial broadcast mobile multimedia network has 1 million subscribers who request 5000 different pieces of 5 minute video clips, the broadcast network could be required to serially transmit for around 420 hours (or 18 days) to deliver all the 5000 different types of clips. This is clearly not a very practical approach and conflicts with the long-tail approach required for next-generation mobile data services.

An another example is Nokia's Media Charger mobile video service, which enables the creation of subscription-based services to deliver media-rich content to Nokia's Series 60 SmartPhones over existing GSM, EDGE, and WCDMA cellular networks. However, the service is available only for the Series 60 phones, which limits its availability to a small segment of mobile users. Moreover, the subscribers may be required to select the content items individually which are pushed to the handset at a later time.

Multimedia streaming and multimedia downloads are some other options for delivery of next-generation data over the mobile networks. However, the technical limitations of the mobile networks may limit their ability to serve a large subscriber base. Mobile operators can encourage a routine use of mobile multimedia only by delivering a high-quality experience encompassing the service discovery, service delivery and media playback aspects. It may be difficult for them to excel on all these parameters using mobile streaming or download services only.

CASE STUDY- ORANGE GROUP

Objective

Frost & Sullivan presents a case study based on a real-world implementation of the SilverStripe platform. The ability of the solution to meet the stated objectives for the customer is analyzed and relevant qualitative and quantitative performance metrics are presented.

Background and Implementation

Orange is the brand used by France Télécom for its mobile network operator and Internet service provider subsidiaries. Bamboo MediaCasting and France Telecom have entered into a group-level agreement to deploy the SilverStripe solution across the Orange wireless properties. As a result of this agreement, the first commercial deployment was with Orange France in December 2007. Orange France subscribers are offered 5 channels of audio-video content for 5 Euros per month, which can be selected from their phones or the Internet. It is important to note that the data traffic is zero rated; in other words, it is free. Content is aggregated from the Internet through a simple RSS mechanism and consists of one hour of fresh programming delivered to subscribers every day. Subscribers can also switch channels at any given moment, and the catalogue is pushed as well.

Key Observations

Key observations of the deployment are as follows:

- 80% of all content pushed is actually viewed
- Each clip is viewed 1.5 times per average per user
- Media is consumed mainly during lunch and commute times

Conclusions

Orange mobile subscribers clearly benefit from the high-quality of content delivered and appreciate the greater control they have over their multimedia experience. SilverStripe enables Orange mobile subscribers to enjoy multimedia content at a time and place of their choosing - as evident by the majority of media consumption happening during lunch and commute times. These times are usually the busiest for the wireless network, in which the network may not be able to provide the necessary resources for high quality streaming or short waiting time for download. In these short breaks, users that like to use certain content on a regular basis prefer immediate availability of content and do not want to spend extra time for searching, browsing or waiting for download or streaming.

The service has seen significant adoption within a short duration, and has delivered on the promise of cost-effective delivery of personalized mobile multimedia to a large customer base.

CONCLUSIONS

Mobile multimedia content is the mainstay of next-generation mobile consumer content offerings. However, the bandwidth requirements for such services are already negating the improvements offered by the 3G networks. As more subscribers start demanding personalized mobile multimedia services, mobile operators run the risk of being unable to satisfactorily serve the requirements of their customer base due to the inability of the mobile network to handle such large data volumes.

Frost & Sullivan opines that Bamboo MediaCasting's SilverStripe is a unique offering that satisfies the key expectations of the mobile multimedia value-chain participants. SilverStripe is a comprehensive multi-bearer solution for push, store and play of mobile multimedia content and is designed to work in the noisy wireless networks. SilverStripe is a clear example of how unused network capacity can be put to good use to overcome obstacles to long-term service adoption for mobile multimedia and provide a high quality user experience at the same time.

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