Contents

Executive Summary

This report provides the results of BT Retail Technology's technical validation of 121Media's PageSense product. The validation was made within BT's live broadband environment and involved a userbase of approximately 18,000 customers, with a maximum of 10,000 online concurrently. The customers who participated in the trial were not made aware of this fact as one of the aims of the validation was not to affect their experience.

The principal phase of the trial took place over the 14-day period between 23rd September 2006 and the 6th October 2006 during which contextual-advertisements were served to the trial users. This report presents factual information, based on the performance of PageSense during this period, as measured against a set of core success criteria. These were established by BT to characterise the systems usability, availability, integrity, resilience, performance, and compatibility and to gauge the reaction of end-users to the system in the absence of specific information regarding the trial.

For the duration of the trial the results produced by PageSense were on the whole successful, the system proving its ability to deliver contextual-based advertisements to trialists in a stable and reliable fashion, as evidenced in the main-body of this report.

For the duration, no BT customer helpdesk calls were received which were directly attributed to a defect of the PageSense system.

A small number of service affecting faults did occur during the trial but these were, in the main, quickly isolated and rectified by 121Media through configuration fine tuning.

The validation did identify some issues which will require further collaboration between 121Media and BT before proceeding. These are summarised below, together with steps that need to be taken. Although none of the issues are deemed to be show stoppers, they will require careful consideration.

Customer Experience Enhancements

1) PageSense proved to be almost entirely transparent to end users. Only 15-20 trialists (0.1% of the trial userbase) identified the presence of the system and had a negative reaction. To ensure 100% transparency, the following work is planned:

   - Phase 2 testing will use the latest revision of PageSense (ProxySense), which reduces the likelihood that customers will detect the system since it does not append a JavaScript tag to web pages and is not visible in the browser.

   - 121Media will take action (both technical and in public relations) to avoid any perception that their system is a virus, malware or spyware and to show that in effect it is a positive web-development.

2) The current opt-out method is cookie-based to preserve the user's anonymity. This will cause a user to become opted in again if they erase their cookies.

   - 121Media will highlight this feature of the opt-out process both in their publicity material and on the opt-out pages themselves.

3) It was noted that posting to some web forums through PageSense caused the JavaScript tag to be appended to a number of users' posts. A fix was provided for this by 121Media toward the end of the trial, following which the issue was no longer detected. It should not arise with ProxySense as no tag is appended.

Scalability Enhancements

4) The capacity of the trial servers used means that a corresponding full-network deployment using similar servers would have been operationally challenging and would have involved a substantial number of devices. BT is in the process of moving to a 21CN network, concentrating users into fewer but larger sites handling on average 700,000 users and 9Gb/s of bandwidth capacity, for which the following are required:

- 121Media will demonstrate a solution that requires fewer devices, uses less footprints and consumes less power.

- BT will design and re-engineer the network to enable the integration of such a facility.

- The Phase 2 Pilot will validate the performance and operation of this implementation, as a trial of a full-scale deployment.

Ad-Serving Enhancements

5) Only limited analytical data was provided by the system. This made it difficult to accurately determine its value and performance.

- Phase 2 testing will also validate the features and performance of the 121Media Media Planning Tool. The test will also run on a much larger userbase (approx 350,000) and statistically useful numbers will provide more information on the commercial model.

Broadband Terms and Conditions

6) The opt-out / opt-in system was demonstrated to work technically, however BT may need to modify its broadband terms and conditions prior to any deployment. The change must permit BT's broadband network to silently drop cookies on customers' PCs.

The Way Forward

A second phase Pilot deployment will be undertaken with a larger userbase. This Pilot will specifically address the issues raised in this report (in terms of User Experience, Analytics and Scalability) and provide a production-environment test of the potential deployment pattern for the BT Retail network as a whole.

Meanwhile BTRT is investigating a design to re-engineer the network [2] and is continuing its location-search for hosting facilities with sufficient capacity.

1 Trial Environment Description

The PageSense system consists of two main components:

- Proxy-Servers, which obtain web-content on behalf of the users and insert JavaScript tags into returned web-pages.

- Channel-Servers, which maintain the browsing history of cookie-id's and serve targeted advertisements to users. These servers also initially generate and drop the cookies to users' browsers.
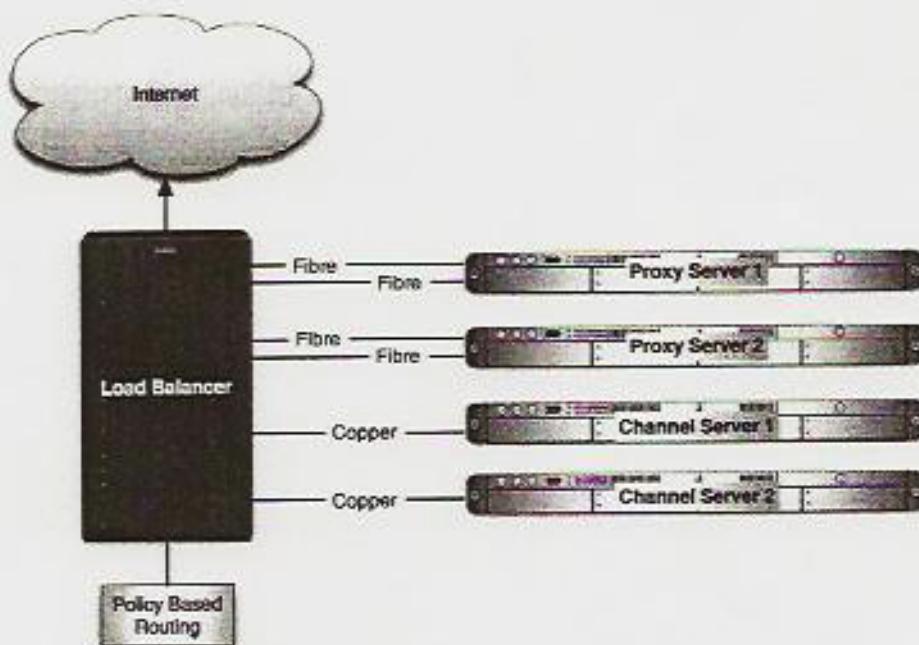
1.1 Network Components

The trial consisted of two proxy-servers and two channel-servers, installed into the inspection point at Reading, selected for its representative user base.

The trial involved approximately 18,000 users with a maximum 10,000 concurrently active on the system during the network's peak period (daily between 7pm and 10pm) and was operated on a 24*7 basis.

The trial users were all ADSL customers with a mix of connection speeds between 256Kbps and 8Mbps down. All users were unaware that they were participants in the trial.

A schematic of the test environment deployed follows.

In operation, user TCP port 80 traffic was redirected using Policy Based Routing through a Load Balancer, configured to use TCS (transparent cache switching). This redirected TCP port 80 traffic to the two real proxy-servers.

A Virtual IP address (VIP) was also created to load-balance traffic generated by each proxy-server to the pair of real channel-servers.

1.2 Advertising Method and Campaign

The trial focussed upon validating PageSense's ability to deliver contextual advertisements to users, based upon their web-browsing history. The trial did not validate bridge-advertisements since it is unlikely BT will use this delivery method.

The PageSense system requires participating users machines to have a 121Media cookie deployed. This contains a Unique ID (UID). This UID facilitates the browsing history of the machine on which the cookie is resident, to be built.

Normally the PageSense system deploys cookies directly to user's machines. BT's broadband terms and conditions prevented this approach. Instead 121Media conducted an initial cookie drop exercise. For two-weeks prior to the trial proper 121Media purchased advertising space on popular third-party web-sites from which cookies were dropped directly onto users machines. This approach in turn constrained the effectiveness of the BTRT trial, since not all of the 10,000 trialists were covered by the initial-drop. Estimations were made that approximately 7,000 had received a cookie.

To trial the contextual, in-page ad-replacement method, 121Media also purchased advertisements on third-party websites for the two-week ad-serving phase of the trial. The following campaigns were sold to UK ad agencies for this period.

Campaign	Agency	Main Channel
American Airlines	Universal McCann	Travel_Air
e2save	MediaVest	Comm_Tele_Wireless
Egg	MediaCom	Finance_Creditcards
Excel Airways	Web Liquid	Travel_Flights
First Direct	Mindshare	Finance_Banking_Personal_Savings
Freedom Finance	MediaEdge CIA	Finance_Loans_Personal
HSBC	Mindshare	Finance_Banking_Personal_Savings
Hutchison 3G	Mindshare	Comm_Tele_Wireless
Inside Track	Mediacom	Education_Property Investment
Monster	MediaEdge CIA	Living_Jobs
More Than	Universal McCann	Finance_Insurance_Auto
Ocean Finance	The Bookings Grp	Finance_Loans_General
One Stop Phone Shop	MediaVest	Comm_Tele_Wireless
Opodo	MediaCom	Travel
Petplan	DNA	Health_Insurance_Pets
Portland Holidays	Universal McCann	Travel
Standard Life Bank	DNA	Finance_Mortgage
Weight Watchers	DNA	Health_Weight Loss

The advertisements were used to replaced a 'default' charity advertisement (one of Oxfam, Make Trade Fair or SOS Children's Villages) when a suitable contextual or behavioural match could be made by the PageSense system. 121Media indicated that the campaigns available in the trial represented only a small percentage of the range that would normally be present in the system.
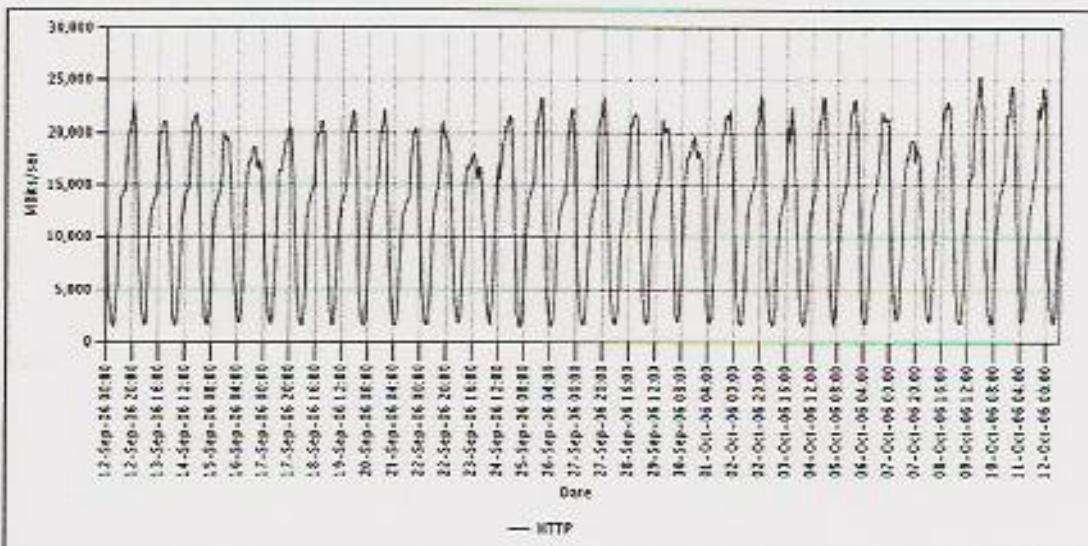
2 Trial Environment Scaling Model

To determine how performance data obtained during the validation would be extrapolated to make accurate projections about scalability to the entire customer-base, the following method was used:

1) Statistics were collected from the network corresponding to the daily HTTP download traffic served to the entire customer base. These results are illustrated.

Total HTTP Utilisation (Internet to Customers)
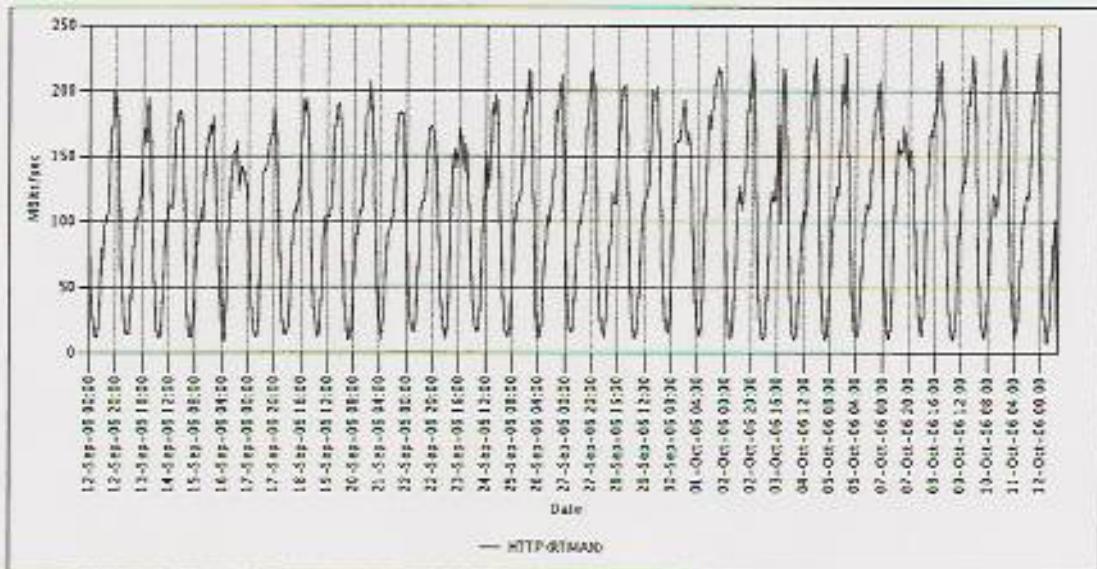
12/09/06 – 12/10/06

2) Statistics were also collected from the specific network portion serving the trial user sample, corresponding to the daily HTTP download traffic served. These results are illustrated.

Trial HTTP Utilisation (Internet to Customers)

12/09/06 – 12/10/06

3) For each case, the 5th and 95th percentiles of the peak HTTP traffic observed, for the twelve days prior to the trail commencing, was used to derive a corresponding percentage of total network HTTP traffic the test sample equated to. The following table identifies this data.

Sample:Network HTTP Rate (Megabits/S)	Ratio (%)
230:20000	1.15
210:19500	1.07
220:18500	1.19
200:18000	1.11
180:16500	1.09
200:18000	1.11
210:19500	1.07
220:19000	1.15
220:20500	1.07
200:18000	1.11
210:17000	1.23
180:17000	1.05

From this information:

The average ratio is calculated to be: 1.098%

The scaling factor is calculated to be: 91

3 Validation Performance

3.1 Success Criteria and Summary Results

The criteria used to gauge the success of the validation are identified in the table below together with the trial-result. As illustrated three categories of the systems performance were deemed only partially compliant against the Success Criteria – User Experience, Scalability and Ad-Serving. One further aspect, verification of the Business Model, could not be completed since the analytical data available, coupled with the size of the advertising campaign used, meant it was not possible to accurately determine.

No.	Requirements	Success Criteria	Result
1	User Experience		
1.1	The installation, integration and use of PageSense to be transparent to customers, other than the desired benefits of the product, to customer service.	No customer calls to helpdesk related to installation, integration & use compatibility issues of PageSense application with other applications	Partially Compliant
2	Compatibility		
2.1	Solution must meet BT Exchange infrastructure environment requirements, including total power per rack = 2KW max	PageSense power requirements = 440watts per full Chassis	Compliant
2.2	Confirm no compatibility issues with different types of operating systems & browsers & virus protection applications	No Operating system & Browser compatibility issues Vista compatibility BTYahoo IE6 & IE7 compatibility MAC Firefox compatibility Google / Ebay Context adverts Virus protection applications	Compliant
3	Scalability		
3.1	Confirm Scalability is in line with 121Media design specifications	Confirmation that a single proxy will support 1500 HTTP requests/second at peak load	Compliant

No.	Requirements	Success Criteria	Result
4	Performance		
4.1	Confirm no measurable degradation to customer perception in browsing service performance as a result of deploying the PageSense application	No mis-operation due to PageSense deployment Correct functioning with no Cookie Correct functioning with new Cookie Correct functioning with old Cookie Correct functioning with deleted Cookie	Compliant
4.2	Test the PageSense solution to confirm graceful operation of PageSense components in overload conditions	The designs to prevent overload conditions arising and/or negate the impact of such conditions	Compliant
5	Resilience		
5.1	The proposed production design to have a fully redundant configuration with no single point of failure.	Production design operation in failover conditions to confirm that any degradation is limited to the PageSense system and transient in nature. Confirmation that in full fail-over the system operates correctly.	Compliant
5.2	The in-service s/w and f/w upgrade of PageSense components, when done in accordance with PageSense normal operating procedures, will not affect customer service.	No PageSense component failures attributable to have root cause for failure as PageSense upgrade of s/w or f/w	Compliant
5.3	The in-service addition of PageSense components not to affect customer service.	No customer service failures to be attributable to have root cause for failure as PageSense component addition	Compliant
5.4	The in-service removal / insertion / removal cycle of the PageSense not to impact normal operation of customer's service	No customer service failures to be attributable to have root cause for failure as PageSense component removal / insertion / cycle removal	Compliant
5.5	Confirm correct operation of fail-over design by pro-active failure of any single PageSense element in a fully redundant production configuration	No significant degradation of normal customer service	Compliant

No.	Requirements	Success Criteria	Result
6	Reliability and Continuous Operation		
6.1	Customer call to the helpdesk associated with PageSense application to be insignificant	The helpdesk to receive less than 5 calls associated with PageSense.	Compliant
6.2	Once configured PageSense to continue to operate in a stable operating state without need for manual intervention or without need for manual fine tuning or need for continuous manual optimisation. ie. 'hands off' operation.	Zero touch normal operation.	Compliant following initial fine tuning
6.3	The installation, integration and use of PageSense to not negatively impact normal operation of any other equipment (i.e. equipment which is not part of the PageSense solution) in the exchange.	No Network faults on non related other equipment attributable to have root cause for failure as PageSense solution	Compliant
6.4	The reliability / availability of PageSense to exceed the Trial Design Objective.	The Trial design objective to be explicitly defined by BT. There will be no unplanned failures for the 2-week duration of the trial at full load operation.	Compliant following initial fine tuning
7	Security		
7.1	Verify PageSense conforms to BT Security Standards	Measure the effectiveness of the 121Media application Click through rates Revenue share model Projected Revenue share based on trial Click through rates and proposed Revenue share model	Compliant
8	Ad-Serving		
8.1	Verify PageSense Business case benefit model assumptions	Measure the effectiveness of the 121Media application Click through rates Revenue share model Projected Revenue share based on trial Click through rates and proposed Revenue share model	Not part of trial design data insufficient to test model

3.2 User Experience

3.2.1 Criteria Requirements and Results

No.	Requirements	Success Criteria	Result
1.1	The installation, integration and use of the PageSense to be transparent to customers, other than the desired benefits of the product, to customer service.	No customer calls to helpdesk related to installation, integration & use compatibility issues of PageSense application with other applications.	Partially Compliant

3.2.2 Non Compliance Issues and Actions

7) PageSense did not prove to be entirely transparent to end users. 15-20 trialists (0.1% of the trial userbase) identified the presence of the system, and in the absence of clarification, their reaction was negative. To address this aspect the following work is planned:

- Phase 2 testing will use the latest revision of PageSense (ProxySense), which reduces the likelihood that customers will detect the system since it does not append a JavaScript tag to web pages and is not visible in the browser.

- 121Media will take action (both technical and in public relations) to avoid any perception that their system is a virus, malware or spyware and to show that in effect it is a positive web-development.

8) The current opt-out method is cookie-based to preserve the user's anonymity. This will cause a user to become opted in again if they erase their cookies.

- 121Media will highlight this feature of the opt-out process both in their publicity material and on the opt-out pages themselves.

9) It was noted that posting to some web forums through PageSense caused the JavaScript tag to be appended to a number of users posts. A fix was provided for this by 121Media toward the end of the trial, following which the issue was no longer detected. It should not arise with ProxySense as no tag is appended.

3.2.3 Observations and Exhibits

For the trial duration, no calls were received by the BT customer helpdesk in relation to PageSense and it is implied that the majority of the 10,000 trial users did not notice any detrimental impact of the system.

At least 15-20 separate users did detect the presence of the system as evidenced from web message board posts.

The operation of the system does have noticeable side-effects, which include web-page tag insertion and navigation bar flutter.

From the postings, no user correctly determined the source of these effects and users did not post that the system was causing poor performance.

However all postings suspected that their machines had a virus, a malware or a spyware infection. Scaling the number of reports from the trial sample the projection made is that in its first two weeks of full operation, in excess of 1300 users would detect these side-effects.

Any deployment of PageSense will clearly require the user base to be informed. Despite the fact that the system is intended to improve the relevance of advertisements through anonymous collation of browsing histories, communications regarding advertisement systems and information collection could lead to negative perception if not carefully handled.

Specific issues observed during the trial are listed below

3.2.3.1 Source IP Address Change

The proxy-servers fetch users content from the web; hence the source IP address of the user is changed for all HTTP transactions. Whilst this is not an issue for dynamically addressed customers, static and no-nat customers might have cause for complaint.

3.2.3.2 Navigation Bar Flutter

On each page-navigation the user's browser returns keyword information to the channel-server, to build a browsing history. The resulting HTTP-transactions are sent to the addresses dns.sysip.net or ntp.sysip.net. This destination is displayed, usually only momentarily and imperceptibly, in the browsers navigation bar for the duration of the transaction. For Internet Explorer, this bar is located at the bottom-left of the browser window. However if the users machine is slow running, or a network connection is experiencing congestion this artefact can become evident to the user. During the trial three users posted their observation of this effect. In each case the reaction was negative, the user suspecting a virus, malware, or spyware of some kind. This artefact is eliminated by the new version of PageSense, "ProxySense".

3.2.3.3 JavaScript Execution Prompting

Users who have their browser configured to prompt on JavaScript execution will be alerted on every page browse they make. One user posted regarding this artefact, their reaction being negative, suspecting a virus, malware, or spyware of some kind. This cannot occur with ProxySense, in which no JavaScript is used.

3.2.3.4   Web-Page Source JavaScript Tag

Every page served to the user has a PageSense JavaScript tag inserted, which is evident at the foot of the page source. Whilst it is likely that only more-technically savvy users will be sensitive to this artefact, three forum posts observed this aspect. In each case reaction was negative, suspecting a virus, malware or spyware of some kind.

Again, this feature of PageSense is removed in ProxySense, which does not insert a Javascript tag on the page.

3.2.3.5   Tag Corrupting Forum Posts

Within a number of web-forum posts, the JavaScript tag inserted into each web-page appeared appended to the users post. 121Media characterised this as a bug relating to a specific editor used by certain forums. A fix was provided for this by 121Media toward the end of the trial, following which the issue was no longer detected. However further time will be required to confirm this. Examples of this artefact follow. Approximately 20 similar posts were evident from a Google search.

Once again, this problem should not occur with the next generation software, ProxySense.

3.2.3.6   Tag Insertion Black-List

During the trial the BT testing-team observed that on the web site, www.assure24.com, certain pages (which extraordinarily contained 60,000 HTML anchor references) caused the Internet Explorer browser to consume 100% CPU resources following execution of the JavaScript tag. This required the browser to be terminated using windows task-manger. 121Media immediately provided a workaround to overcome this issue, whereby the domain-name of the site was added to a tag insertion black-list. 121Media also patched the JavaScript code to prevent other undetected web-sites from causing this problem. Once again, ProxySense should not be affected by this problem.

3.2.3.7   Opt-In and Opt-Out

The current system assumes all users are opted-in by default. The method to opt-out has two features which require consideration:

- Users opt-out by navigating to a web-site and downloading an opt-out cookie. Should they subsequently clear their browsers cached data, they will be silently opted back-in. A mechanism may be required to inform the user at this point that they have opted back-in, though a technical solution for this is not obvious.

- The current opt-out method does not actually avoid the system entirely. A user who has opted-out will still have their web-pages tagged and partial JavaScript execution will occur on every page browsed, although no data collection of any kind will occur.

Compatibility

3.2.4 Requirements Summary and Results

No.	Requirements	Success Criteria	Resul
2.1	Solution must meet BT Exchange infrastructure environment requirements, including total power per rack = 2KW max	PageSense power requirements = 400watts per full Chassis	Compliar – on an individua platforn basis
2.2	Confirm no compatibility issues with different types of operating systems & browsers & virus protection applications	No Operating system & Browser compatibility issues Vista compatibility BTYahoo IE6 & IE7 compatibility MAC Firefox compatibility Google / Ebay Context adverts Virus protection applications	Compliar

3.2.5 Non Compliance Issues and Actions

None - all compliant

3.2.6 Observations and Exhibits

3.2.6.1 Environment Requirements

PageSense does not utilise appliances, instead commodity based servers are used as follows

Functional Specification:

Function	Manuf/Model	Processor	Ports	RAM	Disk
Proxy	HP DL360	2 x 3.4GHz Xeon 2MB L2 cache	2*10/100/1000Base T (Onboard) 2*1000BaseSX (PCI)	4 GB	1 x 80GB SCS
Channel-Server	HP DL360	2 x 3.4GHz Xeon 2MB L2 cache	2*10/100/1000Base T (Onboard)	6 GB	2 x 80GB SCS

Physical Specification:

Width	Length	Depth	Weight	Power Cons.
42 cm	70.5 cm	4.3 cm	14.5kg	300W (normal) 460W (peak)

Based upon the peak power consumption rating of 460Watts, a maximum of four servers car be accommodated per 2kW cabinet.

Operating System Specification:

Both the Proxy-Server and the Channel-Server utilise the Red Hat Enterprise Linux E release 4 (Nahant Update 3) distribution. This version is compliant with existing BTR operations.

3.2.6.2 System Compatibility

OS/Browser Compatibility:

The following OS/Browser combinations are certified as supported by 121Media. N incompatibilities were identified by BT during validations. The current BT Yahoo! Browser wa also verified as being functionally compatible for the system.

OS Browser	Supported	Popup	Rich Media	Banner	Sync	Async	Comments
Win IE 5.0	Y*	+	-	+	+	+	*No IFrame dynam creation: Outdated
Mac IE 5.0	Y*	+	-	+	+	-	
Win2K IE 5.5	Y	+	+	+	+	+	
Win2K IE 6.0	Y	+	+	+	+	+	
WinXP IE 6.0	Y	+	+	+	+	+	
WinXP IE 7.0	Y	+	+	+	+	+	
WinXP Firefox 1.0	Y	+	+	+	+	+	
WinXP Firefox 1.5	Y	+	+	+	+	+	
Win2K Mozilla 1.7	Y	+	+	+	+	+	
WinXP Mozilla 1.7	Y	+	+	+	+	+	
WinXP Opera 7.54	Y*	+	-	+	+	-	*only HTTP 1.0 supported
WinXP Opera 8.54	Y	+	-	+	+	-	*only HTTP 1.0 supported
Mac Safari 125	Y*	+	-	+	+	-	*Pending testing

Application Compatibility:

The following applications are certified safe by 121Media. No broken applications wer
identified during the validations.

Application	Protocol	Content-Type	User-Agent	Inject?	Mand?	Behaviou
WebDAV	HTTP/1.1	Various	Various	No	Yes	No injection occurs becaus the content typ is not text/htm and html files are text/plain
MSN Messenger	HTTP/1.1	Application/x-msn-messenger	MSMSGS	No	No	No injection because of content type and user agent
Skype	Skype	n/a	n/a	No	No	Only uses port 80 for incoming signaling, all voice is over UDP
Yahoo Messenger	HTTP/1.1	Application/x-yahoo-messenger	Various	No	No	No injection: unsupported content-type
ICQ Messenger	HTTP/1.1	Application/x-icq-messenger	various	No	No	No injection: unsupported content-type
Online Gaming	Various	n/a	n/a	No	No	Does not use port 80
Email	SMTP/IMAP/POP	Various	Various	No	No	Does not use port 80
Windows Media Player	HTTP/1.1	Various	Various	No	No	
Real Player (http)	HTTP/1.1	audio/x-pn-realaudio	RMA/1.0	No	No	No injection because of content type an user agent
Google Earth	HTTP/1.1	application/octet-stream	GoogleEarthMac/LT3.1	No	Yes	
Office 2003 online help	HTTP/1.1	Text/html	Microsoft Office/11.0	No	Yes	No injection: unsupported user agent
Windows Update	HTTP/1.1	Text/html	Internet Explorer	yes	yes	Injects like into any normal website, no negative effects.
Bittorrent	Bittorrent	n/a	n/a	No	No	Does not use port 80
Bittorrent HTTP hacks	HTTP/1.1	Various	Various	No	No	No injection: unsupported content types
eDonkey/Overnet	Ed2k	n/a	n/a	No	No	Does not use port 80
YouTube/other video sites	HTTP/1.1	Various	Various	Yes	Yes	Injects like on any site, no negative effects
Antivirus Update	HTTP/1.1	Various	Various	No	No	No injection: unsupported content type.
PC Remote Access	Vnc/rdp/cytrix	Various	Various	No	No	Does not use port 80

3.3 Scalability

The measurements made during the trial indicate that the PageSense system tested wi
require the deployment of approximately 323 server platforms to cater for BT's customer-base
– approximately 283 Proxy-Serves and approximately 40 Channel-servers.

3.3.1 Requirements Summary and Results

No.	Requirements	Success Criteria	Result
3.1	Confirm Scalability is in line with 121Media design specifications	Confirmation that a single proxy will support 1500 HTTP requests / second at peak load.	Compliar

3.3.2 Issues and Actions

The capacity of the trial servers used means that a corresponding full-network deployment wi
be operationally challenging and will involve a substantial number of devices. BT is in th
process of moving to a 21CN network, concentrating users into fewer but larger sites handlin
on average 700,000 users and 9Gb/s of bandwidth capacity. The current solution woul
require the network to be reengineered in a way that breaks this down into smaller capacit
units that fit with the PageSense density. BT is also unable to find hosting accommodation tha
will enable a deployment using this model.
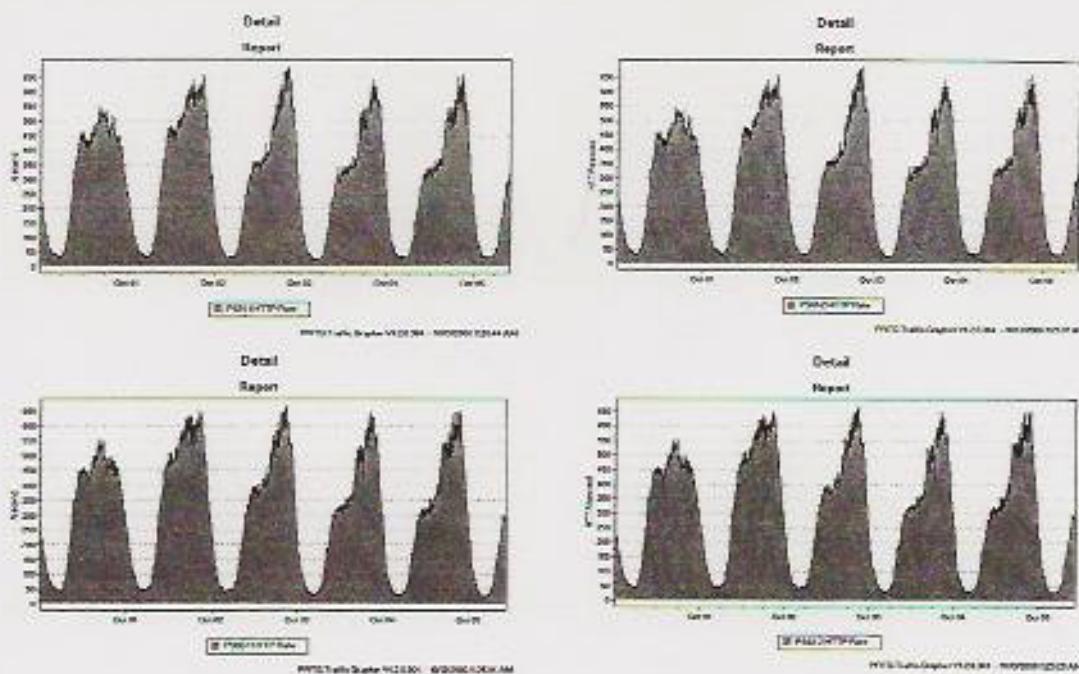
- 121Media needs to develop a solution that requires fewer devices, uses less footprint
  and consumes less power.

- BT needs to design and re-engineer the network to enable the integration of such
  facility.

- A trial of this new design will be necessary before a deployment could b
  recommended.

3.3.3 Observations and Exhibits

3.3.3.1 Proxy-Server Scalability

Initial projections made were that a single Proxy-Server would scale to support 30,00
broadband users with a concurrency of 70%. This figure being derived from the maximum rat
of 750 HTTP requests/second per SQUID instance and 1500 HTTP requests/second total p
server.

The following graphs illustrate the actual offered HTTP rate measured during the trial.

During peak-time, each proxy-server served approximately 700 HTTP requests/second. Based upon the maximum rate, each instance was in fact operating at 93%.

To cater for seasonal traffic growth, at least three Proxy-Servers would be required to support the trial sample. Across six SQUID instances, a utilisation rate of 2,800 HTTP requests/second would amount to a peak utilisation of 466 HTTP requests/second (or 62%).

Using the characterisation information derived in Section 2:

> Proxy-Servers Required   = Total For Sample Network * Scaling Factor
> = 3 * 91
> = 273 servers

Additional proxy-servers will be required to cater for equipment failures. The quantity will depend on the deployment model used, yet a figure of around 10 additional servers is realistic.

As such the total proxy-server requirement will be approximately 283 servers.

3.3.3.2   Channel-Server Scalability
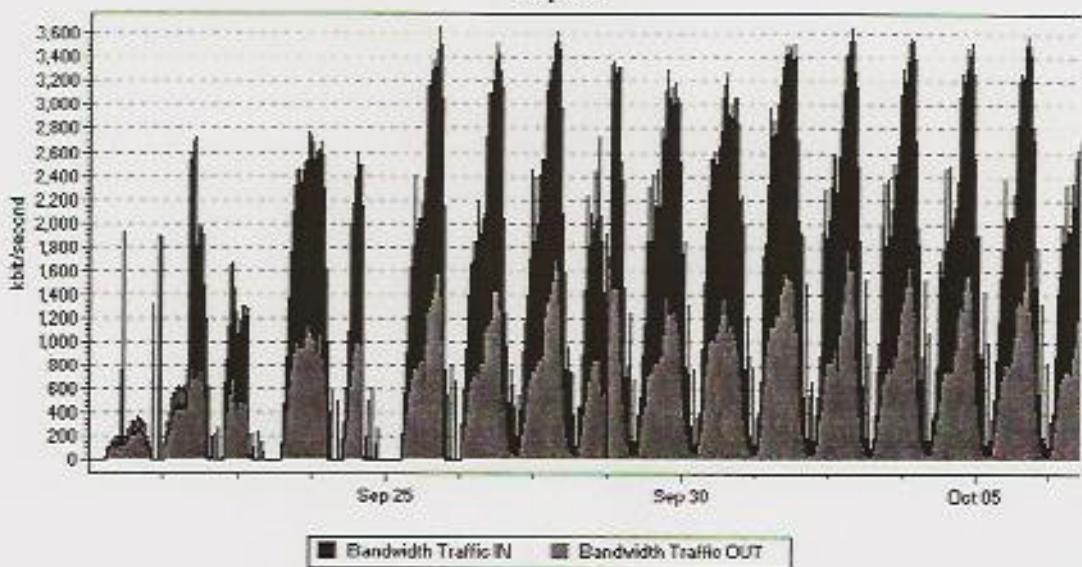
Initial projections made were that a pair of Channel-Servers would scale to support 50,000 broadband users with a concurrency of 70%.

The following graphs illustrate the actual CPU and utilisation statistics measured during the trial.

Channel-Server 01 Utilisation

Detail

Report

| Bandwidth Traffic IN | Bandwidth Traffic OUT |
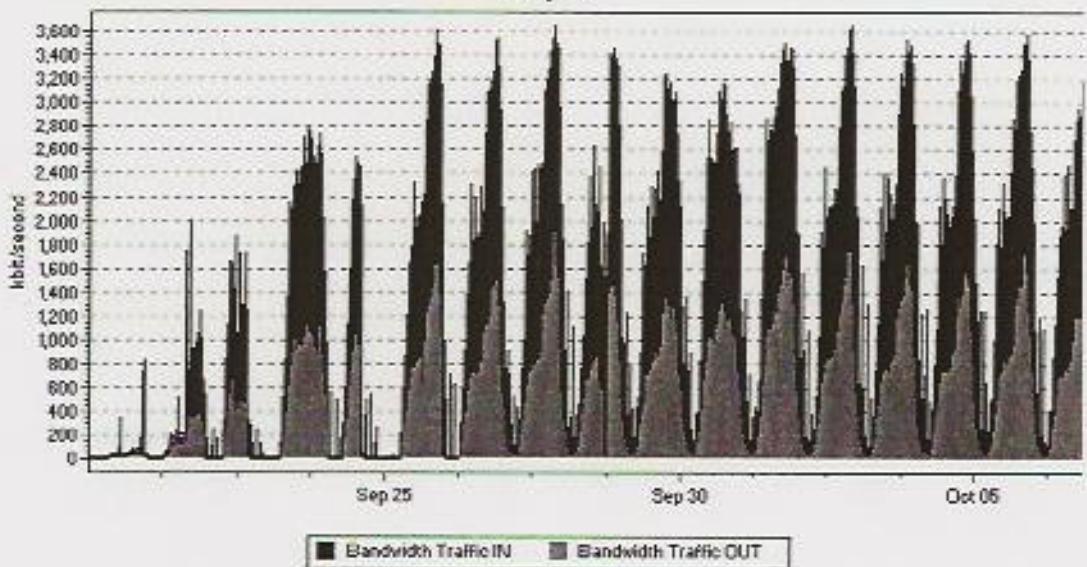
PRTG Traffic Grapher V4.2.0.384 - 10/12/2006 10:45:23
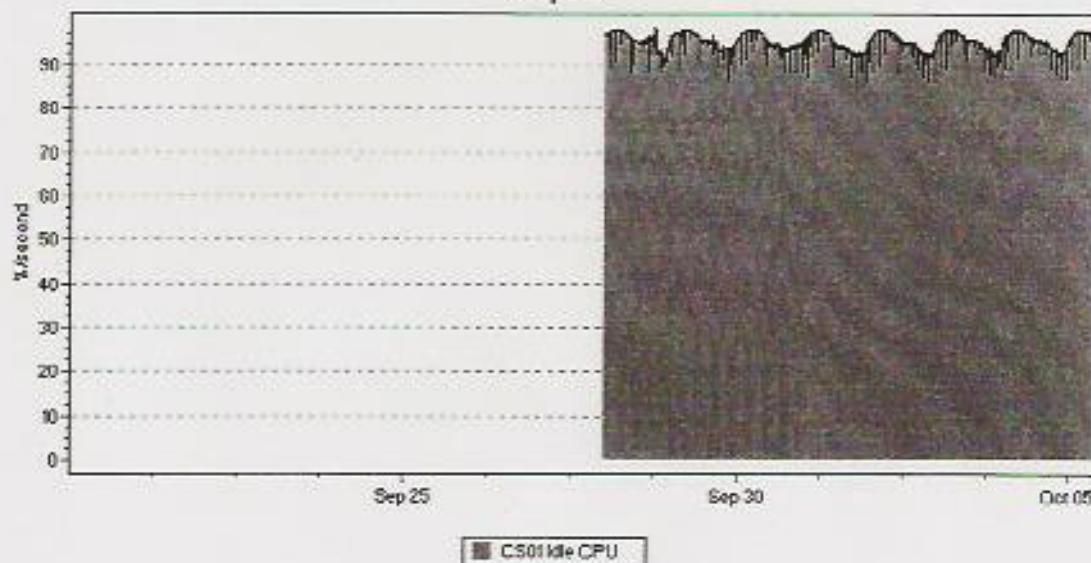
Channel-Server 02 Utilisation

Detail

Report

| Bandwidth Traffic IN | Bandwidth Traffic OUT |
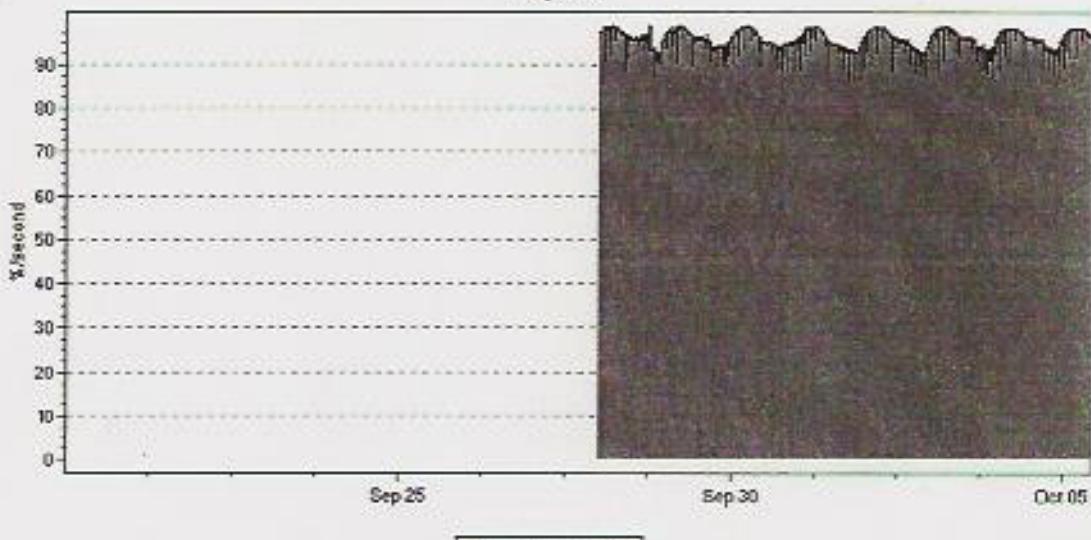
PRTG Traffic Grapher V4.2.0.384 - 10/12/2006 10:46:01

Channel-Server 01 Idle CPU

Detail

Report

CS01 Idle CPU

PRTG Traffic Grapher V4.2.0.364 - 10/12/2006 10.58:17 P

Channel-Server 02 Idle CPU

Detail

Report

CS02 Idle CPU

PRTG Traffic Grapher V4.2.0.364 - 10/12/2006 10.50.59 P

With reference to the CPU measurements each proxy server peaked at a maximum utilisation of approximately 15%.

The projection is made that the load on each server could be trebled whilst maintaining around a 50% CPU loading.

Using the characterisation information derived in Section 2:

Channel-Servers Required = Total For Sample Network * Scaling Factor
= 0.333 * 91
= 31 servers

Additional channel-servers will be required to cater for equipment failures. The quantity will depend on the deployment model used, yet a figure of around 9 additional servers is realistic.

As such the total proxy-server requirement will be approximately 40 servers.

3.4 Performance

3.4.1 Requirements Summary and Results

| No.	Requirements	Success Criteria	Result
5.1	Confirm no measurable degradation to customer perception in browsing service performance as a result of deploying the PageSense application	No mis-operation due to PageSense deployment	Compliant
5.2	Test the PageSense solution to confirm graceful operation of PageSense components in overload conditions	The designs to prevent overload conditions arising and/or negate the impact of such conditions	Compliant
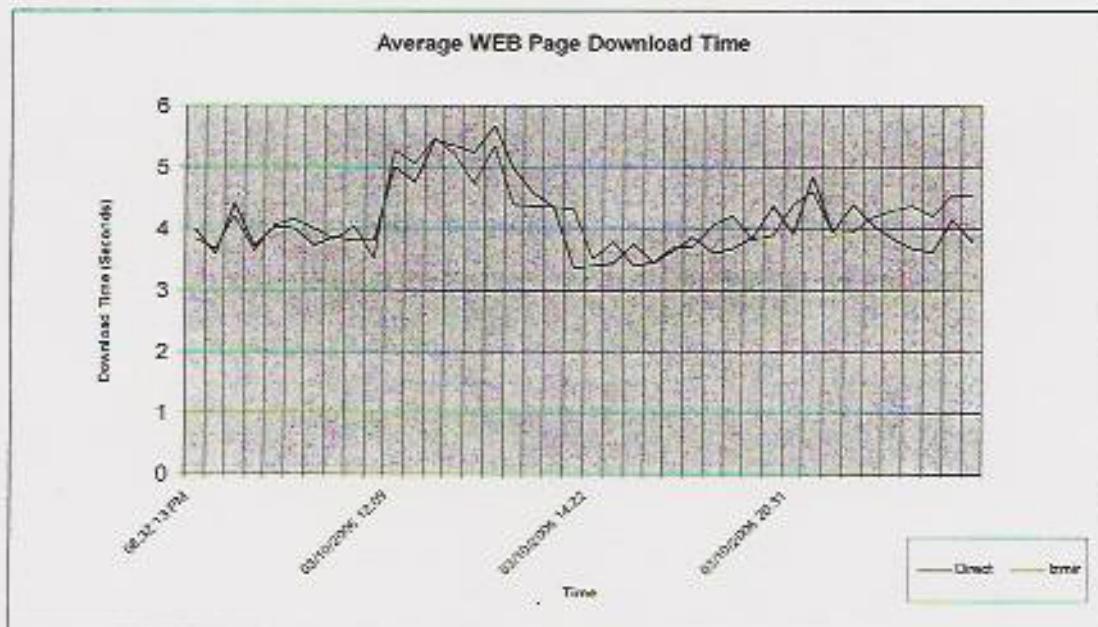
3.4.2 Non Compliance Issues and Actions

None – all compliant

3.4.3 Observations and Exhibits

3.4.3.1 Browsing Latency

Continuous web robot tests were conducted during the trial downloading in series 75 popular web pages [Section 6], pausing for one-minute, then repeating the test. One robot was directed through PageSense and one was directly accessing the Internet. The results for a typical 24-hour period follow:
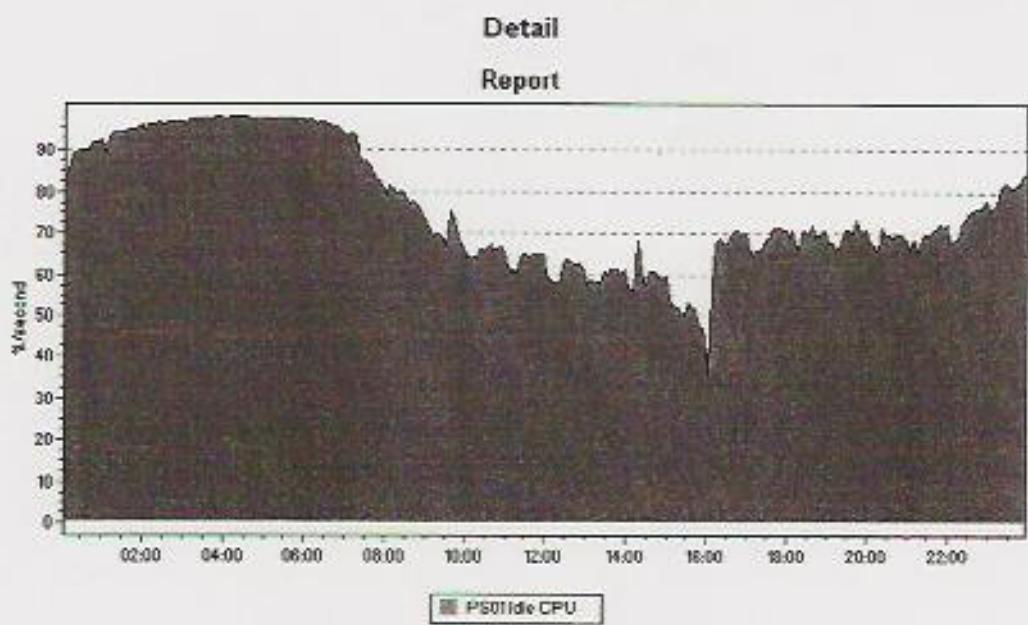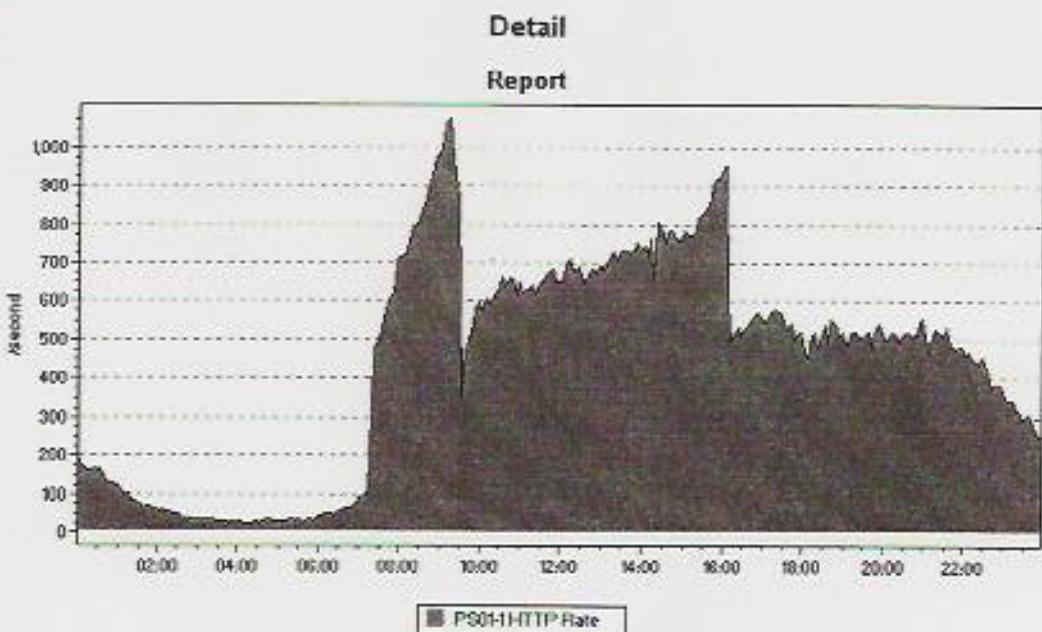

As indicated, there is very little perceptible difference between the direct and PageSense connections, all pages being delivered in between 3-6 seconds during both peak and off-peak periods in both cases.

### 3.4.3.2   Normal Operation and Overload Operation

The following pair of tests were performed to verify performance of the proxy-servers when the rated 750 HTTP request/second maximum was exceeded.

Test Time	Proxy SQUID status
0700-0900	Single Active Instance (PSO1-1)
1000-1600	Dual Proxy-Instance Active (PS01-1 and PS01-2)

The following graphs indicate the resulting HTTP rates and resulting CPU loads during the tests.

Detail

Report

PRTG Traffic Grapher V4.2.0.364 - 10/12/2006 11:13:35 PM

Detail

Report

PRTG Traffic Grapher V4.2.0.364 - 10/12/2006 11:14:46 PM

Single SQUID Instance

At approximately 0815, the HTTP rate on the single active SQUID instance reached th
maximum 750 HTTP request rate. The user load and corresponding HTTP rate continued t
increase. At approximately 0900, the latency of web browsing had increased fron
approximately 3 seconds to approximately 6 seconds, with the occasional browsing failure.

The corresponding CPU of the proxy-server is shown to be approximately 65% idle. Thi:
figure is an average of the pair of processors the server is equipped with. Since one processo
was 100% idle, then the load on the active processor was calculated to be approximately 70%
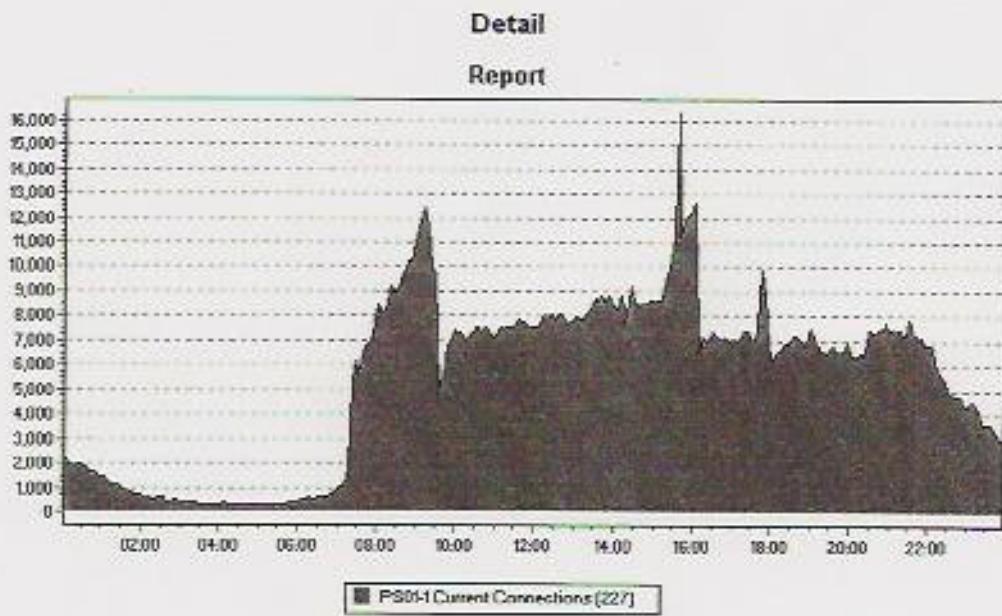
Dual SQUID Instance
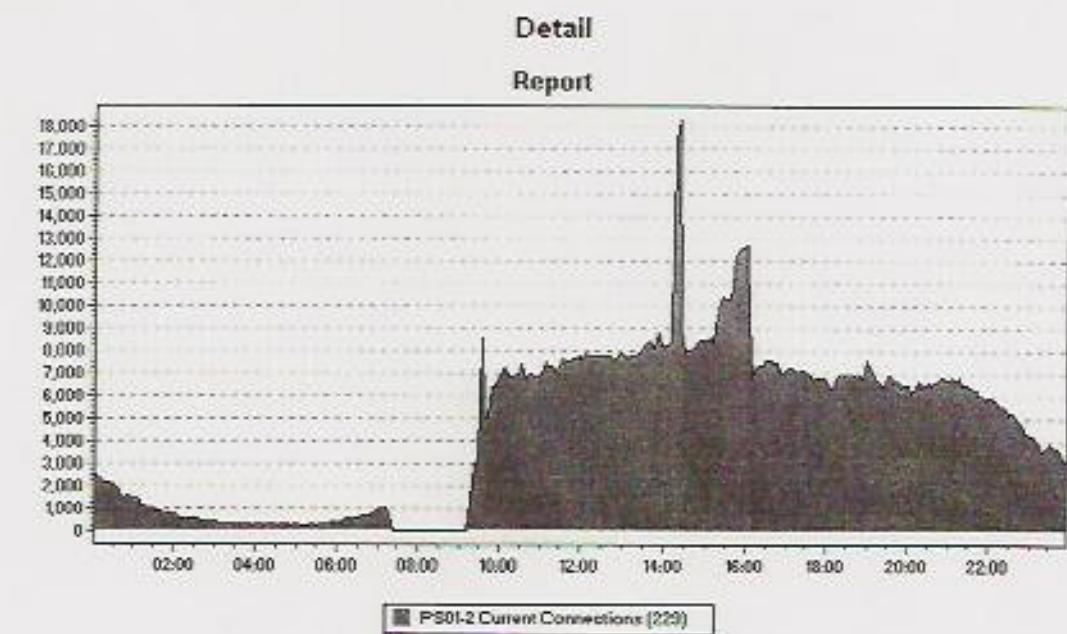
At approximately 1000, the second SQUID instance of proxy-server 01 was also activated
The HTTP rate on each SQUID instance reached the maximum 750 HTTP request rate a
around 1500. The user load and corresponding HTTP rate continued to increase. A
approximately 1600, the latency of web browsing had increased from approximately 3 seconds
to approximately 6 seconds, with the occasional browsing failure.

The corresponding CPU of the proxy-server is shown to be approximately 35% idle. This
figure is an average of the pair of processors the server is equipped with. The load on each
active processor was calculated to be approximately 65%.

TCP Connections

The total number of TCP connections active on each SQUID instance during the two overload
conditions is illustrated in the following graphs:

Detail

Report

PS01-1 Current Connections [227]

PRTG Traffic Grapher V4.2.0.364 - 10/12/2006 1l:17.06 PM

Detail

Report


PS01-2 Current Connections (229)

PRTG Traffic Grapher V4.2.0.384 - 10/12/2006 11:17:38 PM
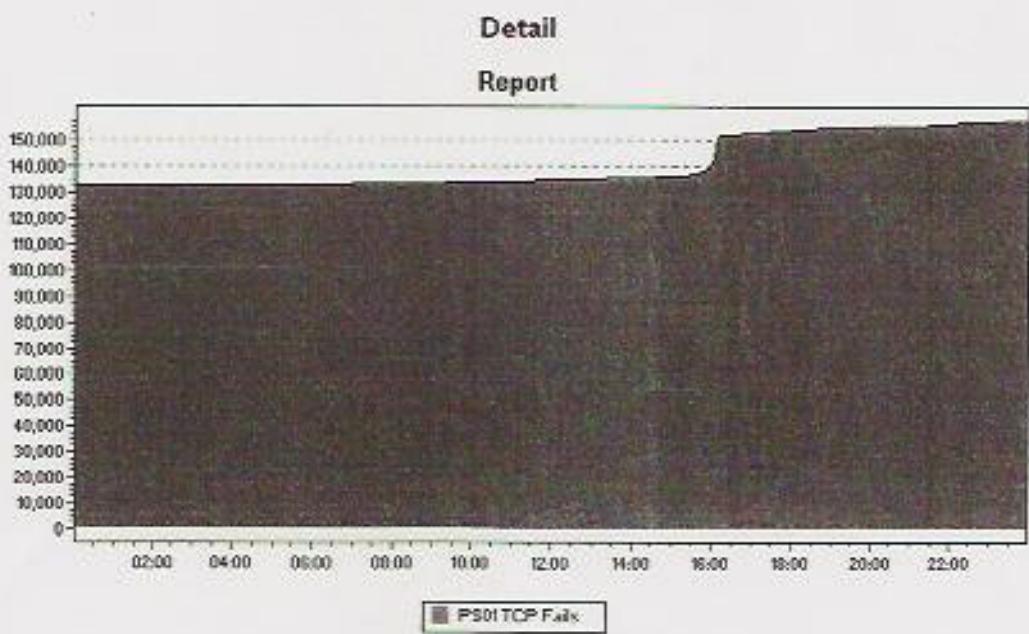
As illustrated:

- The single SQUID instance reached around 12000 TCP connections at the initial overload peak.

- In the dual SQUID instance overload case, almost 13000 TCP connections were supported by each SQUID instance (26000 approximately for the server).

The following graph depicts the total number of TCP connection failures reported by proxy-server 01 during the overload tests. As indicated no noticeable increase was detected across the first condition. In the second case, the number of failed TCP connections rose dramatically, the onset occurring just prior to 1600. This corresponds to an HTTP rate of approximately 900 requests/second per SQUID instance.

Detail

Report

PS01 TCP Fails

PRTG Traffic Grapher V4.2.0.384 - 10/12/2006 11:18:26 PM
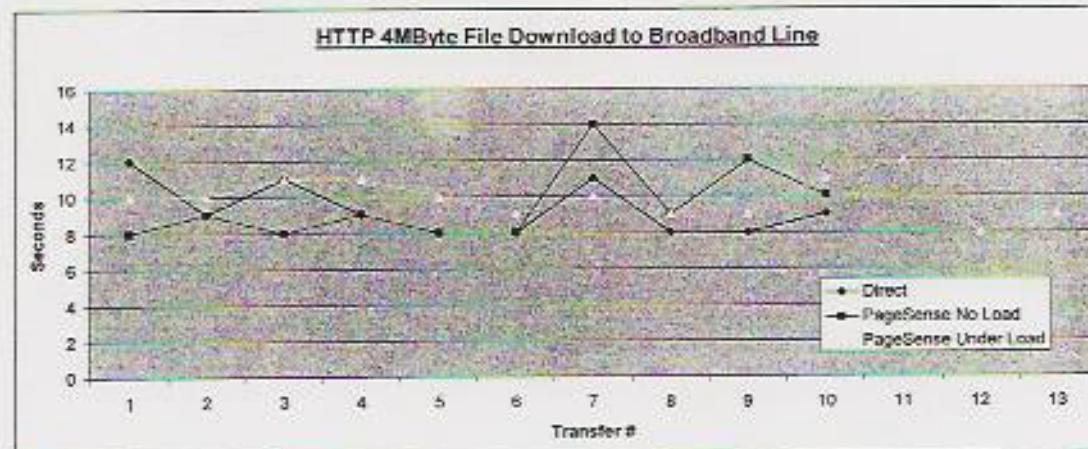
3.4.3.3   HTTP Download Performance

A series of spot-checks were made of the impact of PageSense on file transfers that us HTTP. The performance of both direct HTTP transfers and HTTP transfers proxied throug PageSense were compared.

Broadband Connected Client
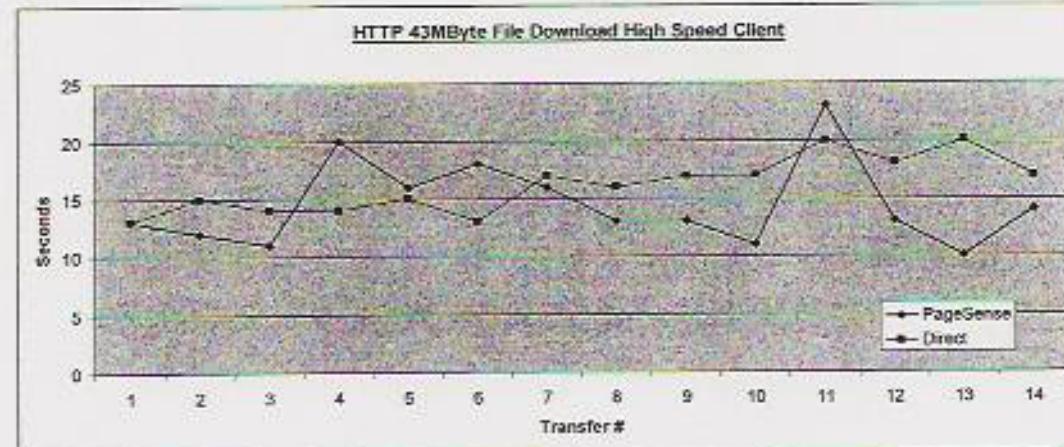
The chart illustrates results obtained from tests made from an 8Mbps connected broadban client using Internet Explorer to download a 4Mbyte file from the public sit http://www.mirror.ac.uk, using HTTP.

The average download time in each of the three test cases, Direct download from the Interne Download through PageSense under no load and Download through PageSense under fu load at the peak user period, was approximately the same, at 10 seconds.

HTTP 4MByte File Download to Broadband Line

LAN Connected Client

The chart illustrates results obtained from tests made from a 100Mbps connected client usin Internet Explorer to download a 43Mbyte file from the public site http://www.mirror.ac.uk, usin HTTP.

HTTP 43MByte File Download High Speed Client

The average download time in each of the two test cases, Direct download from the Internet, and Download through PageSense under full load at the peak user period, was approximately the same, at 15 seconds.

3.5 Resilience

3.5.1 Requirements Summary and Results

No.	Requirements	Success Criteria	Resul
6.1	The proposed production design to have a fully redundant configuration with no single point of failure.	Production design operation in failover conditions to confirm that any degradation is limited to the PageSense system and transient in nature. Confirmation that in full fail-over the system operates correctly.	Compliar
6.2	The in-service s/w and f/w upgrade of PageSense components, when done in accordance with PageSense normal operating procedures, will not affect customer service.	No PageSense component failures attributable to have root cause for failure as PageSense upgrade of s/w or f/w	Compliar
6.3	The In-service addition of PageSense components not to affect customer service.	No customer service failures to be attributable to have root cause for failure as PageSense component addition	Compliar
6.4	The in-service removal / insertion / removal cycle of the PageSense not to impact normal operation of customer's service	No customer service failures to be attributable to have root cause for failure as PageSense component removal / insertion / cycle removal	Compliar
6.5	Confirm correct operation of fail-over design by pro-active failure of any single PageSense element in a fully redundant production configuration	No significant degradation of normal customer service	Compliar

3.5.2 Non Compliance Issues and Actions

None – all compliant

3.5.3 Observations and Exhibits

3.5.3.1 Fully Redundant Configuration

This aspect of the systems resilience was compliant. The trial solution utilised dual Proxy Servers and dual Channel-Servers configured in an active-active configuration. It was verified that on failure of a single server, that correct operation could be maintained by the remaining equipment. Note that the switch-over of operation from the failed to the active unit is no stateful. For example, should a single proxy-server fail, all web transactions in progress would fail to complete from the users perspective and would need to be resumed (utilising the secondary server). Also note that dual SQUID processes were configured on each Proxy Server and its was verified that on failure of a single SQUID process, operation was maintained by the second SQUID process and the remaining two SQUID processes on the second Proxy-Server, subject to the maximum load conditions not being exceeded.

3.5.3.2 In-service Software Upgrades

This aspect of the systems resilience was compliant. It was verified that in-service software upgrades of the PageSense components could be conducted without service disruption.

Considering the Proxy-Server, the procedure verified to do this was as follows:

1) Disable SQUID Process #1 – existing transactions complete gracefully, new transactions are not accepted (and are instead serviced by the remaining SQUID processes).
2) Disable SQUID Process #2 - existing transactions complete gracefully, new transactions are not accepted (and are instead serviced by the remaining SQUID processes).
3) In this state the Proxy-Server is effectively isolated from the network. Software upgrades could then be performed.
4) To introduce the device back into service, each SQUID process was then reactivated in turn.

Considering the Channel-Server, the procedure verified to do this was as follows:

5) Disable TCP port 10080 – this is the port the Proxy-Server directs requests to the Channel-Server on. The Proxy-Server will cease directing requests to the disabled Channel-Server, although any existing transactions complete gracefully.
6) In this state the Channel-Server is effectively isolated from the network. Software upgrades could then be performed.
7) Introduce the device back into service, by enabling its TCP port 10080.

3.5.3.3 In-Service Addition of Components

This aspect of the systems resilience was compliant. The procedure of Section 3.5.3.2 verified this aspect of the system.

3.5.3.4 In-Service Removal/Insertion of Components

This aspect of the systems resilience was compliant. The procedure of Section 3.5.3.2 verified this aspect of the system.

3.5.3.5 Failover Capabilities

The following specific failover tests were conducted:

Failure Mode	Pass/Fail	Notes
Single Squid Process	Pass[1]	Remaining load supported by existing three squid process instances
Dual Squid Instance	Pass[2]	Remaining load supported by second Proxy-Server
Single Proxy-Server	Pass[3]	Remaining load supported by second Proxy-Server
Dual Proxy-Server	Pass[4]	Remaining load bypassed by Load balancer
Single Channel-Server Port 10080	Pass	The Proxy-Server detects the failure within 5-seconds and ceases directing requests to the affected Channel-Server
Single Channel-Server	Pass	The Proxy-Server detects the failure within 5-seconds and ceases directing requests to the affected Channel-Server
Dual Channel-Server Port 10080	Pass	The Proxy-Server detects the dual failure and ceases directing requests to both Channel-Servers. There is no noticeable impact on user browsing experience under this failure.
Dual Channel-Server	Pass	The Proxy-Server detects the dual failure and ceases directing requests to both Channel-Servers. There is no noticeable impact on user browsing experience under this failure.

[1] In this case the correct redistribution of the offered load is mainly a function of the satisfactory performance of the load balancer
[2] In this case the correct redistribution of the offered load is mainly a function of the satisfactory performance of the load balancer
[3] In this case the correct redistribution of the offered load is mainly a function of the satisfactory performance of the load balancer
[4] In this case the correct redistribution of the offered load is mainly a function of the satisfactory performance of the load balancer

3.6 Reliability and Continuous Operation

3.6.1 Requirements Summary and Results

No.	Requirements	Success Criteria	Result
6.1	Customer calls to the helpdesk associated with PageSense application to be insignificant	The helpdesk to receive less than 5 calls associated with PageSense.	Compliant
6.2	Once configured PageSense to continue to operate in a stable operating state without need for manual intervention or without need for manual fine tuning or need for continuous manual optimisation. Ie. 'hands off' operation.	Zero touch normal operation.	Compliant following initial tuning
6.3	The installation, integration and use of PageSense to not negatively impact normal operation of any other equipment (i.e. equipment which is not part of the PageSense solution) in the exchange.	No Network faults on non related other equipment attributable to have root cause for failure as PageSense solution	Compliant
6.4	The reliability / availability of PageSense to exceed the Trial Design Objective.	The Trial design objective to be explicitly defined by BT. There will be no unplanned failures for the 2-week duration of the trial at full load operation.	Compliant following initial tuning
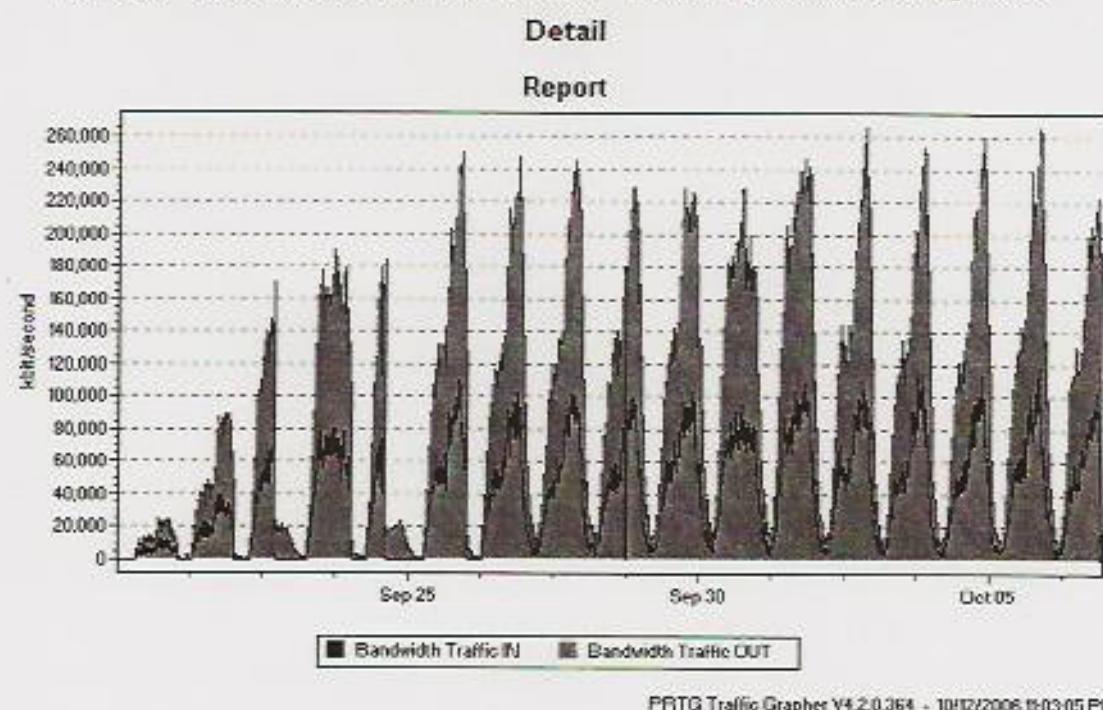
3.6.2 Non Compliance Issues and Actions

Following initial fine tuning the system did operate reliably. The root cause of one outage did remain unknown, although it is fair to say this could have been caused by a defect external to PageSense.
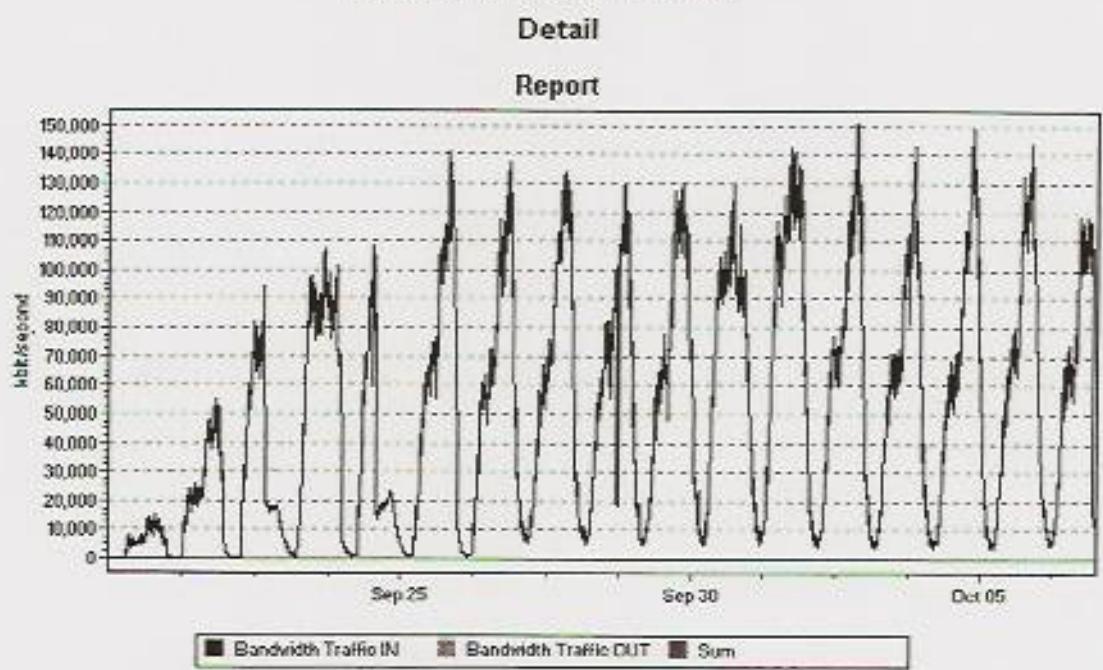
3.6.3 Observations and Exhibits

For the majority of the trial duration, PageSense operated successfully. There follow a number of performance graphs which illustrate this point.
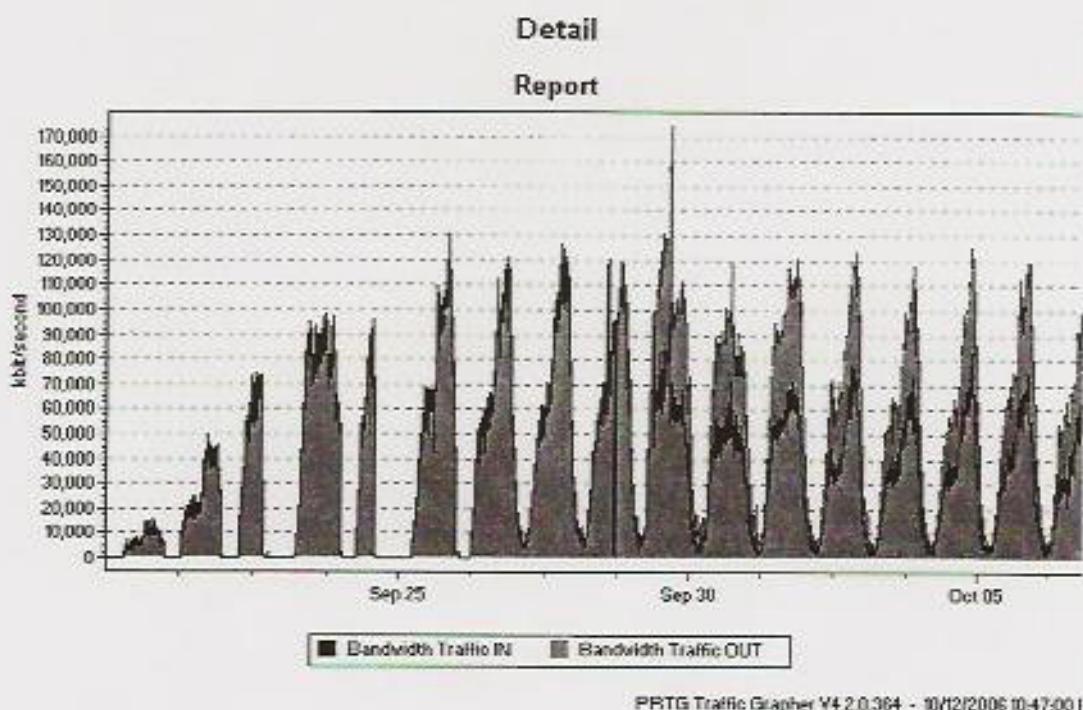
Traffic Out = Total Traffic Outbound from PageSense   Traffic In = Traffic Inbound to PageSense
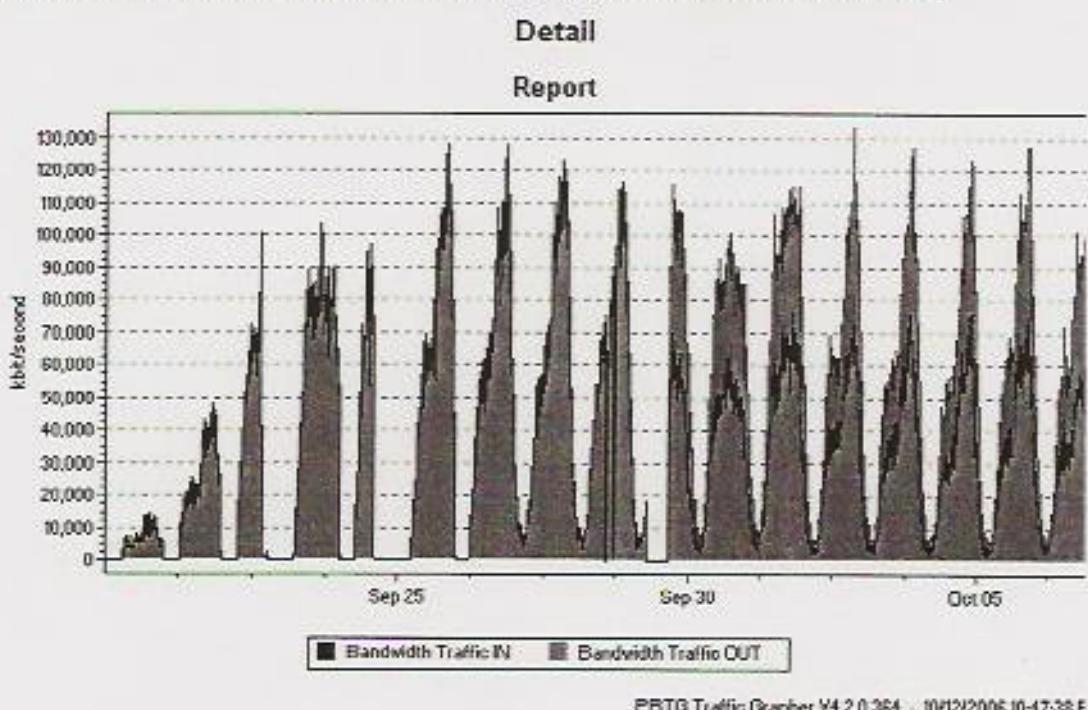
Detail

Report

PRTG Traffic Grapher V4.2.0.364 - 10/12/2006 11:03:05 PM

Traffic In =Traffic Inbound to PageSense

Detail

Report


PRTG Traffic Grapher V4.2.0.364 - 10/12/2006 11:01:45 PM
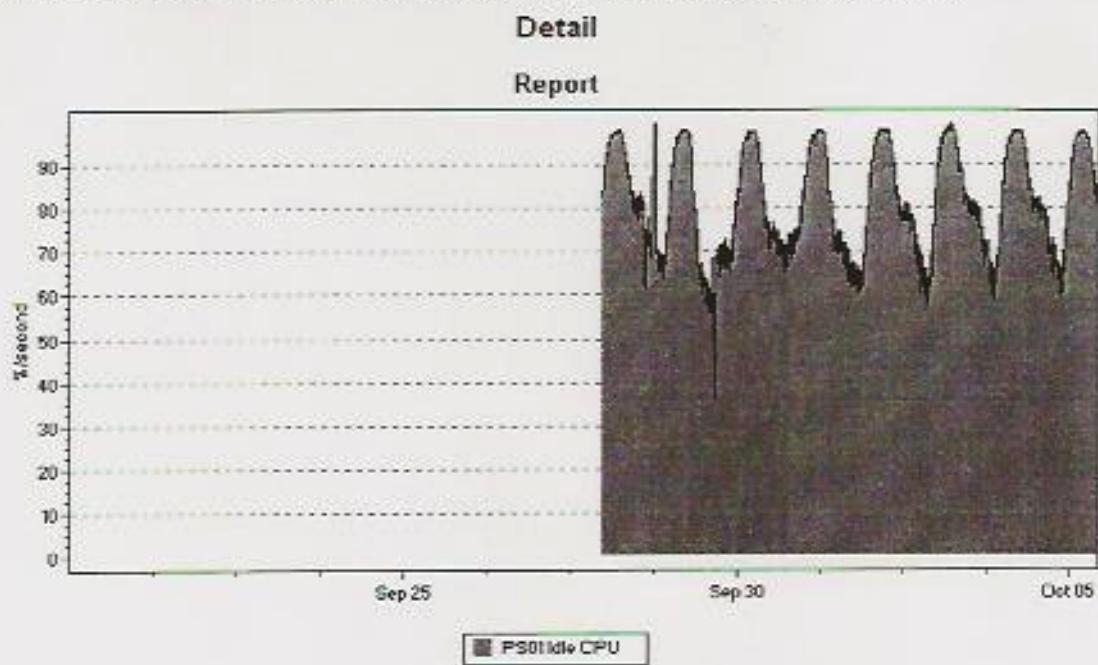
Total inbound and outbound Traffic from proxy-server 01 (pair of SQUID instances).

Detail
Report

Legend: ■ Bandwidth Traffic IN   ▦ Bandwidth Traffic OUT

PRTG Traffic Grapher V4.2.0.364 - 10/12/2006 10:47:00 f
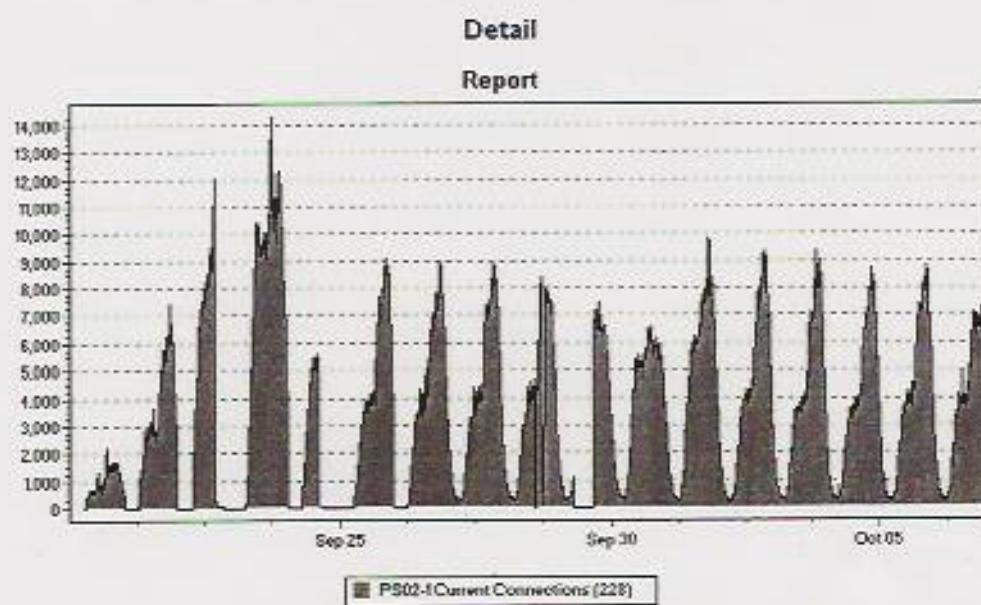
Total inbound and outbound traffic from proxy-server 02 (pair of SQUID instances).

Detail
Report

Legend: ■ Bandwidth Traffic IN   ▦ Bandwidth Traffic OUT

PRTG Traffic Grapher V4.2.0.364 - 10/12/2006 10:47:38 F
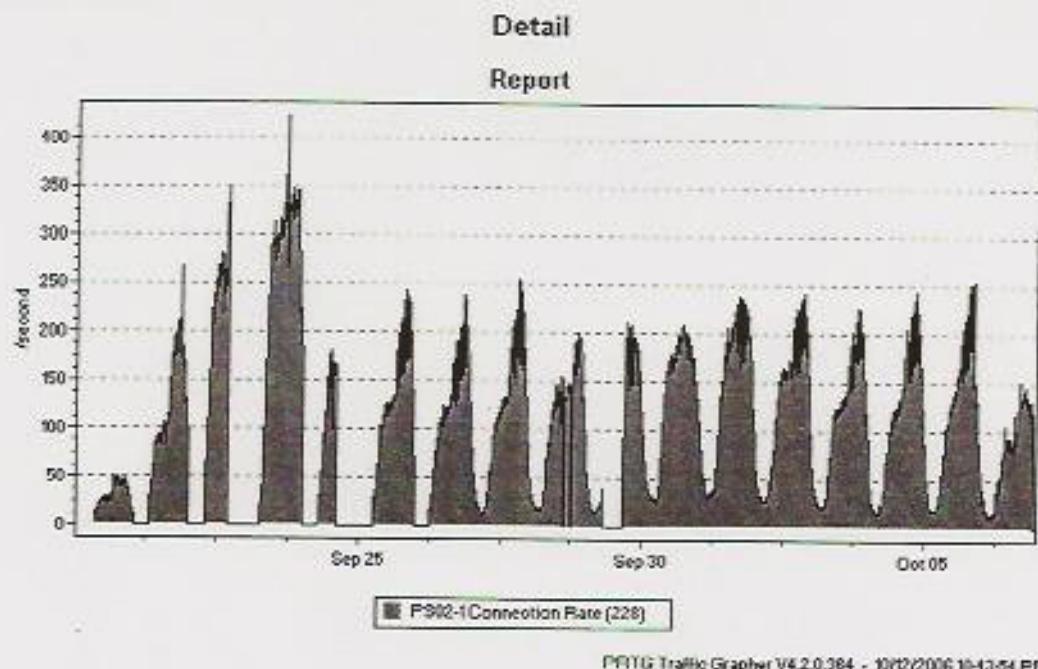
Idle CPU of a single Proxy-Server. Failover testing was being conducted on Sep 29.

Detail

Report

PRTG Traffic Grapher V4.2.0.364 - 10/12/2006 10:57:01 PI

Total TCP Connections established on a single SQUID instance showing reliable connectivity for the trial duration. Drops during Sep 29 are owing to failover testing.

Detail

Report

PRTG Traffic Grapher V4.2.0.364 - 10/12/2006 10:41:19 PM

Total TCP Connection Rate to a single SQUID instance. Drops during Sep 29 are owing to failover testing.

Detail

Report

PRTG Traffic Grapher V4.2.0.384 - 10/12/2006 10:13:54 PM

3.6.3.1 Help Desk Calls

For the duration of the trial the BT customer helpdesk received no calls whose cause was attributed to PageSense.

3.6.3.2 Zero Touch

During the trial 3 separate outages occurred which interrupted users ability to browse. These outages were quickly detected and the trial network isolated whilst a solution was investigated. A solution was successfully identified by 121Media in two of the three cases, resulting in a timely and correct software fix being provided. In the third case, no root cause of failure could be determined. It is fair to say that the issue could have been caused as a result of an element external to the PageSense environment. The issue did not materialise again during the two-week trial.

3.6.3.3 Impact on Other Systems

No defects occurred in other systems that were attributed to PageSense.

3.6.3.4 Reliability and Availability

The effect of Section 3.6.3.2 resulted in the overall of the availability of the system during trial, not meeting its 100% target. However, following tuning PageSense did operate reliably for the remainder of the trial.

3.7 Security

3.7.1 Requirements Summary and Results

No.	Requirements	Success Criteria	Result
7.1	Verify PageSense conforms to BT Security Standards	Penetration Testing to reveal only required active ports Ability to harden OS and application	Compliant

3.7.2 Non Compliance Issues and Actions

None – all compliant

3.7.3 Observations and Exhibits

BTRT's security expert worked with 121Media prior to the trial commencement to verify:

- The system was secured at the OS, network and application level

- The Platform OS is stable and patched with mandatory security updates.

- System is configured to comply with BT login and access standards

- System passed BT standard penetration and port mapping tests

- System is secured at network level with local firewall (iptables) rules restricting access only by BT users.

- 121Media also warrant that the system is able to resist DoS attacks including SYN flood.

3.8 Advertisement Serving

3.8.1 Requirements Summary and Results

No.	Requirements	Success Criteria	Result

3.8.2 Non-Compliance Issues and Actions

Only limited analytical data was provided by the system. As a result of this and because it was not designed to deliver sufficient datapoints for valid analysis, this aspect of the system could not be fully validated.

- Phase 2 testing will also validate the features and performance of the 121Media Media Planning Tool. The test will also run on a much larger userbase (approx 350,000) and statistically useful numbers will enable a validation of the commercial model.

3.8.3 Observations and Exhibits

3.8.3.1 Business Case Model

During the trial the PageSense system was demonstrably able to build per-user profiles of browsing behaviour, and deliver ads to the browser on the basis of these profiles. Spot-checks were carried out during the course of the trial, against test websites to verify this aspect of operation.

However the system has the weakness currently that only limited analytical data is available to provide information defining this activity. Information such as the number of active users of the system, the numbers of advertisements being served was only available as a daily email report, and revenue figures, not meaningful in the context of the trial, were not provided. 121Media stated that the productisation of the system to deliver this information in real time had not yet been completed and was scheduled for a Q4 2006-2007 delivery.

This trial was not designed to provide a commercial validation of the platform, which will occur in the Phase 2 Pilot.

Contextual-Advertising Spot-Check

The following is an example low-level trace obtained from the channel-server during a spot-check of its ability to build a UID browsing history and ultimately deliver a contextual advertising impression.

In this test, the UID is initially browsing web-sites matching for cars, then for sports, then performs a search matching auto finance, then spends some more time in sports before being served an ad – in this case for More Than car insurance.

```
more 16135-(BE0F4390-4000-11DB-8B33-003048529D88]
Sun 24 Sep 2006 09:52:44:021090 ISP_Auto
Sun 24 Sep 2006 09:52:44:021090 ISP_Auto_Amzn
Sun 24 Sep 2006 09:52:44:021090 ISP_Auto_CarQuote
Sun 24 Sep 2006 09:52:44:021090 ISP_Auto_Lexus
Sun 24 Sep 2006 09:52:44:021090 ISP_Auto_Volvo
Sun 24 Sep 2006 09:52:57:200425 ISP_Auto
Sun 24 Sep 2006 09:52:57:200425 ISP_Auto_Amzn
Sun 24 Sep 2006 09:52:57:200425 ISP_Auto_CarQuote
Sun 24 Sep 2006 09:52:57:200425 ISP_Auto_Lexus
Sun 24 Sep 2006 09:52:57:200425 ISP_Auto_Volvo
Sun 24 Sep 2006 09:53:20:530314 ISP_Auto
Sun 24 Sep 2006 09:53:20:530314 ISP_Auto_Amzn
Sun 24 Sep 2006 09:53:20:530314 ISP_Auto_CarQuote
Sun 24 Sep 2006 09:53:20:530314 ISP_Auto_Lexus
Sun 24 Sep 2006 09:53:20:530314 ISP_Auto_Volvo
Sun 24 Sep 2006 09:53:31:806250 ISP_Auto
Sun 24 Sep 2006 09:53:31:806250 ISP_Auto_Amzn
Sun 24 Sep 2006 09:53:31:806250 ISP_Auto_CarQuote
Sun 24 Sep 2006 09:53:31:806250 ISP_Auto_Lexus
Sun 24 Sep 2006 09:53:31:806250 ISP_Auto_Volvo
Sun 24 Sep 2006 09:53:44:612894 ISP_Auto
Sun 24 Sep 2006 09:53:44:612894 ISP_Auto_Amzn
Sun 24 Sep 2006 09:53:44:612894 ISP_Auto_CarQuote
Sun 24 Sep 2006 09:53:44:612894 ISP_Auto_Lexus
Sun 24 Sep 2006 09:53:44:612894 ISP_Auto_Volvo
Sun 24 Sep 2006 09:53:55:814652 ISP_CompTelecom_Internet
Sun 24 Sep 2006 09:53:55:814652 ISP_CompTelecom_Internet_SearchEngines
Sun 24 Sep 2006 09:54:04:196427 ISP_Ent_Sports_Amzn
Sun 24 Sep 2006 09:54:04:196427 ISP_Ent_Sports_SpInt
Sun 24 Sep 2006 09:54:04:196427 ISP_Ent_Sports
Sun 24 Sep 2006 09:54:41:291758 ISP_Auto
Sun 24 Sep 2006 09:54:41:291758 ISP_Auto_Amzn
Sun 24 Sep 2006 09:54:41:291758 ISP_Auto_CarQuote
Sun 24 Sep 2006 09:54:41:291758 ISP_Auto_Lexus
Sun 24 Sep 2006 09:54:41:291758 ISP_Auto_Volvo
Sun 24 Sep 2006 09:54:49:073729 ISP_CompTelecom_Internet
Sun 24 Sep 2006 09:54:49:073729 ISP_CompTelecom_Internet_SearchEngines
Sun 24 Sep 2006 09:54:54:154128 ISP_Ent_CasinoPH
Sun 24 Sep 2006 09:54:56:211739 ISP_Ent_CasinoPH
Sun 24 Sep 2006 09:55:00:317173 ISP_Ent_CasinoPH
Sun 24 Sep 2006 09:57:11:948975 ISP_Auto
Sun 24 Sep 2006 09:57:11:948975 ISP_Auto_Amzn
Sun 24 Sep 2006 09:57:11:948975 ISP_Auto_CarQuote
Sun 24 Sep 2006 09:57:11:948975 ISP_Auto_Lexus
Sun 24 Sep 2006 09:57:11:948975 ISP_Auto_Volvo
Sun 24 Sep 2006 09:59:18:473414 ISP_CompTelecom_Internet
Sun 24 Sep 2006 09:59:18:473414 ISP_CompTelecom_Internet_SearchEngines
Sun 24 Sep 2006 09:59:37:712225 ISP_Ent_Sports_Amzn
Sun 24 Sep 2006 09:59:37:712225 ISP_Ent_Sports_SpInt
Sun 24 Sep 2006 09:59:37:712225 ISP_Ent_Sports
Sun 24 Sep 2006 09:59:47:531497 ISP_Ent_Sports_Amzn
Sun 24 Sep 2006 09:59:47:531497 ISP_Ent_Sports_SpInt
Sun 24 Sep 2006 09:59:47:531497 ISP_Ent_Sports
Sun 24 Sep 2006 09:59:58:026424 ISP_Ent_Sports_Amzn
Sun 24 Sep 2006 09:59:58:026424 ISP_Ent_Sports_SpInt
Sun 24 Sep 2006 09:59:58:026424 ISP_Ent_Sports
Sun 24 Sep 2006 10:00:03:955617 ISP_Ent_Sports_Amzn
Sun 24 Sep 2006 10:00:03:955617 ISP_Ent_Sports_SpInt
Sun 24 Sep 2006 10:00:03:955617 ISP_Ent_Sports
Sun 24 Sep 2006 10:00:37:547806 ISP_Ent_Sports_Amzn
Sun 24 Sep 2006 10:00:37:547806 ISP_Ent_Sports_SpInt
Sun 24 Sep 2006 10:00:37:547806 ISP_Ent_Sports
Sun 24 Sep 2006 10:01:11:109912 ISP_Ent_Sports_Amzn
```

```
Sun 24 Sep 2006 10:01:11:109912 ISP_Ent_Sports_SpInt
Sun 24 Sep 2006 10:01:11:109912 ISP_Ent_Sports
Sun 24 Sep 2006 10:01:45:425664 ISP_Ent_Sports_Amzn
Sun 24 Sep 2006 10:01:45:425664 ISP_Ent_Sports_SpInt
Sun 24 Sep 2006 10:01:45:425664 ISP_Ent_Sports
Sun 24 Sep 2006 10:02:18:454428 ISP_Ent_Sports_Amzn
Sun 24 Sep 2006 10:02:18:454428 ISP_Ent_Sports_SpInt
Sun 24 Sep 2006 10:02:18:454428 ISP_Ent_Sports
Sun 24 Sep 2006 10:02:51:432341 ISP_Ent_Sports_Amzn
Sun 24 Sep 2006 10:02:51:432341 ISP_Ent_Sports_SpInt
Sun 24 Sep 2006 10:02:51:432341 ISP_Ent_Sports
Sun 24 Sep 2006 10:02:52:877843 ISP_CompTelecom_Internet
Sun 24 Sep 2006 10:02:52:877843 ISP_CompTelecom_Internet_SearchEngines
Sun 24 Sep 2006 10:02:59:762296 ISP_CompTelecom_Internet
Sun 24 Sep 2006 10:02:59:762296 ISP_CompTelecom_Internet_SearchEngines
Sun 24 Sep 2006 10:03:24:013679 ISP_Ent_Sports_Amzn
Sun 24 Sep 2006 10:03:24:013679 ISP_Ent_Sports_SpInt
Sun 24 Sep 2006 10:03:24:013679 ISP_Ent_Sports
Sun 24 Sep 2006 10:03:57:266303 ISP_Ent_Sports_Amzn
Sun 24 Sep 2006 10:03:57:266303 ISP_Ent_Sports_SpInt
Sun 24 Sep 2006 10:03:57:266303 ISP_Ent_Sports
Sun 24 Sep 2006 10:04:29:994891 ISP_Ent_Sports_Amzn
Sun 24 Sep 2006 10:04:29:994891 ISP_Ent_Sports_SpInt
Sun 24 Sep 2006 10:04:29:994891 ISP_Ent_Sports
Sun 24 Sep 2006 10:05:03:155827 ISP_Ent_Sports_Amzn
Sun 24 Sep 2006 10:05:03:155827 ISP_Ent_Sports_SpInt
Sun 24 Sep 2006 10:05:03:155827 ISP_Ent_Sports
Sun 24 Sep 2006 10:05:36:294425 ISP_Ent_Sports_Amzn
Sun 24 Sep 2006 10:05:36:294425 ISP_Ent_Sports_SpInt
Sun 24 Sep 2006 10:05:36:294425 ISP_Ent_Sports
Sun 24 Sep 2006 10:06:09:466597 ISP_Ent_Sports_Amzn
Sun 24 Sep 2006 10:06:09:466597 ISP_Ent_Sports_SpInt
Sun 24 Sep 2006 10:06:09:466597 ISP_Ent_Sports
Sun 24 Sep 2006 10:06:32:796829 ISP_CompTelecom_Internet
Sun 24 Sep 2006 10:06:32:796829 ISP_CompTelecom_Internet_SearchEngines
Sun 24 Sep 2006 10:06:45:858189 ISP_CompTelecom_Internet
Sun 24 Sep 2006 10:06:45:858189 ISP_CompTelecom_Internet_SearchEngines
Sun 24 Sep 2006 10:06:48:581998 ISP_Auto_Insurance_HSBC
Sun 24 Sep 2006 10:06:48:581998 ISP_Auto_Insurance_Hometown
Sun 24 Sep 2006 10:06:48:581998 ISP_Auto_Insurance
Sun 24 Sep 2006 10:06:48:581998 ISP_Auto_Insurance_SainsburyBank
Sun 24 Sep 2006 10:06:53:214327 ISP_Auto_Insurance_HSBC
Sun 24 Sep 2006 10:06:53:214327 ISP_Auto_Insurance_Hometown
Sun 24 Sep 2006 10:06:53:214327 ISP_Auto_Insurance
Sun 24 Sep 2006 10:06:53:214327 ISP_Auto_Insurance_SainsburyBank
Sun 24 Sep 2006 10:08:38:162616 ISP_CompTelecom_Internet
Sun 24 Sep 2006 10:08:38:162616 ISP_CompTelecom_Internet_SearchEngines
        :                               :
        :                               :
Sun 24 Sep 2006 11:07:09:218232 ISP_Ent_Sports_Amzn
Sun 24 Sep 2006 11:07:09:218232 ISP_Ent_Sports_SpInt
Sun 24 Sep 2006 11:07:09:218232 ISP_Ent_Sports
Sun 24 Sep 2006 11:07:40:408605 ISP_Ent_Sports_Amzn
Sun 24 Sep 2006 11:07:40:408605 ISP_Ent_Sports_SpInt
Sun 24 Sep 2006 11:07:40:408605 ISP_Ent_Sports
Sun 24 Sep 2006 11:07:55:157853 IMPRESSION 16135 / More Than
```

ed by 121Media

	22/09/2006[1]	23-Sep	24/09/2006[2]	25-Sep	26-Sep	27-Sep	28-Sep	29-Sep	30-Se
c	14577	16441	-	17452	17372	17593	17456	17456	1695
	7785	12778	-	15003	15318	15600	15139	15741	1409
	837488	1198334	-	2800732	2682669	3005344	2524830	2831957	29940
	6591	11714	-	19196	24271	30184	17242	12088	1032
cookied users:	5269	9766	-	16089	18586	16308	8773	7990	7043

- IP addresses seen through the Proxy Servers
ie ID's seen
pages shown (with a JS Tag)
Ads Shown to Reading Trial Users
Ads Shown to Reading Trial Users who had a Cookie

to problems caused by Proxy Configurations
Outage - no data available

4 Broadband Terms and Conditions

Currently BT legal has indicated it is likely the broadband terms and conditions will require alteration to enable the PageSense system to drop web-cookies, which are an essential part to the operation of the system.

Also consideration must be given to the opt-out procedure enabling users to circumvent the system.

Whilst the former issue is not strictly a technical consideration of this report, it is mentioned since owing to the legal position, direct cookie dropping could not be trialed and should be verified once the legal position is clearer.

The latter issue regarding opt-out could not be specifically trialed either since BTRT conducted this test as a stealth trial. The system does provide an opt-out mechanism and this was laboratory tested and verified. However the method of opt-out requires consideration, since it involves the dropping of a web-cookie on the users machine to indicate an opt-out preference, which if wiped by the user means they will be opted back in.

The final point is that the system JavaScript tags every web-page it serves and this aspect of operation should be verified in this context.

6   Download Targets

http://www.amazon.com
http://www.barnesandnoble.com
http://www.potterybarn.com
http://www.williamsonoma.com
http://www.ebay.com
http://www.senate.gov
http://www.ebay.com
http://www.dell.com
http://www.apple.com
http://www.store.apple.com
http://www.hp.com
http://www.epson.com
http://www.yahoo.com
http://www.lycos.com
http://www.msn.com
http://www.excite.com
http://www.norton.com
http://www.mcafee.com
http://www.quicken.com
http://www.people.com
http://www.coke.com
http://www.sony.com
http://www.lucent.com
http://www.nortel.com
http://www.cisco.com
http://www.3com.com
http://www.sun.com
http://www.att.com
http://www.bellsouth.com
http://www.verizon.com
http://www.sbc.com
http://www.nctgroupinc.com/artera/attest-txt-form.htm
http://www.t-mobile.com
http://www.attwireless.com
http://www.verizonwireless.com
http://www.vogue.com
http://the-tech.mit.edu/Shakespeare/hamlet/full.html
http://www.cnet.com

http://www.chevrolet.com
http://www.gm.com
http://www.honda.com
http://www.porsche.com
http://www.subaru.com
http://www.monster.com
http://www.ticketmaster.com
http://www.weather.com
http://www.nctgroupinc.com/artera/attest-txt.htm
http://www.match.com
http://www.sony.com
http://www.sonystyle.com
http://www.kodak.com
http://www.nationalgeographic.com
http://www.sega.com
http://www.mtv.com
http://www.nbc.com
http://www.cbs.com
http://www.foxnews.com
http://www.cnn.com
http://www.nytimes.com
http://www.washingtonpost.com
http://www.state.gov
http://www.house.gov
http://www.nctgroupinc.com/artera/attest-txt-jpg.htm
http://www.usda.gov
http://www.fcc.gov/Reports/lcom1996.txt
http://www.irs.gov
http://www.fedex.com
http://www.ups.com
http://www.airborne.com
http://www.usps.com
http://www.nctgroupinc.com/artera/attest-txt-gIf.htm
http://www.elle.com
http://www.cosmopolitan.com
http://www.time.com
http://www.businessweek.com