

Virtualisation: The need to know what's going on

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EDUCAUSE 2011



The Future is Cloudy

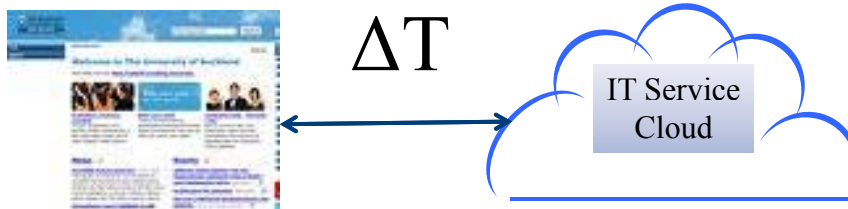


End users are interested in


Functionality Performance

Performance = Latency

ΔT = the time it takes
the entire page to get back

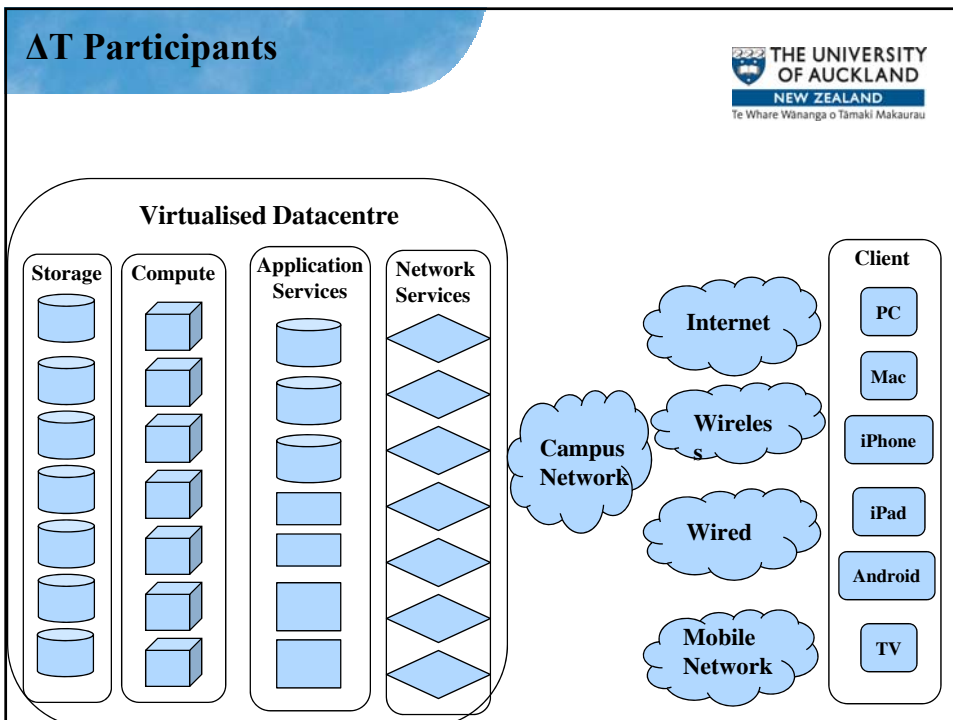


What is the ideal ΔT ?




1 sec 4 sec 10 sec

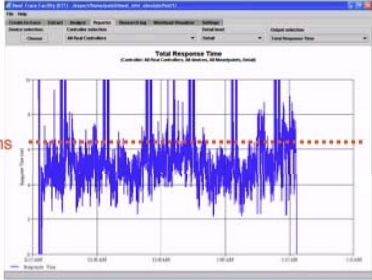
The diagram shows three yellow boxes, each containing a circle divided vertically into a white left half and a red right half. Below each circle is a time label: '1 sec', '4 sec', and '10 sec' respectively.



Virtual on Latency ?

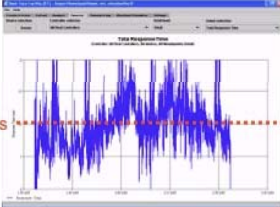


Response time of application in different test scenario



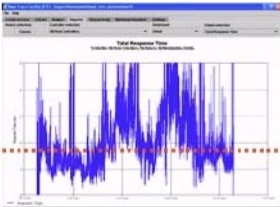
5-6ms

Share nothing



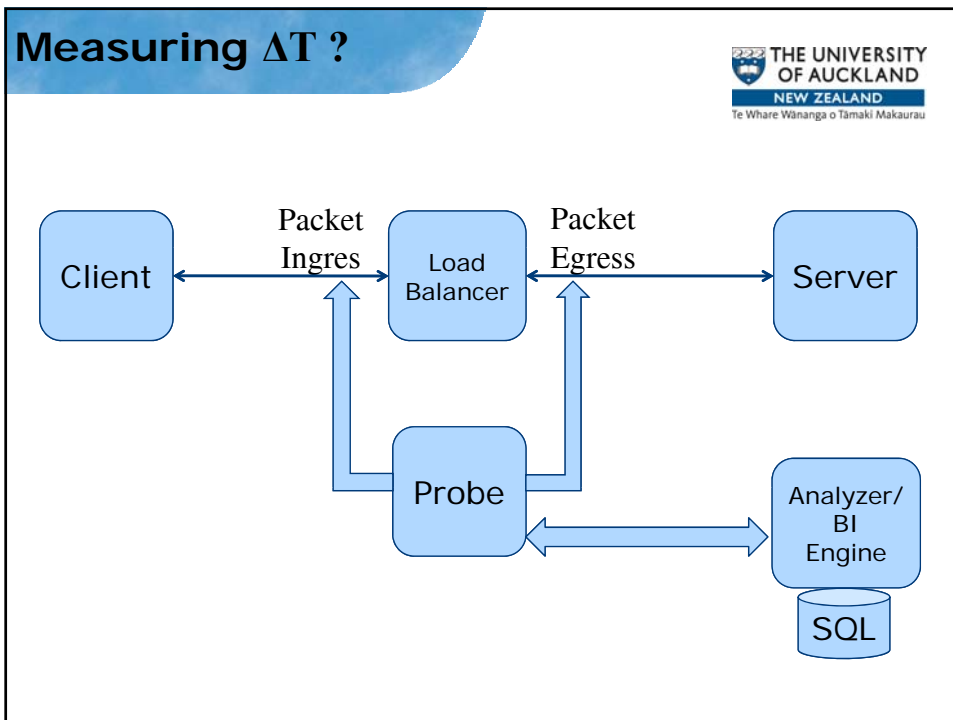
10-13ms

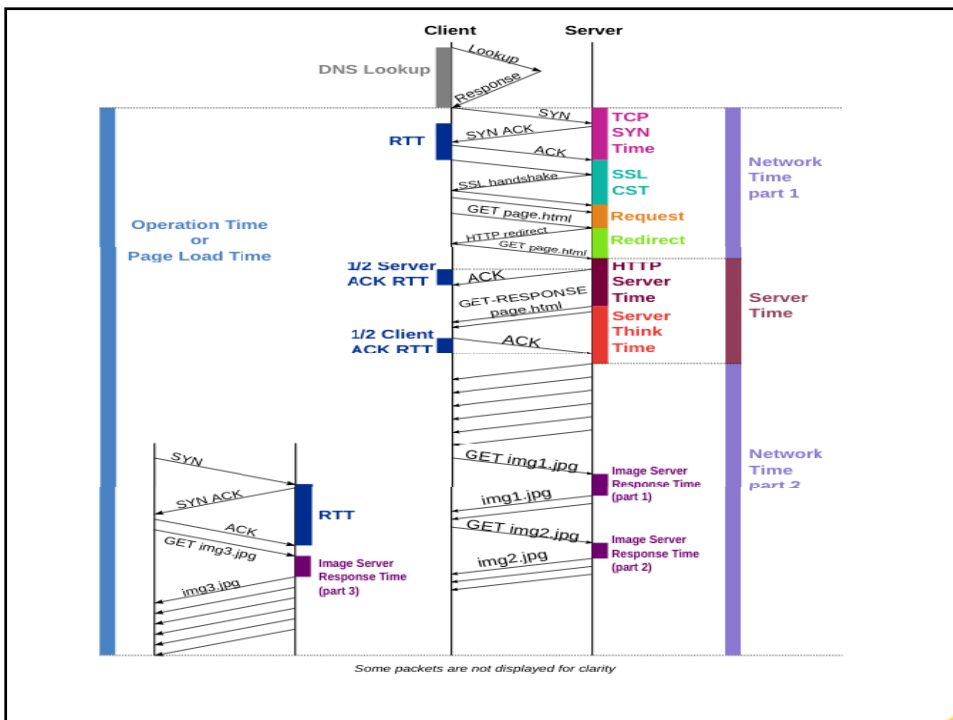
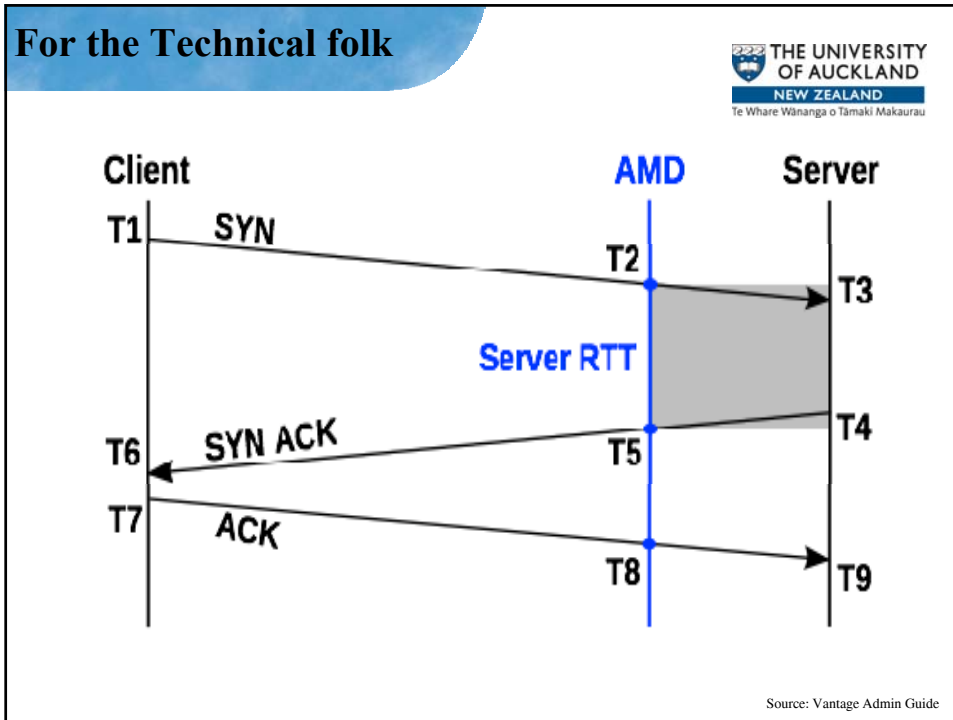
Share same pool



8-10ms

Share separate pool





Business Benefits




- We can talk to users about performance problems
- We can establish baselines for application performance for ALL web pages
- We can identify where applications have problems
- We can measure SLA's against user groups
- Load Testing is reliable and repeatable

Examples




- User Experience Monitoring
- Assistance with Development processes
- Problem Resolution
- We can show we have made things better

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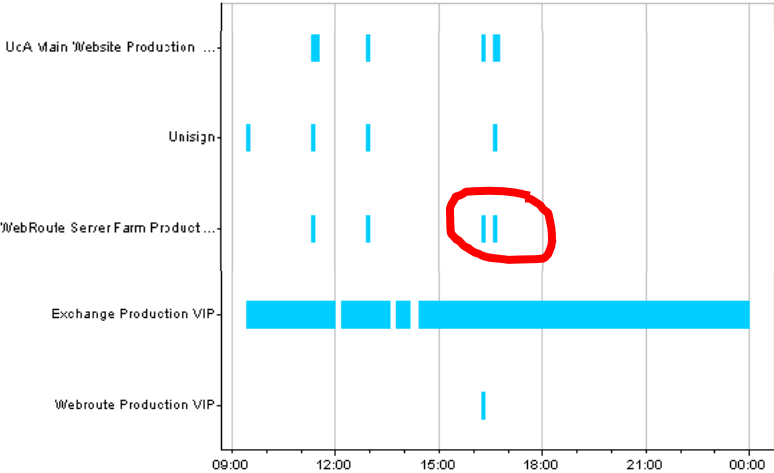
USER EXPERIENCE MONITORING

User Experience Monitoring

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User ID: Begin time:
End time:

Software services



Service	Start Time	End Time
UcA Main Website Production	11:00	12:00
UcA Main Website Production	13:00	14:00
UcA Main Website Production	16:00	17:00
UcA Main Website Production	17:00	18:00
Unisign	09:00	10:00
Unisign	11:00	12:00
Unisign	13:00	14:00
Unisign	16:00	17:00
WebRoute Server Farm Product...	11:00	12:00
WebRoute Server Farm Product...	13:00	14:00
WebRoute Server Farm Product...	16:00	17:00
WebRoute Server Farm Product...	17:00	18:00
Exchange Production VIP	09:00	12:00
Exchange Production VIP	13:00	14:00
Exchange Production VIP	15:00	16:00
Exchange Production VIP	17:00	18:00
Exchange Production VIP	19:00	20:00
Exchange Production VIP	21:00	22:00
Exchange Production VIP	23:00	00:00
Webroute Production VIP	16:00	17:00

User Experience Monitoring



Filters: User name=130.216.66.64
Software service=WebRoute Server Farm Production

User Activity | Network Details


8/2/10 16:35:00 - 8/2/10 16:40:00			
Page URL (incl. whole)	Client site	Client IP address	Time ▲
All	UoA ITS_General	130.216.66.64	8/2/10 16:35
http://www.auckland.ac.nz/	UoA ITS_General	130.216.66.64	8/2/10 16:35
http://www.staff.auckland.ac.nz/	UoA ITS_General	130.216.66.64	8/2/10 16:35
http://www.staff.auckland.ac.nz/for/sta...taff_directory/staff_directory_home.cfm	UoA ITS_General	130.216.66.64	8/2/10 16:35
http://www.staff.auckland.ac.nz/uoaf/for/staff	UoA ITS_General	130.216.66.64	8/2/10 16:35

Open in DMI

User: tcha030@MONVASPRD01:443 (en)

Find:			
Operations	Slow operations	Operation time	Network time
6	0	1.071s	566ms
1	0	711ms	699ms
0	0	-	-
4	0	1.242s	555ms
1	0	750ms	478ms

Service Level Monitoring



Te Whare Wānanga o Tāmaki Makaurau

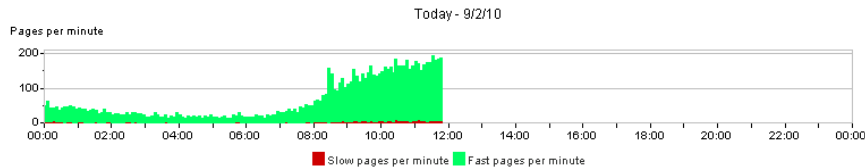
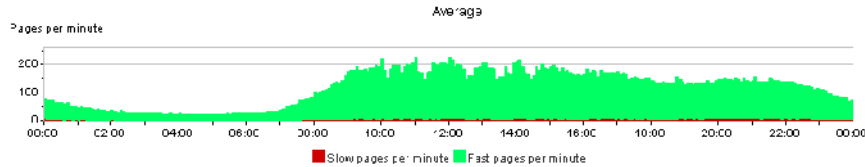
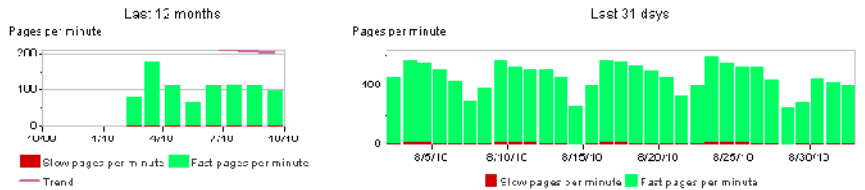
Software service ▲	Analyzer	Usage					Performance		
		Pages	Unique users	Hits	Slow pages	Pages with large server time	Application performance	Affected users	Page load time
Unisign	SSL	25.9 k	5.38 k	95.1 k	897	50	96.5 %	528	1.03 s
UoA Main Website Production VIP	HTTP	39.6 k	8.01 k	277 k	4.02 k	3.42 k	89.8 %	1.89 k	1.92 s
Jahia Authoring Production VIP	SSL	797	9	1.13 k	526	64	34 %	7	7.1 s
CECIL Production VIP	HTTP	94.3 k	3.86 k	681 k	5.52 k	1.33 k	94.1 %	1.83 k	1.38 s
Command Server Production	SSL	92 k	27	646 k	10.9 k	9.87 k	88.1 %	6	1.77 s

SLA = 80% of content delivered in 2-4 seconds

BASELINING


Normality

Pages per minute



Daily Summary Values	Average	Maximum	Latest value
Slow pages per minute	2 (4%)	8 (4%)	5 (3%)
Fast pages per minute	62 (96%)	186 (96%)	182 (97%)

Network - Regions



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	Region	Pages	Unique users	Slow pages	Application performance	Affected users	Page load time	Redirection
	UoA_Grafton	1.05 k	57	92	91.2 %	18	1.96 s	21
	UoA_Tamaki	3.83 k	66	104	97.3 %	17	1.19 s	3
	UoA_Epsom	6.74 k	92	77	98.9 %	27	632 ms	9
	UoA_Remote_Access	14.5 k	601	2.11 k	85.4 %	222	3.09 s	53
	UoA_City	513 k	775	49.2 k	90.4 %	234	1.87 s	7
	Default	71.8 k	1	12.8 k	82.1 %	1	2.94 s	58
	Internet	1.11 M	2.3 k	153 k	86.3 %	1.19 k	2.58 s	52

	Area	Pages	Unique users	Slow pages	Application performance	Affected users	Page load time	Redirection
	UoA_VPN	4.16 k	69	997	76.1 %	43	5.69 s	20
	UoA_Remote_Sites	123	4	3	97.6 %	1	542 ms	20
	UoA_Wireless	9.5 k	511	1.03 k	89.2 %	163	2.08 s	71
	UoA_Dialup	135	9	56	58.5 %	9	5.62 s	147
	UoA_Hospitals	588	8	28	95.2 %	6	937 ms	0.6

Totals for W

Network - Internet


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	Area	Pages	Unique users	Slow pages	Application performance	Affected users	Page load time
	The University of Auckland	167 k	2.47 k	25.6 k	84.6 %	90	2.64 s
	Netjale	148 k	2	15.2 k	91.1 %	2	1.91 s
	Vodafone NZ Ltd.	39 k	1	3.16 k	91.7 %	1	1.87 s
	Crioni Internet	28.8 k	1	3.42 k	85.1 %	1	2.99 s
	CallPlus Services Limited	24.6 k	1	3.07 k	87.5 %	1	2.13 s
	TelstraClear Ltd	20.3 k	3	3.04 k	85 %	3	2.73 s
	Google Inc.	12.4 k	1	904	92.7 %	1	1.86 s
	Woosh Wireless	11 k	1	3.31 k	69.8 %	1	1.46 s
	WorldCharge Communications LTD	7.41 k	1	1.07 k	85.5 %	1	2.59 s
	Auckland	7 k	1	809	83.4 %	1	1.91 s
	CT&CZ GTS NOVERA (GTS CZ)	5.48 k	1	368	93.3 %	1	2.08 s
	Yahoo	5.43 k	3	402	92.6 %	1	1.61 s
	AS number for Vodafone NZ IP Networks	3.39 k	1	546	83.9 %	1	4.06 s
	FX Networks Limited	2.80 k	1	224	92.3 %	1	1.40 s
	Link Telecom (NZ) Limited	2.86 k	1	99	96.5 %	1	933 ms
	SCV Broadband Access Provider	2.48 k	1	1.17 k	52.8 %	1	4.8 s
	Hurricane Electric, Inc.	2.37 k	1	16	99.3 %	1	477 ms
	KC Computer Service Ltd.,	1.86 k	1	140	92.5 %	1	1.47 s
	DTS ISP New Zealand	1.65 k	1	124	92.5 %	1	1.24 s
	Pakistan Telecommunication Company Limit...	1.57 k	1	780	50.2 %	1	5.23 s
	The JANET IP Service	1.37 k	1	256	81.3 %	1	3.32 s
	Snap Internet Limited	1.31 k	1	245	81.3 %	1	3.43 s
	Asia Online New Zealand	1.29 k	1	116	91 %	1	1.84 s

PROBLEM SOLVING 1

Google Mini's running slow

Before Tuning

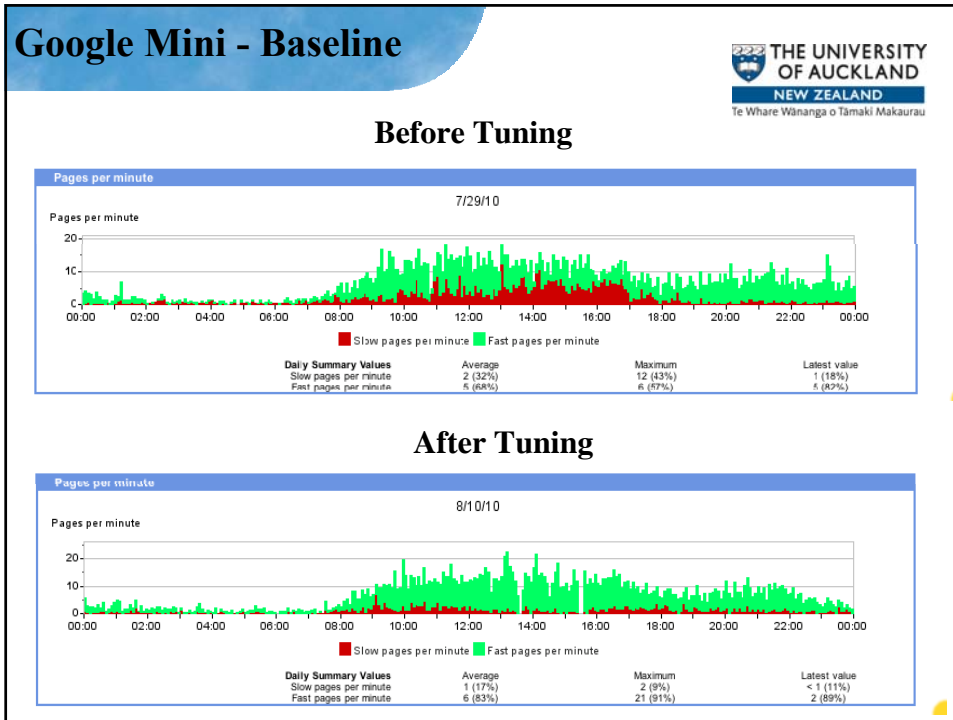
Google Mni Farm Production		HTTP	26.3 k	3.93 k	33.2 k	3.18 k	5.24 k	87.9 %	2.07 k	1.7 s
Google Mini Production VIP		HTTP	9.89 k	4.03 k	16 k	3.15 k	4.98 k	68.2 %	2.05 k	4.4 s


One Legged Dog

google2.its.auckland.ac.nz		130.216.12.52	Google Mini Farm Production	Default (TOS: 0b:0h:0d)	HTTP	26.3 k	3.98 k	33.2 k	3.18 k	5.24 k	87.9 %	2.07 k	1.7 s
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After Tuning

Google Mini Farm Production		HTTP	46.8 k	3.98 k	49.8 k	1.31 k	4.34 k	97.2 %	1.01 k	522 ms
Google Mini Production VIP		HTTP	10.1 k	3.98 k	15.8 k	1.73 k	4.14 k	82.9 %	1.36 k	2.44 s






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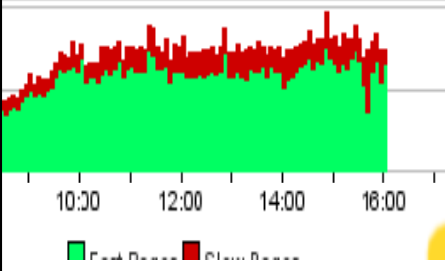
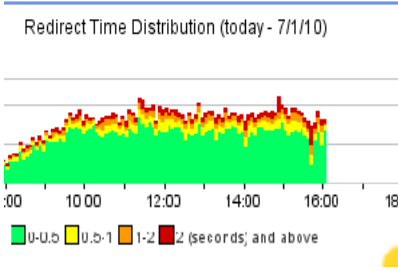
PROBLEM SOLVING 2

Debugging a realtime event




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At 4:00 we had a slow down on the main university web site

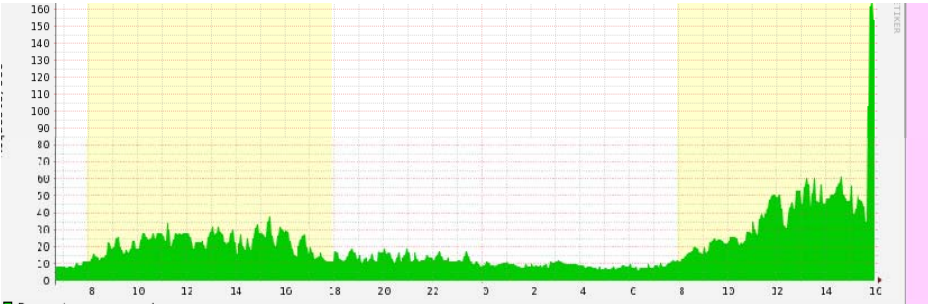
Digging deeper there seems to be problems with redirects

Correlation




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There's a peak of requests against one of the network elements. But what is causing them?



■ Requests per second
 Max req: 163.51 req/sec Avg req: 21.21 req/sec Cur req: 153.07 req/sec
 Working Day averages req: 30.34 req/sec

User Activity


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User ID: Begin time: 7/11/10 15:45
 End time: 7/11/10 15:50

Page: 1 | 2 | 3 | 4 | 5 | 6 | 7 >> (Number of Entries: 1833)

DATE: 11/07/10 15:45:23.7110105:10237						
Client	IPMS	Client Sites	Server Bytes	Page Loads	Slow Page Loads	
132.216.240.33	header2.hea.auckland.ac.nz	167 MB	125 KB	2924	482	
132.216.240.159	e-cachel301r.auckland.ac.nz	22 MB	38 KB	862 k	121 k	
132.216.240.1	header1.hea.auckland.ac.nz	41 MB	338 KB	618 k	80	

www.auckland.ac.nz


header2.hea.auckland.ac.nz (132.216.240.33)

TIME: 11/07/10 15:45:18.9787110:1100185:10237									
JPL	Location	Name	Client IP	View	Page Loads	Slow Page Loads	Page Load Time	Network Time	Network Time Percentage
Auckland U.P.S.	8431	The University of Auckland	132.216.240.33	11/07/10 15:45	15 / k	292	0.81 s	0.25 s	29.4
Auckland U.P.S.	8431	The University of Auckland	132.216.240.33	11/07/10 15:50	13 / k	183	0.78 s	0.24 s	31.1




[Click here to see Network Details Report](#)

Load Test 1 & 2 are pretty active

Load Testing minor indiscretion


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~1m hits against the pre-prod Campus Solutions

CS9 PROD Admin		950 k
Unisign		98.5 k
Auckland Uni Website		88.8 k

1 million hits against the pre-prod Campus Solutions in a day

PROBLEM SOLVING 3

Packet loss – Why ?


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Server name	Server loss rate	Server realized bandwidth	TCP connections attempts	Network performance	Affected users
webroute1.its.auckland.ac.nz	9.6 %	18.1 Mbps	1 118 M	47.2 %	983
webroute2.its.auckland.ac.nz	7 %	14.4 Mbps	1 117 M	62.6 %	1.02 k
webroute3.its.auckland.ac.nz	9.6 %	23.3 Mbps	793 k	59.9 %	564

Region	Pages	Server loss rate	Server realized bandwidth	TCP connections attempts	Network performance	Affected users
UoA_Grafton	7 89 k	6.4 %	13.5 Mbps	50.1 k	89.5 %	22
UoA_Tamaki	4.39 k	10.5 %	10.4 Mbps	32.7 k	54.1 %	24
UoA_Epsom	17.8 k	1 %	11.2 Mbps	60 k	98 %	119
UoA_Remote_Access	4.61 k	4.7 %	2.77 Mbps	30.4 k	90.5 %	257
UoA_City	78.8 k	9.4 %	27.3 Mbps	1.69 M	48.3 %	256
Default	14 k	3 %	10.5 Mbps	53.1 k	74 %	1
Internet	271 k	8.6 %	16.9 Mbps	1 21 M	52.7 %	978

Packet Loss – Why ?

Area	Server loss rate	Server realized bandwidth	TCP connections attempts	Network performance	Affected users
UoA_Library	3 %	405 Mbps	137 k	67.5 %	84
UoA_ITS	10.3 %	42.7 Mbps	73.9 k	66.4 %	51
UoA_Faculties	14.7 %	15 Mbps	128 k	21.9 %	11
UoA_Data_Centre	0.1 %	30.1 Mbps	1.36 M	72.7 %	13

Site	Server loss rate	Server realized bandwidth	TCP connections attempts	Network performance	Affected users
UoA_Science	6.6 %	861 Mbps	8 k	99.9 %	15
UoA_Statistics	0.2 %	1.2 Mbps	3.61 k	99.4 %	6
UoA_Engineering	20.8 %	5.24 Mbps	79.4 k	8.2 %	65
UoA_Maths	0.8 %	887 Mbps	1.85 k	89.2 %	4
UoA_Library	6.4 %	33.9 Mbps	36.1 k	10.2 %	21

UniSat Access – TV Programming

User name/Aggregation ID	Network performance relevant bytes	Network performance affected bytes	Network performance ▲	Total bytes
bioeng1100.bioeng.auckland.ac.(130.216.216.100)	15.5 kB	15.5 kB	0 %	15.5 kB
bioeng1172.bioeng.auckland.ac.(130.216.216.172)	3.93 GB	3.93 GB	0 %	3.93 GB
bioeng1217.bioeng.auckland.ac.(130.216.216.217)	1.7 GB	1.7 GB	< 0.1 %	1.7 GB
cee213208.care.auckland.ac.nz(130.216.213.208)	331 kB	329 kB	0.5 %	331 kB
englib1103.lib.auckland.ac.nz(130.216.219.103)	151 kB	141 kB	6.2 %	151 kB
des072.esc.auckland.ac.nz(130.216.209.201)	15.2 kB	12.1 kB	20.6 %	15.2 kB
s.zarrouk1.esc.auckland.ac.nz(130.216.209.175)				

Page URL (incl. whole)	Client site	Client IP address
All	UoA_Engineering	130.216.218.172
http://www.unisat.auckland.ac.nz	UoA_Engineering	130.216.218.172
All	UoA_Engineering	130.216.218.172
http://www.unisat.auckland.ac.nz	UoA_Engineering	130.216.218.172
All	UoA_Engineering	130.216.218.172
http://www.unisat.auckland.ac.nz	UoA_Engineering	130.216.218.172

Summary

- Virtualization means that applications share resources
- One change affects everybody
- Application Performance Monitoring lets you know what your customer is experiencing in terms of latency
- Application Performance Monitoring lets you make performance changes with confidence
- And if something is going wrong you stand a chance of being able to find out why

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