Project Canary: A Performance Monitor for Solaris and Linux

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Project Canary

- Project Canary is made of two parts:
  - Canary Monitor
    - Performance
    - Trend Analysis
    - Capacity Planning
  - Canary Load Test
    - Creates Repeatable Load
    - Allows Easy Comparisons
- Both tools have the same design
  - Tools do not need root to run or install
  - Runs on Linux and Solaris, both SPARC and x86

How does it work?

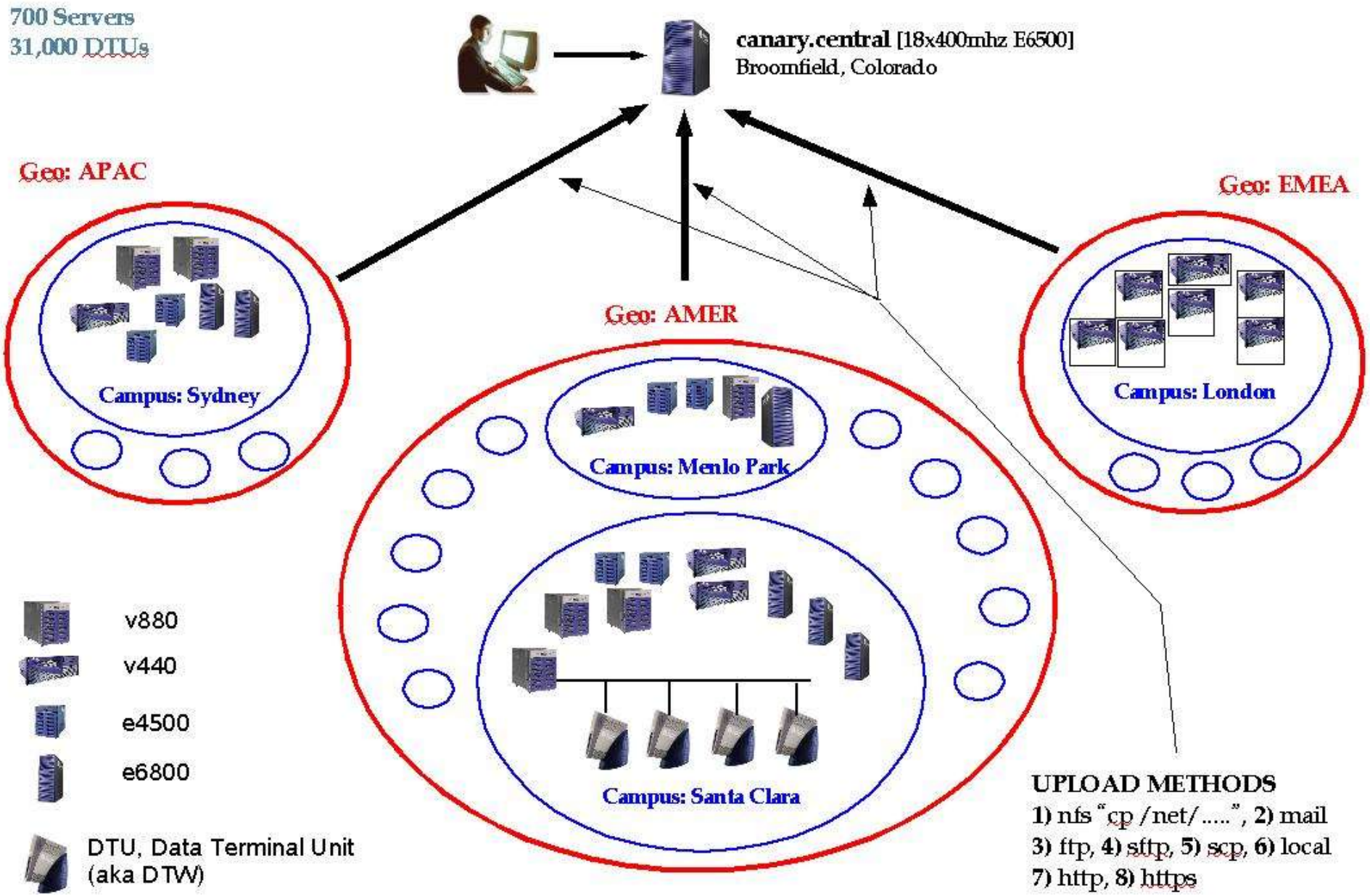
- Canary Monitor
  - On the machine being watched, we execute a shell script, *canary_solaris.sh* or *canary_linux.sh,* producing 900 line ASCII file.
  - These 48 commands are executed in 90 seconds; output files are sent to a central server for reporting and graphing
  - Data is sampled every 30 seconds and every 10 minutes.
  - Creates a configuration template showing the /etc/system, automount, and GNOME settings across all servers
  - Uses less than 19 seconds of CPU time and 90 seconds of elapsed time per execution
  -

How does it work? (cont)

Operating System	*Canary Client*	*Canary Server*	*Notes*
Solaris 2.6	Yes	No	Gnuplot binaries are compiled for Solaris 8
Solaris 7	Not Tested	No	Gnuplot binaries are compiled for Solaris 8
Solaris 8	Yes	Yes	
Trusted Solaris 8	Yes	Yes	
Solaris 9	Yes	Yes	
Solaris 10, Global Zone	Yes	Yes	
Solaris 10, Local Zone	Partial	Yes	Only sees Local Zone
SuSE Linux 2.4	Yes	Yes	
SuSE Linux 2.6	Yes	Yes	
Red Hat Linux	Yes	Yes	

Project Canary supports most common Solaris and Linux environments

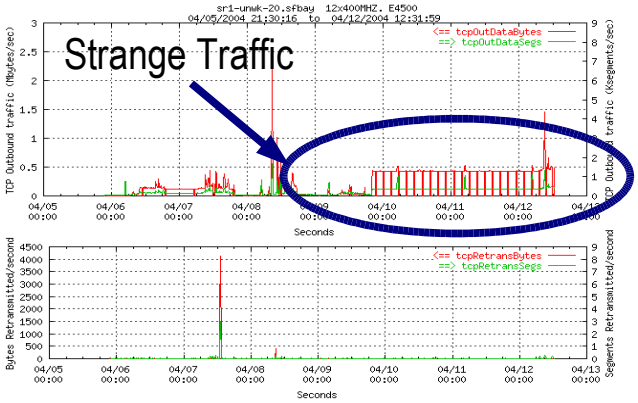
Project Canary Deployment at Sun



Dashboard

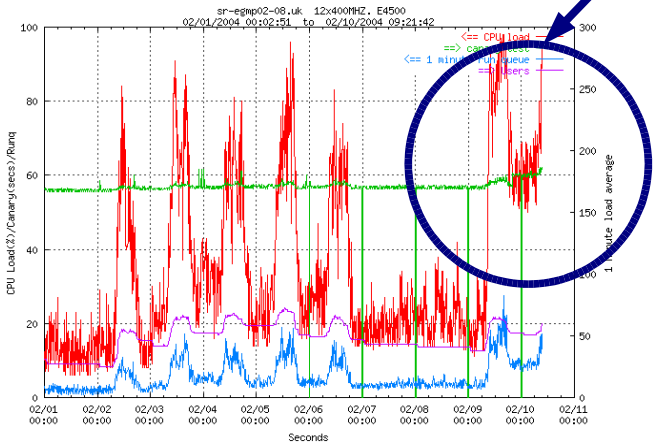
- 20 graphs per server created every 10 minutes.
- Show network traffic, CPU load, memory, application profiles.
- Shows runaways, unusual data patterns.

TCP Traffic



CPU Load

Runaway Process



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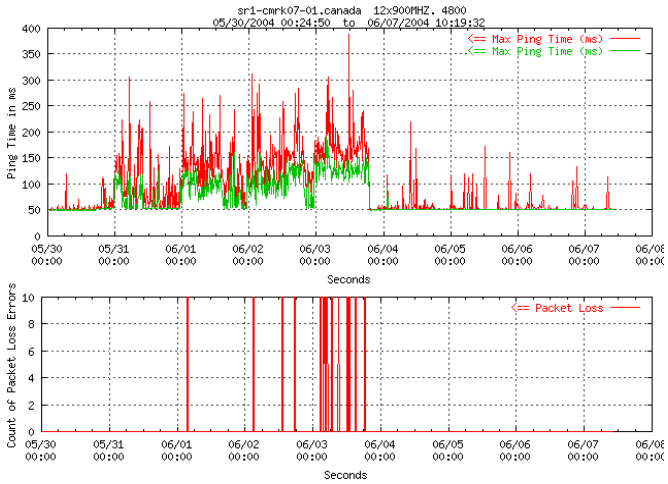
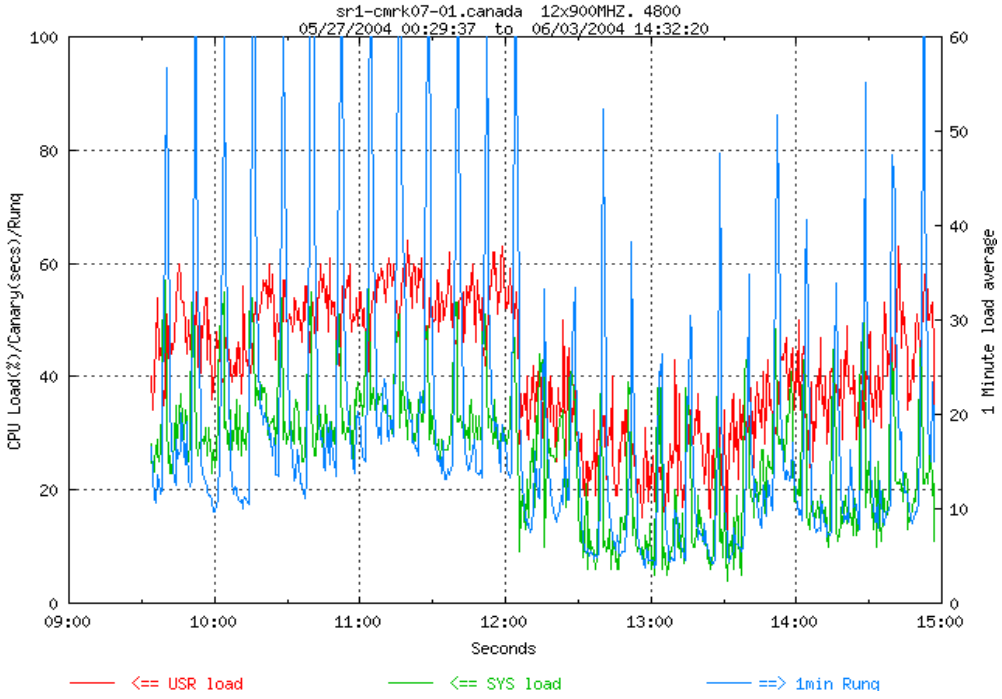
Dashboard: More root causes found



Avg and Max ping time indicated a bad network for four days. Ping time tripled.

We sample %SYS, %USR, runq every 30 seconds: %SYS increased by 20% every 10 minutes. Runq increased by over 60 every 10 minutes. Suspect: automountd



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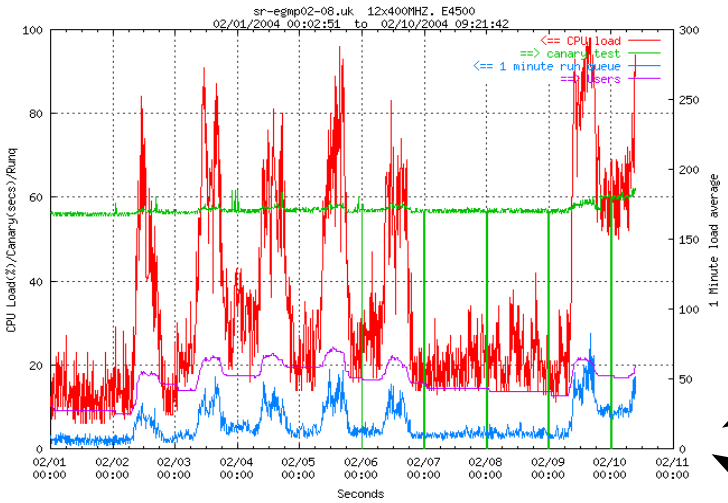
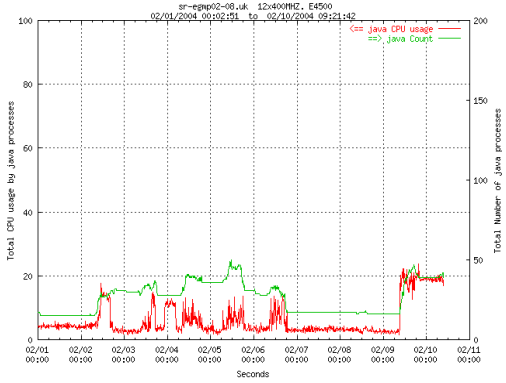
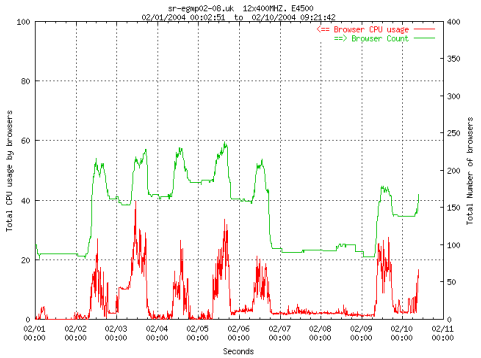
Dashboard: Load is profiled

Overall Load (%USR + %SYS)

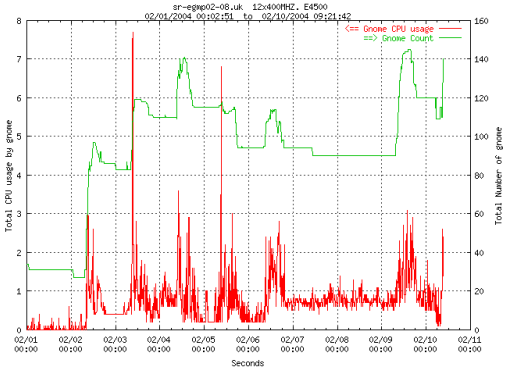




Jre, java, java_vm: Scale: 0-100%



Browsers
Scale 0-100%



GNOME graph comprises 14 different GNOME processes

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Reports: Summary

Reports Menu

- Probe Age
- Server Drilldown
- CPU Load (Animated)
- ⊞ Application Load Profiles
- ⊞ Configuration
- User's CPU
- User Multi Logon
- Application Histograms
- PRSTAT Histograms
- ⊞ CPU Profiles
- Graph Pid[s]
- DTU Terminal Stat
- Canary Heatmap
- EBC
- DTU Map
- Sun Ray Badge
- Find Sun Ray Badge Status

⊟ Download
- v4_00 (Aug 5, 2005)
  - sparc [9.1 Mb]
  - linux [2.5 Mb]
  - x86 [2.2 Mb]

Reports

← **Select report!**

Report/Group Name	Report Type	Has Child	Description
Probe Age		No	Each host's parsed file will be counted in a 15, 30, 45, 60 minute bucket.
Server Drilldown		No	Every server we watch is listed here.
CPU Load (Animated)		No	Description
Application Load Profiles		3	CPU Load profile per server
Configuration		4	Comparison of crypto settings, automount settings, gnome settings, and common usage.
User's CPU		No	Regression graphs for cpu,active sun ray users,process pids,canary.
User Multi Logon		No	Users logged onto multiple Sun Rays
Application Histograms		No	Description
PRSTAT Histograms		No	Description
CPU Profiles		10	CPU Profiles for some system processes.
Graph Pid[s]		No	Web form to graph pids per host dynamically
DTU Terminal Stat		No	status on Sun Ray dtu's .
Canary Heatmap		No	canary heatmaps.
EBC		No	These are the DTU's in the Executive Briefing Center
DTU Map		No	DTU's by Building

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Reports: DTU Activity ,summary

Reports Menu

- Probe Age
- Server Drilldown
- CPU Load (Animated)
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- Configuration
- User's CPU
- User Multi Logon
- Application Histograms
- PRSTAT Histograms
- CPU Profiles
- Graph Pid[s]
- DTU Terminal Stat
- Canary Heatmap
- EBC

Reports > dtu_stat

	Geo	Total DTU's	Terminal Packets (per sec)	Lost Packets (per sec)	Terminal Bytes (per sec)	DTU CPU Load (0-100%)	DTU Ping Time (ms)	
1	AMER	18,816	1,309	380,305	775,238	91	1353	1
2	APAC	3,870	2,329	25	783,309	941	312	2
3	CUSTOMER	18	29	0	32,871	7	0	3
4	EMEA	8,430	1,465	9	574,544	91	191	4
5	SHOW	0	0	0	0	0	0	5
	Total DTU's	31,134						
	idle DTU's	28,430						
	users with no card	980						
	users with card	1,724						

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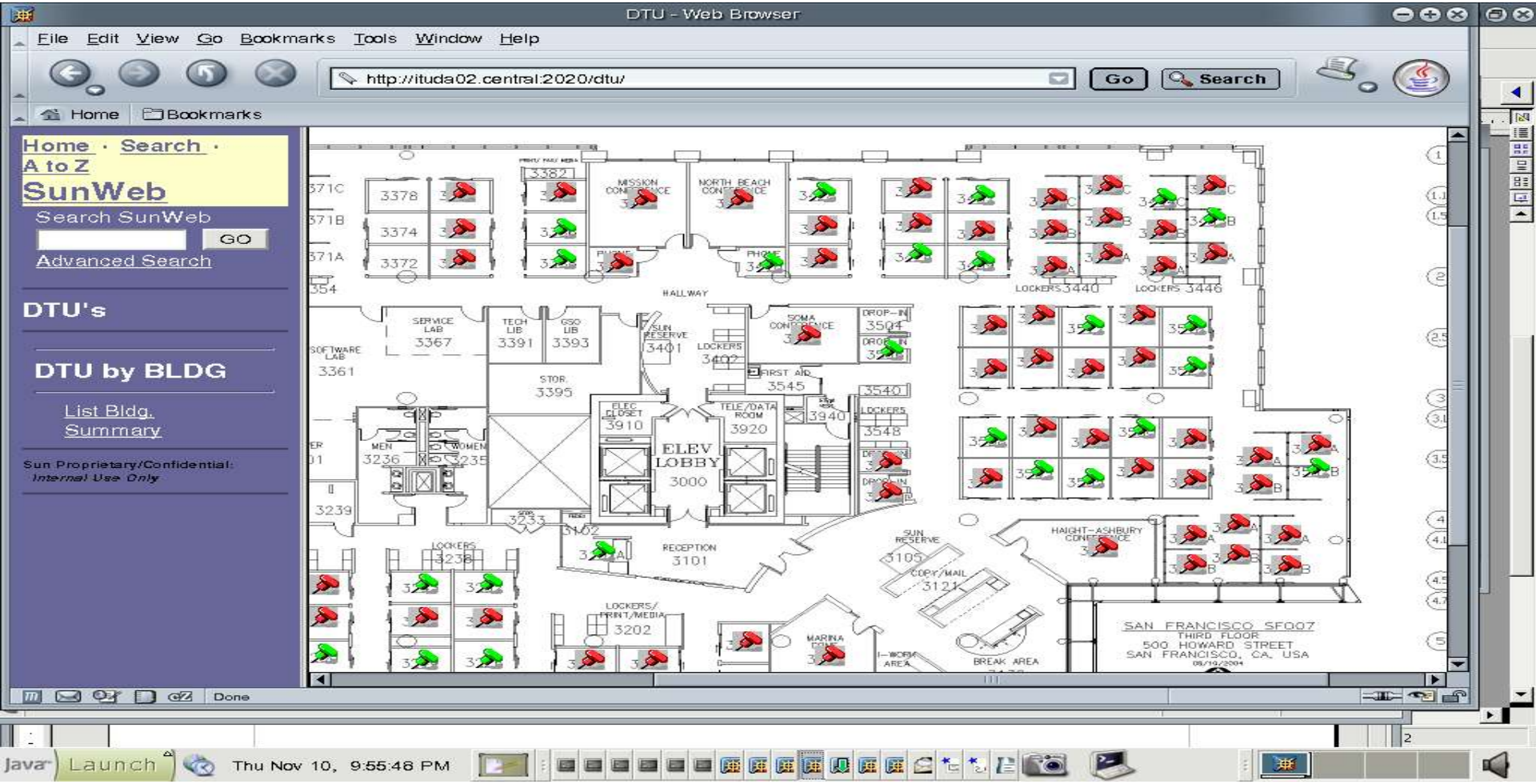
Reports: DTU Activity ,details

Reports > dtu_stat > AMER > ubrm > sr1-ubrm-19.renegades.Central.Sun.COM

	Terminal ID (TermType.MAC)	IP addr	Terminal Packets (per sec)	Lost Packets (per sec)	Terminal Bytes (per sec)	DTU CPU Load (0-100%)	Work From Home	DTU Ping Time (ms)	Token Card	DTU Firmware
1	SunRayP2.080020fe824a	129.147.175.48	64	3	71,899	4	N	0	OpenPlatform.4090009c242c870c170b	3.1_32,REV
2	SunRayP1.080020b5e006	129.147.41.24	34	1	41,341	3	N	0	JavaBadgeNP.4090009c227b2d031f04	3.1_32,REV
3	SunRayP3.080020c54b8c	129.147.82.233	51	0	39,086	4	N	0	OpenPlatform.4090009c243f21013717	3.1_32,REV
4	SunRayP2.080020f81211	129.147.41.59	22	0	24,709	3	N	0	auth.ks120138	3.1_32,REV
5	SunRayP1.080020e76392	129.148.213.187	18	0	17,278	8	N	0	OpenPlatform.4090009c243f2216141f	3.1_32,REV
6	SunRayP1.080020c13efa	129.147.14.8	14	0	13,808	2	N	0	auth.do112764	3.1_32,REV
7	SunRayP1.080020c15695	129.147.28.118	14	0	13,325	2	N	0	JavaBadgeNP.4090009c22b1e7180717	3.1_32,REV
8	SunRayP2.080020f84692	129.147.20.146	-1	1	7,738	0	N	0	JavaBadgeNP.4090009c2311b216210b	3.1_32,REV
9	SunRayP2.080020fe8dc4	129.147.170.55	-1	0	4,520	0	N	0	JavaBadgeNP.4090009c227b2d032823	3.1_32,REV
10	SunRayP2.080020fdce89	129.147.170.164	-1	0	3,013	0	N	0	JavaBadgeNP.4090009c2311b20c1c05	3.1_32,REV
11	SunRayP1.080020c0ecba	129.147.14.4	1	0	938	1	N	0	auth.nb159727	3.1_32,REV
12	SunRayP7.0003ba7b4b32	129.147.27.91	4	0	423	1	N	0	auth.efitbrm	3.1_32,REV
13	SunRayP2.080020f80bcc	129.147.44.100	3	0	382	1	N	0	pseudo.080020f80bcc	3.1_32,REV
14	SunRayP2.080020fd7eea	129.147.192.90	3	0	347	1	N	0	pseudo.080020fd7eea	3.1_32,REV
15	SunRayP7.0003ba6ba721	10.193.3.116	1	0	141	1	Y	40	JavaBadgeNP.4090009c227b2d032d17	3.1_32,REV
16	SunRayP4.0003ba3c09b3	10.193.3.11	1	0	138	1	Y	127	JavaBadgeNP.4090009c227b2d031823	3.1_32,REV
17	SunRayP2.080020fe98c5	129.147.174.39	0	0	63	1	N	0	JavaBadgeNP.4090009c2311b2063a14	3.1_32,REV
18	SunRayP2.080020fdcd1c	129.147.10.26	0	0	45	1	N	0	pseudo.080020fdcd1c	3.1_32,REV
19	SunRayP2.080020fda358	129.147.82.41	0	0	45	1	N	0	pseudo.080020fda358	3.1_32,REV
20	SunRayP2.080020f8ac20	129.147.170.199	0	0	45	1	N	0	pseudo.080020f8ac20	3.1_32,REV
21	SunRayP2.080020f8a6ed	129.147.172.3	0	0	45	1	N	0	pseudo.080020f8a6ed	3.1_32,REV

Reports: DTU Map



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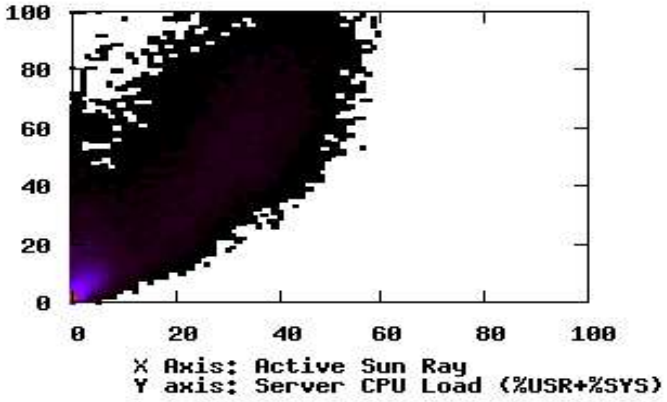
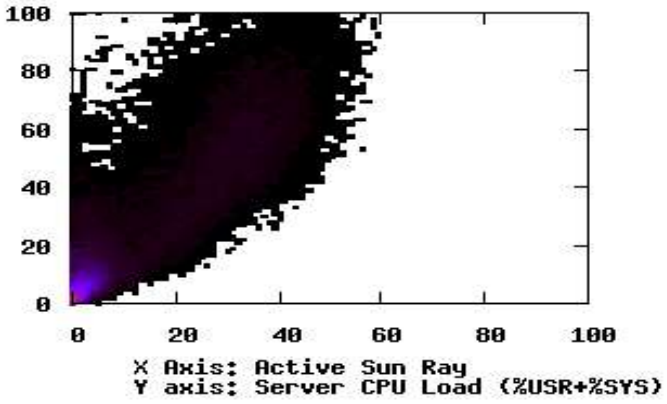
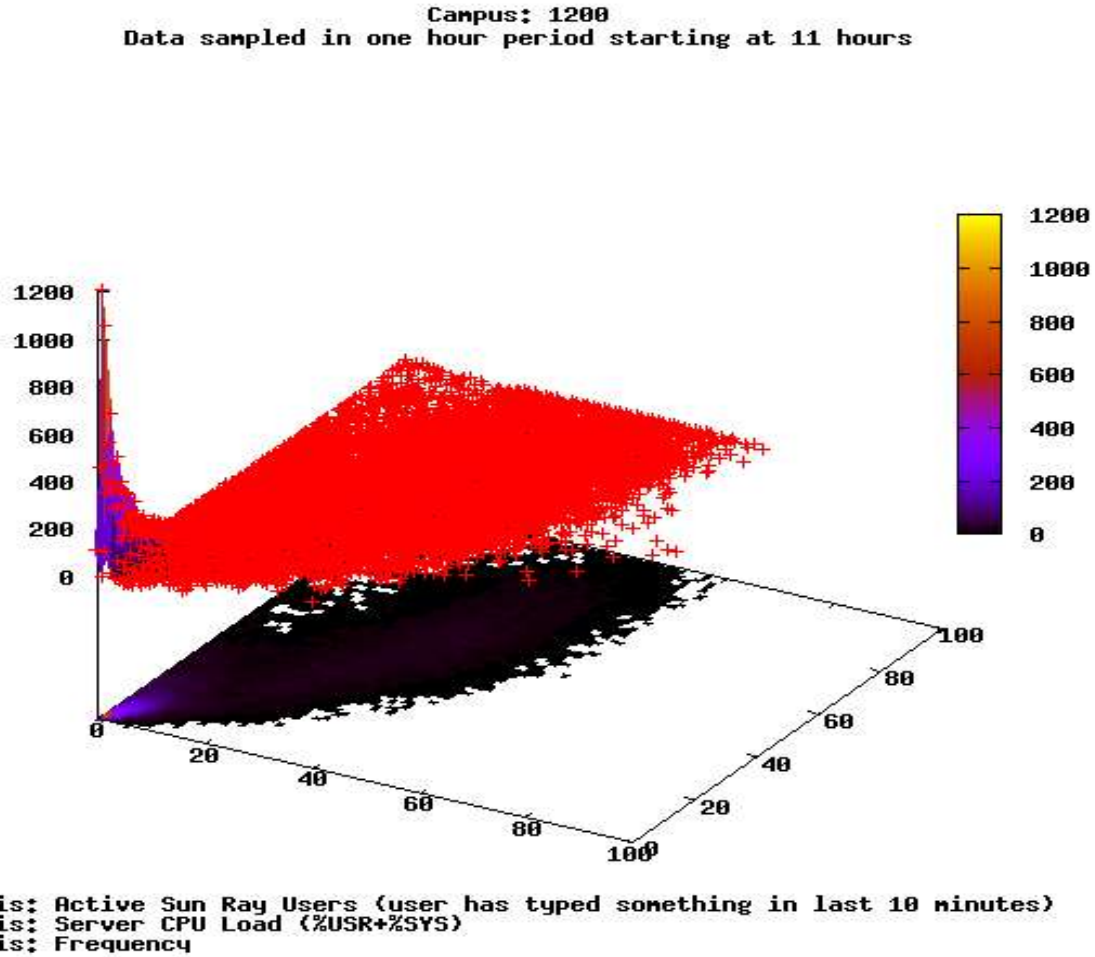
Reports: Animated Load Graphs
Used for Capacity Planning







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Reports: Apps Histograms

Reports > apps_histogram

Total Hosts	755
Total N	1,109,822
CPU Minutes	Process exceeded 1000 cpu minutes
CPU %	Process exceeded 50 % of 1 cpu
Threads	Process exceeded 50 threads

	ProcName	N	Graph	Daily CPU Usage/Day (in Mins.)			CPU Load (% per CPU)			Thread (Count)		
				Xbar	Min/Max	STD Dev	Xbar	Min/Max	STD Dev	Xbar	Min/Max	STD Dev
1	AMonitor	1	Go	0.00	0/0	0.00	0.00	0/0	0.00	1.00	0/1	0.00
2	AServer	4	Go	0.00	0/0	0.00	0.00	0/0	0.00	1.00	0/1	0.00
3	Animate	1	Go	0.00	0/0	0.00	0.00	0/0	0.00	1.00	0/1	0.00
4	BitchX	1	Go	0.00	0/0	0.00	0.00	0/0	0.00	1.00	0/1	0.00
5	CC	1	Go	0.00	0/0	0.00	0.00	0/0	0.00	1.00	0/1	0.00
6	Cgistub	75	Go	0.00	0/0	0.00	0.00	0/0	0.00	1.00	0/1	0.00
7	Connect	1	Go	0.00	0/0	0.00	0.00	0/0	0.00	1.00	0/1	0.00
8	Debus	9	Go	1.33	0/12	3.77	0.22	0/2	0.63	1.00	0/1	0.00
9	Eterm	4	Go	0.00	0/0	0.00	0.00	0/0	0.00	1.00	0/1	0.00
10	FvwmAuto	3	Go	0.00	0/0	0.00	0.00	0/0	0.00	1.00	0/1	0.00

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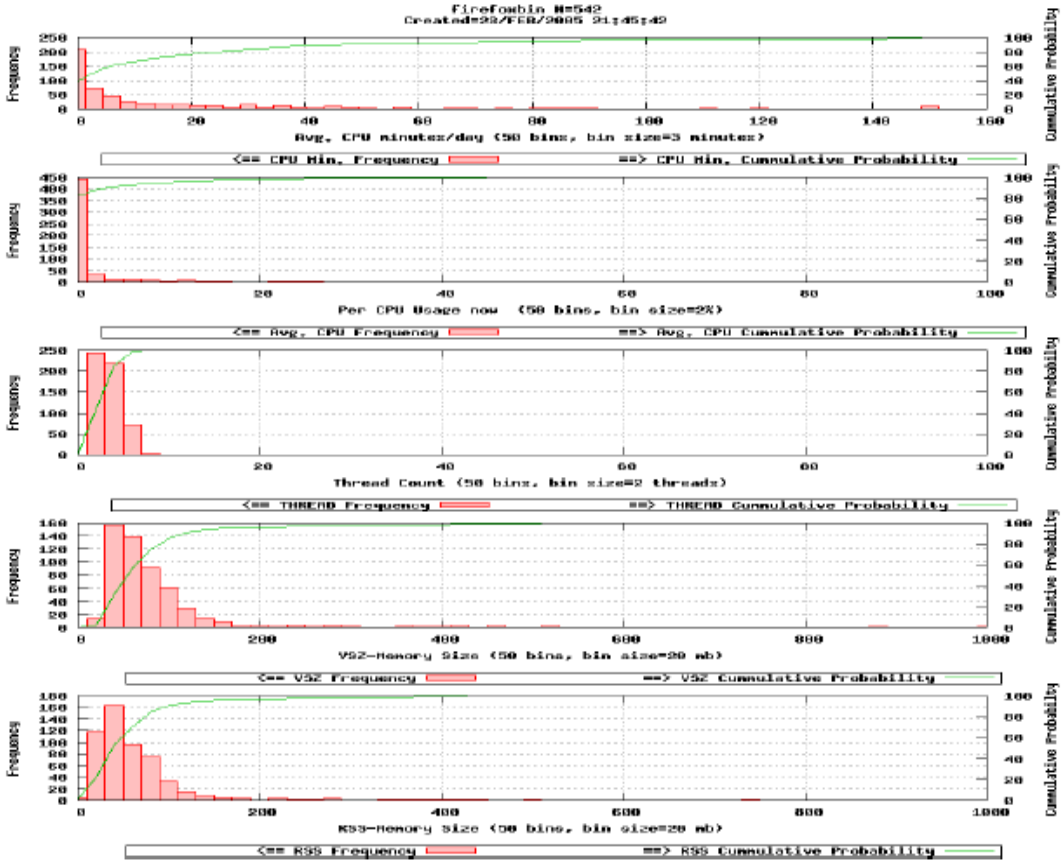
Reports: Apps Histograms

- Click on 'GO' for firefox



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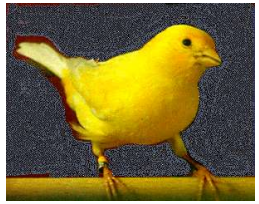
Reports: Apps Heat Map



File Options Help

default tm3

FC 3880

V440

V490

V890

3800

E4500

Details of selected node

Attribute	Value
(Label)	880
(Number of nodes)	342
Machine	
Server	
Average Users	40.7982
Average Deltasecs	76.0351
Average Runq	2.6427

Main | Legend | Filters | Hierarchy

Label: (Name)

Size: Runq

Color: cpu avg

Maximum depth

[0] 1 2

Aggregate: Average

Scale: Linear Square Root Logarithmic

Color Binning

Equally spaced bins 3

98 605 165 70

0 33.3333 66.6667 100

Canary Load Test: More Information

- http://canary.sfbay Canary web site.
- Canary Monitor Authors:
- Wayne Chan, Karen Chau, Gabriel Bolano,
- Patrick Humphreys, Andreas Haupt, Sean Meighan
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- To get copy of Canary Monitor
- http://itsm-eng.sfbay/canary/download/sparc_canary.tar.gz

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