IBM

# nmon & topas for Performance Monitoring

**Presentation Version 21**

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**Advanced Technology Support, Europe**

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**2**
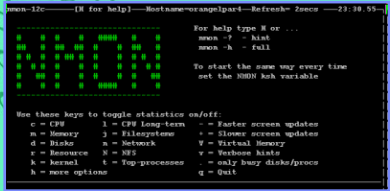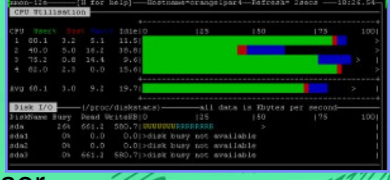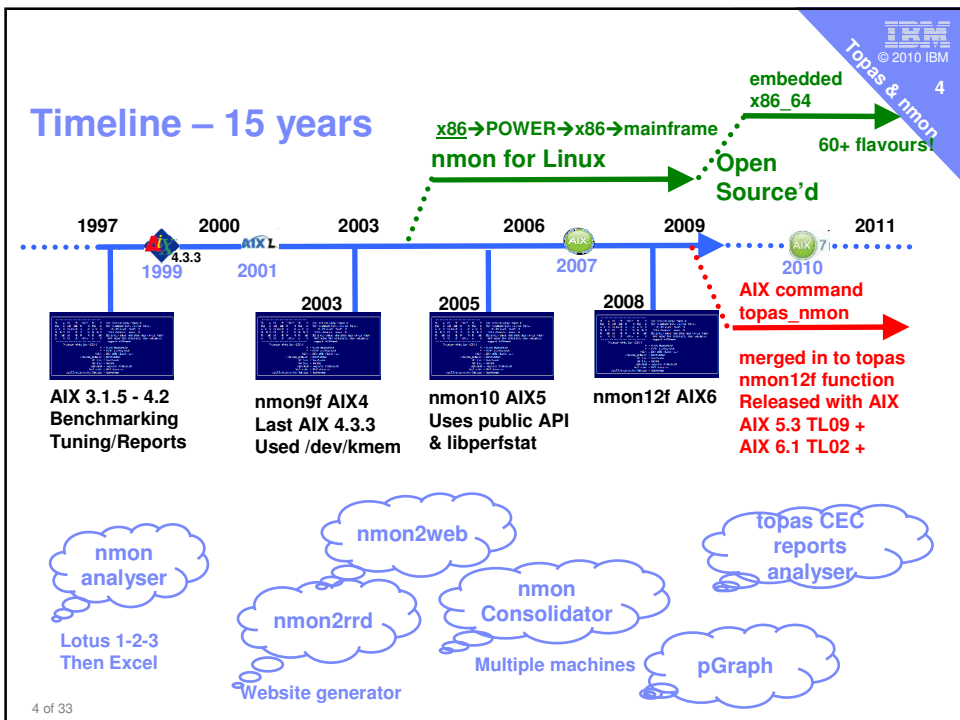Topas & nmon

**Let talk about**

# nmon

Year 16

2 of 33

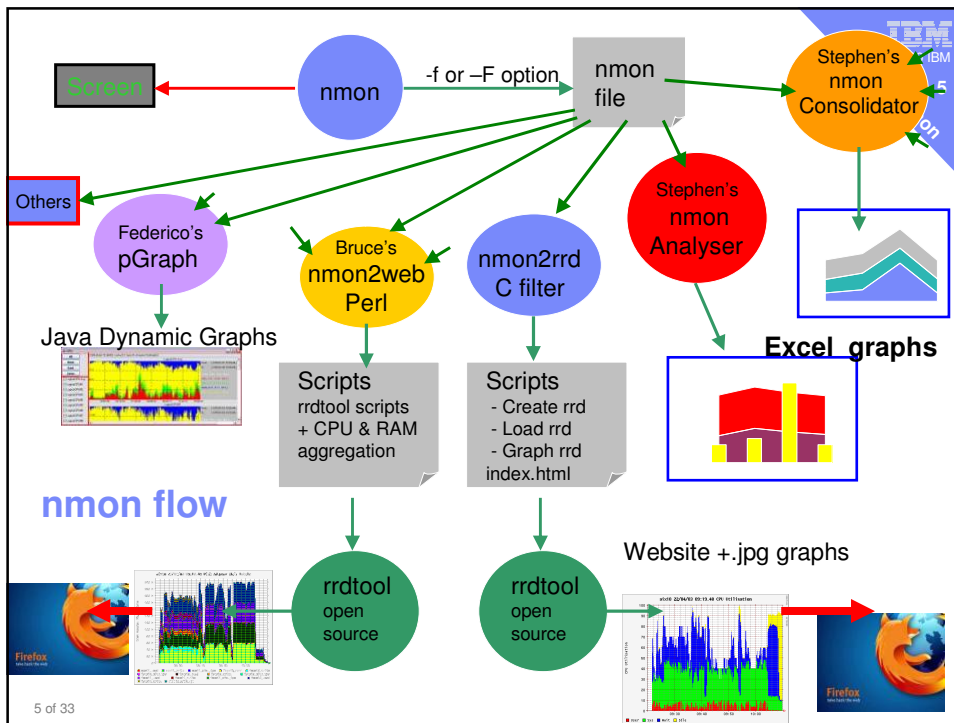## nmon for Linux v14g now Open Source

- nmon for Linux on Power then added x86, Z, x86_64
- Released by IBM - July 2009
  - **http://nmon.sourceforge.net**
  - Binaries for **66** Linux flavours
    Largely thanks for MPG
- Compile for your Linux flavour
  - Cell blades, disk engines,
  - Diskless, embedded ++
  - 6000 lines of C code→200 KB
- Fully supported by the nmon analyser
- On a Linux Distro's?
  - Ubuntu/Debain (get-apt), IBM on PowerLinux, x86 & secret, …

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**Topas & nmon**

**4**

## Timeline – 15 years

x86→POWER→x86→mainframe

**nmon for Linux**

**Open Source'd**

embedded x86_64

60+ flavours!

| 1997 | 1999 | 2000 | 2001 | 2003 | 2006 | 2007 | 2009 | 2010 | 2011 |

AIX 3.1.5 - 4.2
**Benchmarking
Tuning/Reports**

2003
**nmon9f AIX4
Last AIX 4.3.3
Used /dev/kmem**

2005
**nmon10 AIX5
Uses public API
& libperfstat**

2008
**nmon12f AIX6**

**AIX command
topas_nmon**

**merged in to topas
nmon12f function
Released with AIX
AIX 5.3 TL09 +
AIX 6.1 TL02 +**

**nmon analyser**

Lotus 1-2-3
Then Excel

**nmon2web**

**nmon2rrd**

Website generator

**nmon Consolidator**

Multiple machines

**topas CEC reports analyser**

**pGraph**

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Screen

nmon — -f or –F option — nmon file

Stephen's nmon Consolidator

Others

Federico's pGraph

Bruce's nmon2web Perl

nmon2rrd C filter

Stephen's nmon Analyser

Java Dynamic Graphs

Excel graphs

Scripts
rrdtool scripts
+ CPU & RAM
aggregation

Scripts
- Create rrd
- Load rrd
- Graph rrd
index.html

**nmon flow**

rrdtool open source

rrdtool open source

Website +.jpg graphs

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### nmon is half the story

**The other half is due to the nmon Analyser
Excel spreadsheets from Stephen Atkins, UK**

**Another personal time project**

**The sole designer/developer:**
➢ **nmon analyser**
➢ **nmon Consolidation**
➢ **Topas CEC analyser**

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## Email 6:
## What 1ˢᵗ things do I look for in an nmon file?

- Firmware level           (BBBP lsconf)
- AIX level - release, TL and SP   (BBBP oslevel -s)
- Not using classic nmon      (AAA)

- If any over 2 years old the nmon user are either a newbie or a time waster.
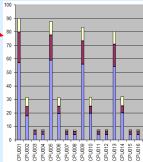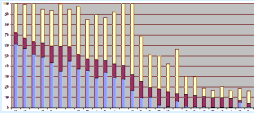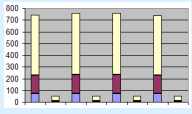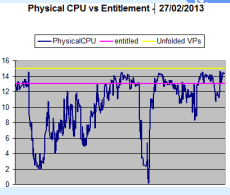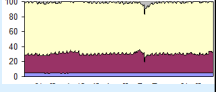- From this I know how professional they are!!

- If you don't service your car for three+ years:
  Why should the car maker spend time investigating your problem or take the blame for the top speed !

- Then period of time covered and the interval
  - Long intervals hide peaks

- Then what version of the Analyser was used
  - Only use the latest 3.4a

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## Then
## What 2ⁿᵈ things do I look for in an nmon file?

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- LPAR tab physical CPU use
  - Shared Uncapped – how often over Entitlement
  - Most utilisation numbers are pointless now IMHO
- CPU_SUMM tab
  - Shows use of SMT
- DISKBUSY tab
  - No disks over 50%
  - Most disks active – i.e. not old school disk layout
- IOADAPT tab
  - Disk I/O even across FC adapters
- MEM tab
  - Check free memory is NOT large. If it is – tune to use it
- MEMNEW tab
  - Is filesystem cache use as expected. RDBMS DIO/CIO should be small



Physical CPU vs Entitlement - 27/02/2013

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## Then
## What 3rd things do I look for in an nmon file?

- NET tab
  - Is it pretty!
  - Does it peak at a well know network speed?
- Page tab
  - Should be low but do see high filesystem paging these days = memory mapped files.
- POOL tab
  - See if Pool is exhausted
- Proc
  - Compare RunQ with SMT thread available
- Top - if present
  - Check is the top CPU processes expected
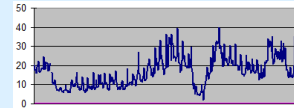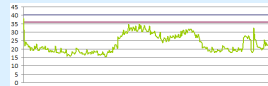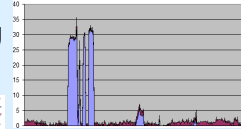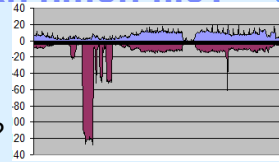
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## nmon Consolidator v1.4.1

- Produces overview charts for CPU, Memory, Network, Disk
  - Fast & simple code, pre-generated charts

- Multiple nmon/topasout files for:
  - ALL LPARs of one machine
  - Clustered system – Oracle RAC / HPC
  - Modelling changes from Dedicated to Shared CPU LPARs
  - Server consolidation Modelling
  - Reporting actual or potential savings from virtualisation

- Trend charts - processing multiple files from 1 LPAR

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Processor savings due to Virtualisation

# Mode Changing



nmon→topas_nmon→ Nigel's Monitor mode

topas→ default    DETAIL    topas

C    a    C_EC ← topas -C
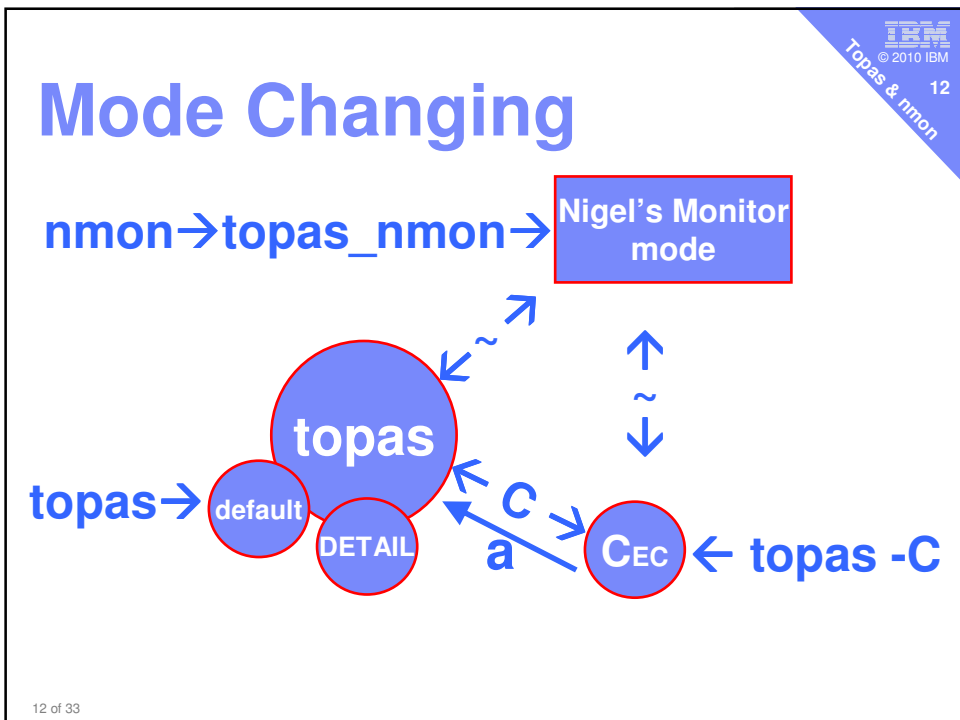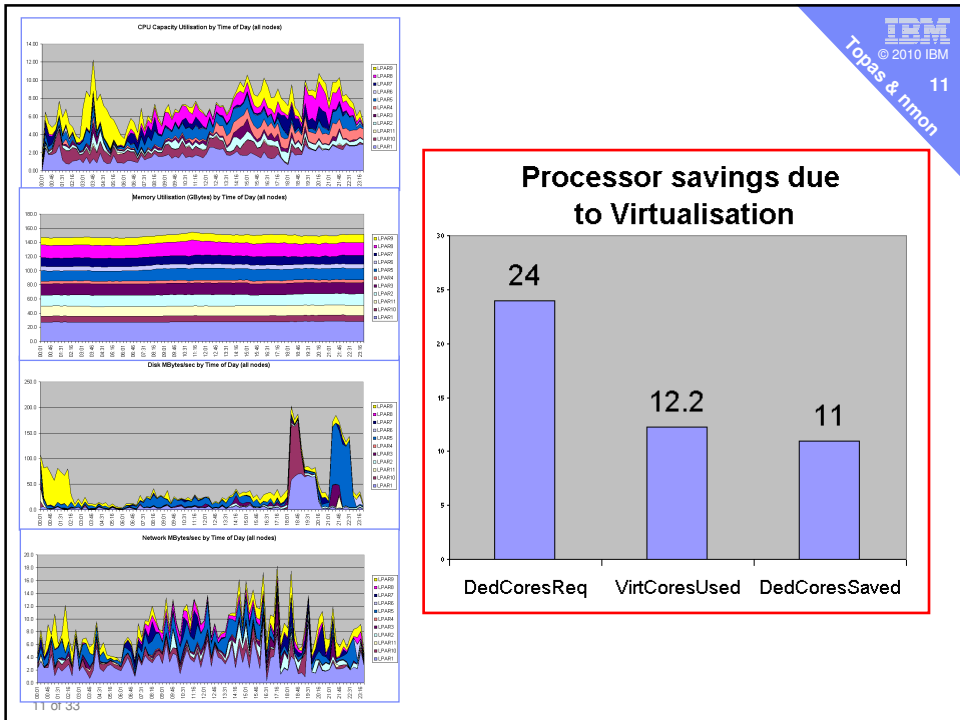
**Let talk about**

# topas

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**topas** problems

**No marketing**
**No Redbook**
**Manual is 30+ pages**

KB-W
AQW
MWT
PSz
Vcsw
%bdon
MPuse
hpit
physb
pmem

10 different online modes
7 file formats (with friends)

**RTFM**

7

## Modes

### Topas

**Local AIX mode**

**Cross-partition Mode**
**[CEC/whole machine]**

**nmon mode**

**nmon Classic for AIX & Linux**

**Default View** ①

**Detailed View** ②

**LPAR View** ③

**nmon View** ⑤

**nmon View**

**CEC Save** ⑨

⑥ **AMS**

**nmon Save** ⑩

**WPAR** ⑦

**WPAR**

**VIOS View** ⑧

**nmon Save**

**Other Local Save Tools**

**topasout**

**CSV file**
**Text Reports**

**nmon Analyser**
**nmon Consolidator**
**nmon2rrd/nmon2web**
**Other tools or databases**

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# Topas Local AIX

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Topas & nmon

**Slide 17 — cndfp**

```
Topas Monitor for host:      diamond6            EVENTS/QUEUES    FILE/TTY
Sat Jan 30 16:44:11 2010     Interval:  2        Cswitch    744   Readch   19.0M
                                                 Syscall  23472   Writech  12391
CPU  User%  Kern%  Wait%  Idle%  Physc  Entc     Reads    5148   Rawin       0
ALL  51.0   11.6    0.0   37.5   0.86  107.7     Writes     52   Ttyout     96
                                                 Forks      16   Igets       0
Network  KBPS   I-Pack  O-Pack  KB-In  KB-Out    Execs      16   Namei    1070
Total     5.8   16.9    14.0     2.7     3.1     Runqueue  2.0   Dirblk      0
                                                 Waitqueue 0.0
Disk    Busy%    KBPS      TPS KB-Read KB-Writ                   MEMORY
Total    0.0     2.0               0.0     2.0    PAGING         Real,MB   4096
                                                 Faults  15850   % Comp     47
FileSystem       KBPS      TPS KB-Read KB-Writ   Steals     0   % Noncomp  15
Total           19.0K     5.0K 19.0K   12.0      PgspIn     0   % Client   15
                                                 PgspOut    0
Name             PID   CPU%  PgSp Owner          PageIn     0   PAGING SPACE
java          426214   1.0 373.1 root           PageOut    0   Size,MB    512
inetd         299154   0.8   3.5 root
topas         442408   0.6   4.1 root
xmtopas       393364   0.3   2.0 root
syncd         143522   0.1   0.6 root
xmgc           45078   0.0   0.4 root
getty         278682   0.0   0.6 root
gil           114744   0.0   0.9 root
```

```
Topas Monitor for host:      diamond6            EVENTS/QUEUES    FILE/TTY
Sat Jan 30 17:12:04 2010     Interval:  4        Cswitch    644   Readch   16.9M
                                                 Syscall  20883   Writech  10919
                                                 Reads    4564   Rawin       0
                                                 Writes     47   Ttyout     31
                                                 Forks      14   Igets       0
                                                 Execs      14   Namei     942
                                                 Runqueue  1.2   Dirblk      0
                                                 Waitqueue 0.0
                                                                 MEMORY
                                                 PAGING         Real,MB   4096
                                                 Faults  14282   % Comp     47
                                                 Steals     0   % Noncomp  15
                                                 PgspIn     0   % Client   15
                                                 PgspOut    0
                                                 PageIn     0   PAGING SPACE
                                                 PageOut    0   Size,MB    512
                                                 Sios       0   % Used      2
                                                                % Free     98
                                                 NFS (calls/sec)
                                                 SerV2      0   WPAR Activ   0
                                                 CliV2      0   WPAR Total   0
                                                 SerV3      0   Press: "h"-help
                                                 CliV3      0          "q"-quit
```

**Slide 18 — P E D L V F**

```
Topas Monitor for host:    diamond6   Interval:  4   Sat Jan 30 18:04:00 2010
                         DATA TEXT PAGE                      PGFAULTS
USER      PID   PPID PRI NI  RES  RES SPACE  TIME CPU% I/O OTH COMMAND
root   426214     1  82 20 95525   22 95525 19:35 6.2   0   0 java
root   303296 421990 54  0    17    3    30  0:01 4.7   0   0 ncpu
root   311540 303296 52  0    16    3    29  0:01 3.7   0   0 ncpu
root   299154 217234 65 20   891   12   891 27:49 0.4   0 2212 inetd
root   335936 299154 64 20   455   25   455  0:00 0.2   0 547 xmtopas
root   442422 413838 58 41  1173   92  1173  0:00 0.0   0   0 topas
root   278682     1  60 20   147   21   147  0:35 0.0   0   0 getty
root   114744     0  37 41   240    0   240  0:25 0.0   0   0 gil
root   229412     1  60 20   112    0   112  0:19 0.0   0   0 random
root   143522     1  60 20   148    2   148  0:18 0.0   0  19 syncd
root        1     1  60 20   180   11   180  0:00 0.0   0   0 init
pconsole 372944 344306 82 20 9770   18  9770  0:10 0.0   0   0 java
root   295142     1  60 20   304    0   304  0:05 0.0   0   0 rpc.lock
root   250014 217234 60 20  1031  176  1031  0:00 0.0   0   0 sendmail
root   274592 217234 60 20   861   10   861  0:00 0.0   0   0 syslogd
root   110646     0  36 41   112    0   112  0:00 0.0   0   0 netm
root   286866 217234 60 20  1373   53  1373  0:00 0.0   0   0 aixmibd
root    45078     0  60 41   112    0   112  0:20 0.0   0   0 xmgc
root   262276     1  60 20   783    6   783  0:05 0.0   0   0 slp_srvr
```
**P**

```
Interval:   4    Logical Partition: diamond6    Sat Jan 30 18:55:28 2010
Psize:  8              Shared SMT 4     Online Memory:   4096.0
Ent: 0.80             Mode: UnCapped    Online Logical CPUs:16
Partition CPU Utilization             Online Virtual CPUs:  4
%usr %sys %wait %idle physc %entc %lbusy  app  vcsw  phint %hypv  hcalls
 67    9     0   25   0.9 118.59  8.07  6.47  1640     2  97.9  33572

LCPU  minpf majpf  intr   csw   icsw runq lpa scalls usr sys wt idl  pc  lcsw
Cpu0  11576    0   361   472    241  1 100 17419  82  16   0   2 0.49  251
Cpu1    82     0   104    99     40  0 100    64  80   1   0  20 0.29  126
Cpu2     0     0    91     0      0  0   0     0   0   0   0 100 0.08   95
Cpu3     0     0    90     0      0  0   0     0   0   0   0 100 0.08   92
Cpu4     0     0    90     0      0  0   0     0   0  18   0  82 0.00   90
Cpu5     0     0    90     0      0  0   0     0   0  17   0  83 0.00   90
Cpu6     0     0    90     0      0  0   0     0   0  17   0  83 0.00   90
Cpu7     0     0    90     0      0  0   0     0   0  17   0  83 0.00   90
Cpu8     0     0    90     0      0  0   0     0   0  14   0  86 0.00   90
Cpu9     0     0    90     0      0  0   0     0   0  14   0  86 0.00   90
Cpu10    0     0    90     0      0  0   0     0   0  14   0  86 0.00   90
Cpu11    0     0    90     0      0  0   0     0   0  14   0  86 0.00   90
Cpu12    0     0    85     0      0  0   0     0   0  15   0  85 0.00   85
Cpu13    0     0    90     0      0  0   0     0   0  13   0  87 0.00   90
Cpu14    0     0    90     0      0  0   0     0   0  12   0  88 0.00   90
Cpu15    0     0    90     0      0  0   0     0   0  12   0  88 0.00   90
```
**L**

```
Topas Monitor for host:    diamond6   Interval:  4   Sat Jan 30 17:59:48 2010
Network        KBPS  I-Pack  O-Pack  KB-In  KB-Out
en0             0.2    2.8     0.0    0.2    0.0
lo0             0.0    0.0     0.0    0.0    0.0
```
**E**

```
Topas Monitor for host:    diamond6   Interval:  4   Sat Jan 30 19:03:04 2010
VolumeGroup    TPS    Kb_read  Kb_wrtn
rootvg         228       8      28804   14.1K

LogicalVolume  TPS    Kb_read  Kb_wrtn   Kbps
hd1             0       0         0      0.0
hd10opt         0       0         0      0.0
hd11admin       0       0         0      0.0
hd2             1       4         0      2.0
hd3           226       4      28800   14.1K
hd4             0       0         0      0.0
hd5             0       0         0      0.0
hd6             0       0         0      0.0
hd8             1       0         4      2.0
hd9var          0       0         0      0.0
lg_dumplv       0       0         0      0.0
livedump        0       0         0      0.0
```
**V**

```
Topas Monitor for host:  silvervios1 Interval:  2   Sun Jan 31 01:31:39 2010
Disk  Busy%  KBPS    TPS  KB-R  ART  MRT  KB-W  AWT  MWT  AQW  AQD
hdisk0 67.0 23.0K 184.0  0.0  0.0  7.2 23.0K 3.6 56.5  0.0  0.0
hdisk2  0.0  0.0    0.0  0.0  0.0  0.0  0.0  0.0 24.4  0.0  0.0
hdisk1  0.0  0.0    0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0
hdisk5  0.0  0.0    0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0
cd0     0.0  0.0    0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0
hdisk3  0.0  0.0    0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0
hdisk4  0.0  0.0    0.0  0.0  0.0  0.0  0.0 10.7  0.0  0.0
```
**D**

```
Topas Monitor for host:  diamond6   Interval:  4   Sat Jan 30 17:59:20 2010
FileSystem           KBPS    TPS   KB-R   KB-W  Open  Create  Lock
/usr                14.4K   3.7K  14.4K   0.0   1K      0      0
/                    2.1K  675.0   2.1K   9.0   689     0    285
/tmp                 0.0    0.0    0.0    0.0    0       0      0
/var                 0.0    0.0    0.0    0.0    0       0      0
/home                0.0    0.0    0.0    0.0    0       0      0
/var/adm/ras/livedump 0.0   0.0    0.0    0.0    0       0      0
/admin               0.0    0.0    0.0    0.0    0       0      0
/proc                0.0    0.0    0.0    0.0    0       0      0
/opt                 0.0    0.0    0.0    0.0    0       0      0
```
**F**

# Topas VIOS view

---
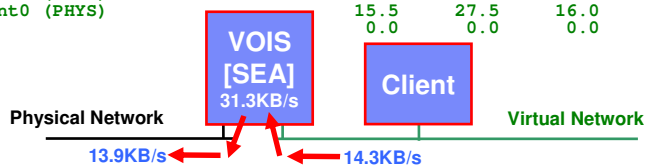
## topas VIOS 2.1+ SEA Network Monitoring

**Hit "E" for shared Ethernet adapter(s) → SEA**

**Direction of traffic in this case from Virtual Ethernet out of the VIOS**
- ent2 virtual 14KB/s incoming
- ent0 = physical = 14 KB/s outgoing
- ent10 = SEA = 14KB/s in and 14 KB/s out

```
Topas Monitor for host:    bronze_ivm  Interval:   2   Fri Dec  5 08:08:19 2008
================================================================================
Network                                   KBPS    I-Pack   O-Pack    KB-In   KB-Out
ent10 (SEA)                               31.3     43.0     43.0     15.9     15.4
 |\--ent2 (VETH)                          15.9     15.5     27.0     14.3      1.6
  \--ent0 (PHYS)                          15.5     27.5     16.0      1.6     13.9
lo0                                        0.0      0.0      0.0      0.0      0.0
```

**VOIS [SEA]**
**31.3KB/s**

**Client**

**Physical Network**          **Virtual Network**

**13.9KB/s** ←          ← **14.3KB/s**

## Another Example two SEA + HEA

```
Topas Monitor for host:    bluevio44  Interval:   2   Mon Nov  9 18:28:12 2009
==============================================================================
Network                               KBPS   I-Pack    O-Pack    KB-In    KB-Out
ent5 (SEA)                            30.9     35.5      35.0     15.5      15.5
  |\--ent1 (PHYS)                     15.5     25.0      10.5     14.7       0.8
   \--ent4 (VETH)                     15.5     10.5      24.5      0.8      14.6
ent6 (SEA)                             1.9     15.5      16.0      0.9       1.0
  |\--ent0 (HEA PHYS)                  1.0     15.5       0.5      0.9       0.1
   \--ent3 (VETH)                      0.9      0.0      15.5      0.0       0.9
lo0                                    0.0      0.0       0.0      0.0       0.0
```

## topas VIOS 2.1+  Storage Monitoring

**Hit "D" and then "d" → You can see VIOS virtual/physical Disks**

**And which hosts adapters is generating the I/O**

```
Topas Adapter View   :    bronze_ivm  Interval:    2   Fri Dec  5 08:29:17 2008
==============================================================================
Adapter          KBPS      TPS    KB-R    KB-W
sissas0          9.9K     92.0     0.0    9.9K
vhost0           0.0       0.0     0.0     0.0
vhost1           9.9K    184.0    92.0    92.0
==============================================================================
Vtargets/Disks   Busy%    KBPS    TPS    KB-R    ART    MRT    KB-W    AWT    MWT    AQW    AQD
hdisk0           0.0      0.0     0.0     0.0     0.0    3.6    0.0     0.0    62.6   0.0    0.0
hdisk1           25.0     9.9K    92.0    0.0     0.0    3.5    9.9K    4.2    28.9   0.0    0.0
hdisk2           0.0      0.0     0.0     0.0     0.0    0.0    0.0     0.0    0.0    0.0    0.0
hdisk3           0.0      0.0     0.0     0.0     0.0    0.0    0.0     0.0    0.0    0.0    0.0
hdisk4           0.0      0.0     0.0     0.0     0.0    0.0    0.0     0.0    0.0    0.0    0.0
```

**Virtual Disks**   **Client**   **Server**   **Logical Volume**

vhost ······· vhost1 ········ sissas0 ·····

hdisk0 to 4
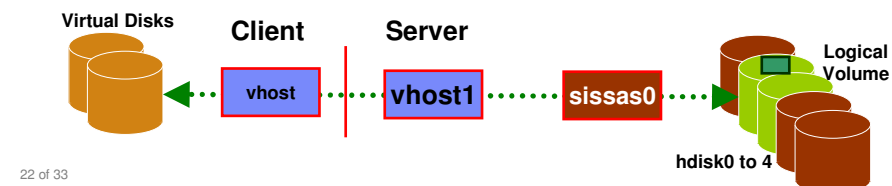
# CEC
# Whole machine
# Cross Partition
# All LPAR
# View

```
Topas CEC Monitor              Interval: 10              Sun Jan 31 02:12:49 2010
Partitions Memory (GB)          Processors
Shr:  5    Mon:11.9  InUse: 9.5  Shr:2.5  PSz:  4   Don: 0.0 Shr_PhysB  0.02
Ded:  0    Avl:  -               Ded:  0  APP:  4.0 Stl: 0.0 Ded_PhysB  0.00

Host        OS  M  Mem InU Lp  Us Sy Wa Id PhysB  Vcsw Ent  %EntC PhI  pmem
-----------------------------------shared------------------------------------
silvervios1 A61 U  2.0 0.8 2   0  0  0 99  0.01  284 0.50   1.4  0     -
silvervios2 A61 U  1.9 1.4 4   0  0  0 99  0.01  427 0.50   1.3  2     -
silver5     A61 UM 3.0 3.0 2   0  0  0 99  0.01  217 0.50   1.2  0  1.59
silver8     A61 U  2.0 1.2 4   0  0  0 99  0.01    0 0.50   1.0  0     -
silver4     A61 UM 3.0 3.0 8   0  0  0 100 0.00    0 0.50   0.0  0  1.12

Host        OS  M  Mem InU Lp  Us Sy Wa Id PhysB  Vcsw %istl %bstl
----------------------------------dedicated----------------------------------
```

---

## Cross Partition View

- LPAR: topas –C
- VIOS
  - topas then hit "C"
  - topas –cecview    (ugly)
- Totally different program inside topas

**Once only**
**- Can take 20 seconds**
**- Newer version polls**
   **the local network for**
   **AIX LPARs**

xmtopas **AIX**

**topas**

xmwlm **AIX**

xmperf **AIX**

- Only LPARs on same sub-net
  - Edit $HOME/Rsi.hosts
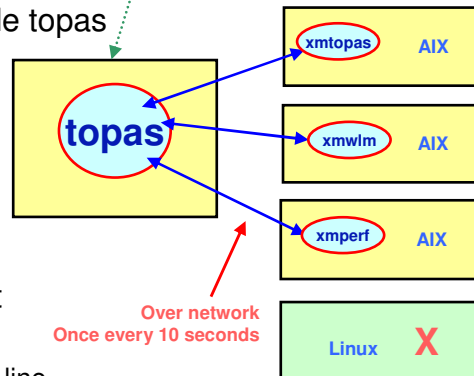
**Over network**
**Once every 10 seconds**

**Linux    X**

  - Fully hostname.domain one per line

# Active Memory Sharing view

AMS has a renewed focus due to new De-Duplication features

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---

**Logical Memory**

**Memory Pool Size**

## LPAR: vmstat -h

```
# vmstat -h 10

System configuration: lcpu=2 mem=2048MB ent=0.50 mmode=shared mpsz=4.00GB

kthr    memory           page              faults           cpu              hypv-page
----- ----------- ------------------- ------------ ----------------------- ---------------
r b    avm    fre    re pi po fr sr cy in  sy  cs us sy id wa  pc    ec  hpi hpit pmem loan
0 0 190419 173073   0  0  0  0  0  0  2 149 159  0  1 99  0 0.01  1.6    0    0 1.20 0.80
0 0 190419 173073   0  0  0  0  0  0  2  24 152  0  0 99  0 0.00  0.8    0    0 1.20 0.80
0 0 190419 173073   0  0  0  0  0  0  1  19 166  0  0 99  0 0.00  0.8    0    0 1.20 0.80
0 0 207225 189696   0  0  0  0  0  0  6 334 196 35  2 64  0 0.18 36.9   25   53 1.33 0.67
0 0 207227 189694   0  0  0  0  0  0  2  39 170 50  1 50  0 0.25 50.8    7   15 1.33 0.67
0 0 207227 189694   0  0  0  0  0  0  5  20 164 50  1 50  0 0.25 50.8    0    0 1.33 0.67
. . .
. . .
```

**Logical Memory Statistics**

**Monitoring 1 LPAR
for AMS is "insane"**

**Hypervisor Page-Ins Faults/s**

**Time waiting for hypervisor page-ins (in milliseconds)**

**Physical Memory → pmem**

**Loaned Memory**
**If ams_loan_policy=0 (off) this will be zero**

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13

## topas –C    AMS → Have to monitor all LPARs

**No details for Linux on POWER or IBM i = no daemon**

**Regular extra "g" details**

```
Topas CEC Monitor                Interval:  10              Wed Dec  3 10:15:06 2008
Partition Info    Memory (GB)         Processor          Virtual Pools :    0
Monitored  : 4    Monitored  : 8.0    Monitored  :2.0    Avail Pool Proc:   3.7
UnMonitored: -    UnMonitored:   -    UnMonitored:   -   Shr Physical Busy:  0.28
Shared     : 4    Available  :   -    Available  :   -   Ded Physical Busy:  0.00
Uncapped   : 4    UnAllocated:   -    UnAllocated:   -   Donated Phys. CPUs  0.00
Capped     : 0    Consumed   : 6.5    Shared     :   2   Stolen Phys. CPUs : 0.00
Dedicated  : 0                        Dedicated  :   0   Hypervisor
Donating   : 0                        Donated    :   0   Virt. Context Switch: 976
                                      Pool Size  :   4   Phantom Interrupts  :  1


Host        OS  M  Mem InU Lp  Us Sy Wa Id  PhysB  Vcsw Ent  %EntC PhI  pmem
------------------------------shared------------------------------------
silver_vios1 A61 U  2.0 1.9 8  08  1  0 90  0.01  873 0.40   2.6  0    -
silver_lpar2 A61 UM 2.0 1.4 2  49  1  0 49  0.26  244 0.50  51.3  1   1.30
silver_lpar3 A61 UM 2.0 1.6 2   0  0  0 99  0.01  294 0.50   1.4  0   0.78
silver_lpar4 A61 UM 2.0 1.7 2   0  0  0 99  0.01  220 0.50   1.3  0   0.87
silver_lpar5 A61 UM 2.0 1.7 2   0  0  0 99  0.01  218 0.50   1.1  0   1.01
```

**Inu→InUse LPAR Working Set**

**Shared memory LPAR**
**Physical Memory → pmem**

**Dedicated Memory LPAR**

**Logical Memory → Mem**

---

## AMS Pool Level: topas –C then hit "m"

```
Topas CEC Monitor                Interval:  10              Wed Dec  3 10:56:12 2008
Partitions Memory (GB)           Memory Pool(GB)      I/O Memory(GB)
Mshr:  4   Mon: 8.0   InUse: 6.8 Mpsz: 4.0  MPuse: 4.0 Entl: 308.0Use: 47.9
Mded:  0   Avl: 1.2              Pools: 1


mpid   mpsz  mpus   mem  memu  iome  iomu     hpi    hpit
---------------------------------------------------------------------
0      4.00  3.99  8.00  6.82 308.0  47.9      32      31
```

**Hypervisor Page-in Time (msecs)**

**Hypervisor Page-in/second**

**Pool Size**

**Pool Used**

**In use I/O Memory**

**I/O Memory → assign for device driver DMA I/O**

**For more on I/O Memory see:**
• **lparstat -m**
• **lparstat -me**

**Machine memory**

**Machine memory Used**

# topasout

Takes binary topas recording files /etc/perf/…
Reports for
- LPAR,
- All Partitions or
- Whole Machine

In formats
- text report
- CSV data files

Manual page worse than topas ☹

# topasout

Machine or LPAR - Data reports
- topasout -c|-s|-a /etc/perf/daily/*hostname*_YYMMDD.topas
- Example: topasout –a /etc/perf/daily/silver8_090304.topas
- The output overwrites the file /etc/perf/daily/*hostname*_YYMMDD.topas_01
    - c = comma separated          →but one timestamp and value per line
    - s = spreadsheet          →space separated 100's of stats per line
    - a = analyser          →.csv file for nmon analyser – or – use topas_nmon directly

Machine or LPAR - Text reports
- topasout -R *OPTION*    [-i MM -b HHMM -e HHMM]    /etc/perf/daily/*hostname*_YYMMDD.topas
- *OPTION* = detailed|summary|poolinfo|disk |lan|mempool|adapter|vadapter|vios|vios_adapter
- Example: topasout –R summary /etc/perf/daily/silver8_090304.topas >/tmp/LPARsummary.txt
- Text reports via standard out, so you need to redirect the output to a file

Cross-Partition –Text reports
- topasout -R detailed | -R summary    [-i MM -b HHMM -e HHMM]    /etc/perf/topas_cec.YYMMDD
- Example: topasout -R detailed topas_cec.090305 >/tmp/CECdetailed.txt
- Text reports via standard out, so you need to redirect the output to a file

For system use only, do NOT run these manually.
- topasout -R daily | -R weekly

   Notes: YYMMDD = year, month, day     MM is minutes     HHMM is hours & minutes

## Whole machine performance graphs
## topasrec → topasout →CEC analyser (Excel)

```
Topas CEC Monitor              Interval:  10           Tue Dec 21 10:46:34 2010
Partitions Memory (GB)           Processors
Shr: 9    Mon: 119  InUse:27.0  Shr: 8  PSz: 26   Don: 0.0 Shr_PhysB  0.17
Ded: 1    Avl:  -              Ded:  6  APP: 25.8 Stl: 0.0 Ded_PhysB  0.00

Host       OS  Mod Mem InU Lp  Us Sy Wa Id  PhysB  Vcsw Ent  %EntC PhI  pmem
--------------------------------shared--------------------------------------
purple2    A61 Ued 6.5 6.4 12   0  0  0 98   0.04  969 2.00   2.0  0    -
purplevio1 A61 Ued 2.0 1.8  8   0  3  0 95   0.04    0 0.50   7.6  0    -
purplevio2 A61 Ued 2.0 1.7  8   0  2  0 97   0.02    0 0.50   4.5  0    -
purple1    A61 Ued 4.0 3.3 32   0  0  0 99   0.02    0 2.00   1.0  0    -
purple6    A61 Ued  64 4.8 40   0  0  0 99   0.01    0 1.00   1.5  0    -
purple11   A71 Ued 3.0 1.6  8   0  1  0 98   0.01  552 0.50   2.3  0    -
purplevio3 A61 Ued 2.0 0.9  8   0  1  0 98   0.01  425 0.50   2.3  0    -
purple4    A61 Ued 2.0 2.0  2   0  0  0 99   0.00  645 0.50   0.8  0    -
purple5    A53 U-d 2.0 1.0  2   0  0  0 99   0.00    0 0.50   0.6  0    -
```

topas –C working OK but want to record it
1. http://tinyurl.com/topas-cec
   – Download CEC Analyser from Stephen Atkins
2. topasrec -C -o sample -s 120 -c 720  (every 2 minutes all day)
   – Creates sample_cec_101222_2149.topas
3. topasout -a sample_cec_101222_2149.topas
   – Creates sample_cec_101222_21492.topas.csv
4. Start CEC Analyser & load the .csv output file & you get →

---

## Whole machine performance graphs
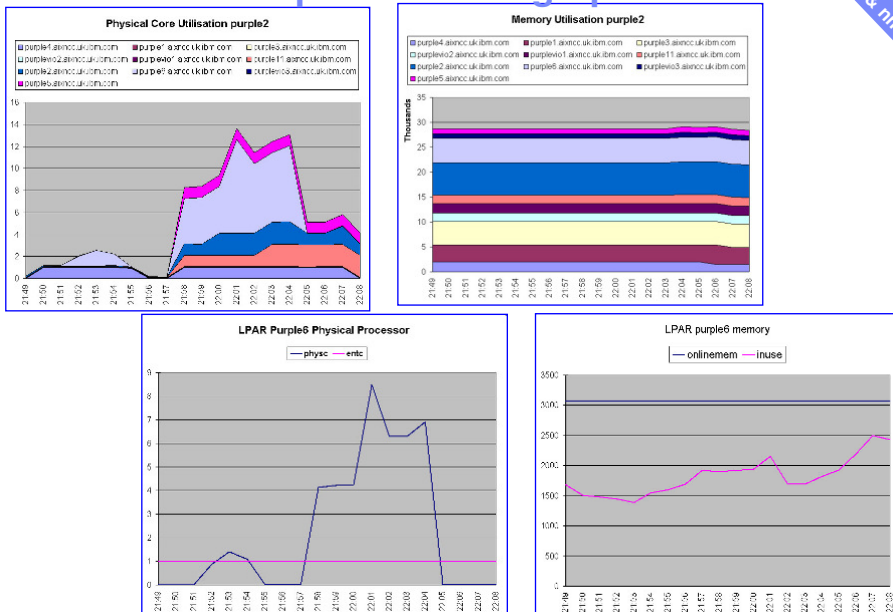
# New Stuff

1. nmon analyser improvements from Stephen Atkins
   – Make sure you use the latest version
   – http://tinyurl.com/nmon-analyser
2. Topas Active Memory Expansion
3. nmon Active Memory Expansion file output
4. Topas Memory Affinity
5. nmon gets WPAR
6. Too Many CPUs problem
7. nmon online disk columns
8. nmon file output more stats

purple7.aixncc.uk.ibm.com

---

# Active Memory Expansion - AME

▪ Rapidly growing adoption

▪ Nigel's opinion
   – "It's a no brainer & here to stay"
   – "Future POWER processors will … err!
      Blow your socks off!"

---

## Active Memory Expansion Conceptual Model

**Memory Pages**

**Compressed Memory pages**
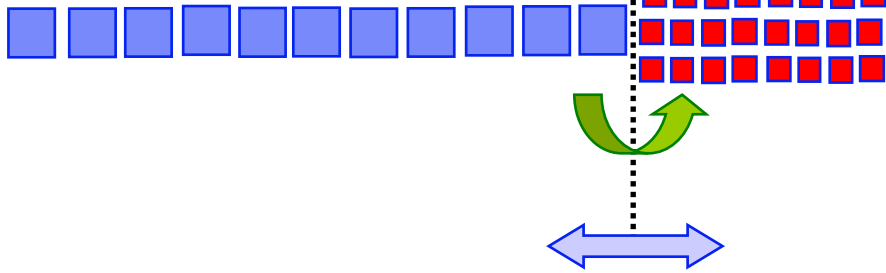
**Dynamically adjusted depending on compression ratio & target**

## What is your Plan?

**Memory Shrinking**
**to release RAM for other uses**
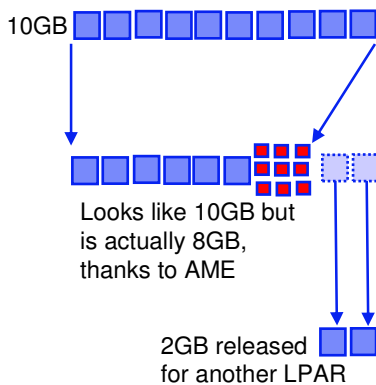
**Memory Growing**
**for RAM optimisation & performance**

10GB

10GB

But want 14GB to improve performance

Looks like 10GB but is actually 8GB, thanks to AME

2GB released for another LPAR

Actually still using 10 GB but looks like 14 GB, thanks to AME

**topas**

**TMEM = True Memory**
**CMEM = Compressed Memory**
**CI = Compressed Page In**
**CO = Compressed Page Out**

**EF = Expansion Factor**
**T = Target**
**A = Actual**

---

## nmon capture to file then Analyser

- MEM tab
  - Size of the Compressed pool (MB)
  - Size of true memory (MB)
  - Expanded memory size (MB),
  - Size of the Uncompressed pool (MB)

- MEMNEW tab
  - Compressed Pool%

- PAGE tab
  - Paging rates (pages per second) but this time very quickly in & out of the compressed memory area
  - Compressed pool pgins - other tools like topas call this CI
  - Compressed pool pgouts - other tools like topas call this CO

---

## Topas AME - Very small change

```
Topas Monitor for host:green3
Thu Oct  6 17:48:40 2011   Interval:2          EVENTS/QUEUES       FILE/TTY
                                               Cswitch     290    Readch    3703
                                               Syscall     219    Writech    287
CPU    User% Kern% Wait% Idle%   Physc  Entc%  Reads        29    Rawin        0
Total  99.8   0.2   0.0   0.0    2.00 199.91   Writes        0    Ttyout     287
                                               Forks         0    Igets        0
Network   BPS  I-Pkts  O-Pkts   B-In  B-Out    Execs         0    Namei        7
Total    1.20K  10.00    1.50  836.0  392.0    Runqueue   9.00    Dirblk       0
                                               Waitqueue  0.0
Disk    Busy%   BPS    TPS  B-Read  B-Writ                        MEMORY
Total    0.0     0      0       0       0       PAGING            Real,MB   2048
                                               Faults      0    % Comp      53
FileSystem      BPS    TPS  B-Read  B-Writ      Steals      0    % Noncomp   40
Total          3.62K  28.50  3.62K      0       PgspIn      0    % Client    40
                                               PgspOut     0
WLM-Class (Active)   CPU%   Mem%  Blk-I/O%      PageIn      0    PAGING SPACE
System                0      65       0         PageOut     0    Size,MB    512
Shared                0       5       0         Sios        0    % Used       1
                                                                 % Free      99
Name           PID  CPU%  PgSp Class         ..AME...............
ncpu      7536784  25.0  148K wp06            TMEM        2.00G WPAR Activ   2
ncpu      9044056   0.0  144K wp06            CMEM      512.00 WPAR Total   2
ncpu      8388632   0.0  108K wp06            EF[T/A]  1.0/1.0 Press: "h"-help
ncpu      9306134   0.0  136K wp06            CI:   0CO:     0         "q"-quit
```

- Units have moved
  - TMEM, MB 2000 → TMEM    2.00G

# Memory Affinity & SRAD

- See my session
  - PE07
  - POWER7, AIX, Affinity and Performance

## topas –M or
## topas and the hit M or
## nmon then ~ then M

## Power 770 again …

```
# lssrad –av
REF1   SRAD        MEM       CPU
0
            0    25054.75     0-11 28-31 40-43 56-59 72-75
            3     6705.50     52-55 68-71
1
            1    17679.00     12-15 20-23 32-35 44-47 60-63 76-79 104-107
            2    14193.00     24-27 36-39 48-51 64-67
```

## Yes it is a bit of a mess to highlight some things

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---

```
Topas Monitor for host:    purple1    Interval:   2    Mon Aug 22 04:24:30 2011
================================================================================
REF1    SRAD   TOTALMEM  INUSE    FREE     FILECACHE  HOMETHRDS  CPUS
--------------------------------------------------------------------------------
  0      0      24.5G    6919.9   17.7G      90.7       224       0-11 28-31 ...
         3      6705.5   2051.4   4654.1     17.9       359       52-55 68-71
  1      2      13.9G    4118.7    9.8G      49.5       379       24-27 36-39 ...
         1      17.3G    4784.2   12.6G      61.8       217       12-15 20-23 ...
================================================================================
CPU     SRAD   TOTALDISP  LOCALDISP%  NEARDISP%  FARDISP%
--------------------------------------------------------------------------------
  0                                      .0        4.1
  1                                      .7        0.0
  2                                      .0        0.0
  3                                      .0        0.0
  4      0       70        85.7        11.4       2.9
  5      0       62       100.0         0.0       0.0
  6      0       12       100.0         0.0       0.0
  7      0       32       100.0         0.0       0.0
  8      0       23        95.7         0.0       4.3
  9      0       52       100.0         0.0       0.0
 10      0       36       100.0         0.0       0.0
 11      0       20       100.0         0.0       0.0
 12      1       67        79.1        20.9       0.0
 13      1       31        93.5         6.5       0.0
 14      1       18        77.8        22.2       0.0
 15      1       11       100.0         0.0       0.0
 20      1       62        38.7        61.3       0.0
 21      1       65        52.3        47.7       0.0
 22      1       14       100.0         0.0       0.0
 23      1       15        60.0        40.0       0.0
 24      2       85        76.5         2.4      21.2
 25      2       56        82.1        17.9       0.0
 26      2       23       100.0         0.0       0.0
 27      2       20        95.0         5.0       0.0
```

**You know this bit now**
**Note: different order to lssrad**

## Slide 43

```
Topas Monitor for host:    purple1    Interval:   2    Mon Aug 22 04:24:30 2011
================================================================================
REF1    SRAD   TOTALMEM  INUSE      FREE     FILECACHE  HOMETHRDS  CPUS

  0      0      24.5G    6919.9    17.7G      90.7        224      0-11 28-31 ...
         3     6705.5    2051.4    4654.1     17.9        359      52-55 68-71
  1      2      13.9G    4118.7     9.8G      49.5        379      24-27 36-39 ...
         1      17.3G    4784.2    12.6G      61.8        217      12-15 20-23 ...
================================================================================
CPU    SRAD                          ARDISP%  FARDISP%
-------------------------------------------------------
  0      0      197       26.9        69.0      4.1
  1      0       30       73.3        26.7      0.0
  2      0        7      100.0         0.0      0.0
  3      0       33      100.0         0.0      0.0
  4      0       70       85.7        11.4      2.9
  5      0       62      100.0         0.0      0.0
  6      0       12      100.0         0.0      0.0
  7      0       32      100.0         0.0      0.0
  8      0       23       95.7         0.0      4.3
  9      0       52      100.0         0.0      0.0
 10      0       36      100.0         0.0      0.0
 11      0       20      100.0         0.0      0.0
 12      1       67       79.1        20.9      0.0
 13      1       31       93.5         6.5      0.0
 14      1       18       77.8        22.2      0.0
 15      1       11      100.0         0.0      0.0
 20      1       62       38.7        61.3      0.0
 21      1       65       52.3        47.7      0.0
 22      1       14      100.0         0.0      0.0
 23      1       15       60.0        40.0      0.0
 24      2       85       76.5         2.4     21.2
 25      2       56       82.1        17.9      0.0
 26      2       23      100.0         0.0      0.0
 27      2       20       95.0         5.0      0.0
```

**SRAD Memory View**

**CPUs but limited room**

**Home processes/threads**

**File system cache RAM (numperm)**

**43**

## Slide 44

```
Topas Monitor for host:    purple1    Interval:   2    Mon Aug 22 04:24:30 2011
================================================================================
REF1    SRAD   TOTALMEM  INUSE      FREE     FILECACHE  HOMETHRDS  CPUS

  0      0      24.5G    6919.9    17.7G      90.7        224      0-11 28-31 ...
         3     6705.5    2051.4    4654.1     17.9        359      52-55 68-71
  1      2      13.9G    4118.7     9.8G      49.5        379      24-27 36-39 ...
         1      17.3G    4784.2    12.6G      61.8        217      12-15 20-23 ...
================================================================================
CPU    SRAD   TOTALDISP  LOCALDISP%  NEARDISP%  FARDISP%
--------------------------------------------------------
  0      0      197       26.9        69.0      4.1
  1      0       30       73.3        26.7      0.0
  2      0        7      100.0         0.0      0.0
  3      0       33      100.0         0.0      0.0
  4      0       70       85.7        11.4      2.9
  5      0       62      100.0         0.0      0.0
  6      0       12      100.0         0.0      0.0
  7      0       32      100.0         0.0      0.0
  8      0       23       95.7         0.0      
  9      0       52      100.0         0.0      
 10      0       36      100.0         0.0      0.0
 11      0       20      100.0         0.0      0.0
 12      1       67       79.1        20.9      0.0
 13      1       31                             0.0
 14      1       18                             0.0
 15      1       11      100.0         0.0      0.0
 20      1       62       38.7        61.3      0.0
 21      1       65       52.3        47.7      0.0
                 .0       0.0         0.0
                 .0      40.0         0.0
                 .5       2.4        21.2
                 .1      17.9         0.0
 26      2       23      100.0         0.0      0.0
 27      2       20       95.0         5.0      0.0
```

**SMT=4 → 1 physical core**
**Are all logical CPUs in use?**

**Mostly Near memory access ☺**

**Most work on 1st SMT**

**Move the cursor here to order the Logical CPUs**

**44**

## Topas New: Affinity stats → M (memory!)

© 2010 IBM
45
Topas & nmon

**Power 770**

**LPAR = 64 GB**
**Across 3 SRAD's**

**CPU's are**
**0- 7    →8 = 2**
**8-11   →4 = 1**
**16-23  →4 = 1**
**VP = 4**

**VP=10 across 16 CPUs**
**-We don't have a SRAD**
**for 10 CPUs**
**VP=10 SMT=4 40 VCPUs**

**Excellent**

**Good**

**Blisteringly Fast**

**Very little use so 100% not that important**



---

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Topas & nmon

# Workload Partition - WPAR

- Was in nmon classic but not topas_nmon
  – Now in topas_nmon 4Q 2011
  – Below is topas          Below is topas -@ (WPAR view)



Move to WPAR name & hit f
to see its processes

## Slide 47

**nmon WPAR stats are back in AIX 7 TL1/AIX6 TL7**  47

- WPAR hit @ & WLM hit W

**Memory stats**
**numperm=**
**filesystem cache**

**Kernel stats**
**Process switches**
**Fork new process**

**Type =**
**System or App**
**State =**
**Active or Defined**

**Includes the resource constrains & current values**

```
-topas nmon---k=Kernel-stats---   Host=green3----Refresh=2 secs---00:07.04
 CPU-Utilisation-Small-View           EntitledCPU= 1.00 UsedCPU= 1.555
Logical  CPUs        0----------25----------50----------75----------100
CPU User% Sys% Wait% Idle%|         |          |          |          |
  0  33.3  1.3   0.0  65.4|UUUUUUUUUUUUUUU             >            |
  1  42.3  0.0   0.0  57.7|UUUUUUUUUUUUUUUUUUU          >           |
  2   0.0  0.0   0.0 100.0|>                                        |
  3   0.0  0.0   0.0 100.0|>                                        |
  4  61.5  1.3   0.0  37.2|UUUUUUUUUUUUUUUUUUUUUUUUUUUUU     >      |
  5  12.8  0.0   0.0  87.2|UUUUUU>                                  |
  6   0.0  0.0   0.0 100.0|>                                        |
  7   0.0  0.0   0.0 100.0|>                                        |
EntitleCapacity/VirtualCPU +----------|----------|----------|----------+
EC+ 62.9  0.9   0.0  36.2|UUUUUUUUUUUUUUUUUUUUUUUUiiiiiiiiiiiiiiiiii|
 VP 48.9  0.7   0.0  28.1|UUUUUUUUUUUUUUUUUUUUUUiiiiiiiiiiiii--------|
EC= 155.5% VP= 77.8%      +--No Cap---|----------|-SMT-4-----100% VP=2 CPU+
 Workload  Partition (WPAR)
Number of WPARs= 2         |  Physical-CPU| Memory-in-MB |
WPAR-Name        Type  State |  User System|InUse numperm| RunQ pSwitch Fork
wp06             Sys Active |  0.00  0.01| 64.3  35.9|  0.0     14  0.0
wp02             Sys Active |  0.96  0.00| 32.7   8.5|  2.6     54  0.0
 Work-Load-Manager (WLM)
Classes=2    Mode=Active        Rsets ProcTotal ClassTotal
             CPU    MEM    BIO CPU MEM IO  CPU   MEM   BIO
Class Name   |---Used-Percent--||--Desired-||----Shares-----|Proc's T I L
wp06             0.5    4.5   0.0 100  98 100   -1    -1    -1    20 0 0 0
wp02            52.4    2.2   0.0 100  98 100   -1    -1    -1    21 0 0 0
Total percentage 52.9    6.7   0.0         Tier, Inheritance & LocalShm=T I L
```

---

## Slide 48

**nmon WPAR stats are back in AIX 7 TL1/AIX6 TL7**  48

- **Not** just WLM hit W

**Busy with WPAR work**

**These are WLM classes and WPAR stats appear to be missing**

```
-topas nmon---W=WLM---         Host=green3        Refresh=2 secs---17:08.11
 CPU-Utilisation-Small-View           EntitledCPU= 1.00 UsedCPU= 1.999
Logical  CPUs        0----------25----------50----------75----------100
CPU User% Sys% Wait% Idle%|         |          |          |          |
  0  20.0  1.0   0.0  79.0|UUUUUUUUUU                               >
  1  79.5  0.0   0.0  20.5|UUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUU     >
  2   0.0  0.0   0.0 100.0|>                                        |
  3   0.0  0.0   0.0 100.0|>                                        |
  4 100.0  0.0   0.0   0.0|UUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUU>
  5 100.0  0.0   0.0   0.0|UUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUU>
  6   0.0  0.0   0.0 100.0|>                                        |
  7   0.0  0.0   0.0 100.0|>                                        |
EntitleCapacity/VirtualCPU +----------|----------|----------|----------+
EC+ 79.5  0.3   0.0  20.2|UUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUiiiiiiiiii|
 VP 79.5  0.3   0.0  20.2|UUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUiiiiiiiiii|
EC= 199.9% VP= 100.0%     +--No Cap---|----------|-SMT-4-----100% VP=2 CPU+
 Work-Load-Manager (WLM)
Classes=5    Mode=Active        Rsets ProcTotal ClassTotal
             CPU    MEM    BIO CPU MEM IO  CPU   MEM   BIO
Class Name   |---Used-Percent--||--Desired-||----Shares-----|Proc's T I L
Unclassified     0.0    8.5   0.0 100  98 100   -1    -1    -1     0 0 0 0
Unmanaged        0.0   30.6   0.0 100  99 100   -1    -1    -1     0 0 0 0
Default          0.0    8.1   0.0 100  98 100   -1    -1    -1     3 0 0 0
Shared           0.0    5.2   0.0 100  98 100   -1    -1    -1     0 0 0 0
System           0.2   64.7   0.0 100  99 100   -1    -1    -1    79 0 0 0
Total percentage 0.2   86.5   0.0         Tier, Inheritance & LocalShm=T I L
```

## Too many CPUs

- Power 795 = 256 cores = 1024 logical CPUs
- Can't watch this on screen 1024 pixel screen!
- Actually logical CPUs not so interesting
  - Once we know they are all in use

- Want to see whole VM physical CPU use hit `l` (L)
- CPU Long term view
  - 70 snapshots
  - But tops out at 100%
  - Even if say 8 times over Entitlement
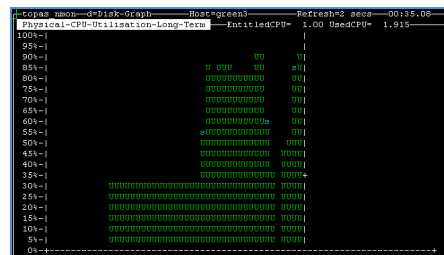
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## Too many CPUs

- Long term Physical CPU view
- Lowercase L and #

**Insert bar walks right then wraps around to left**

**Last snapshot**

**Max=2 physical CPUs**

**Average of what is on screen**

## Slide 1
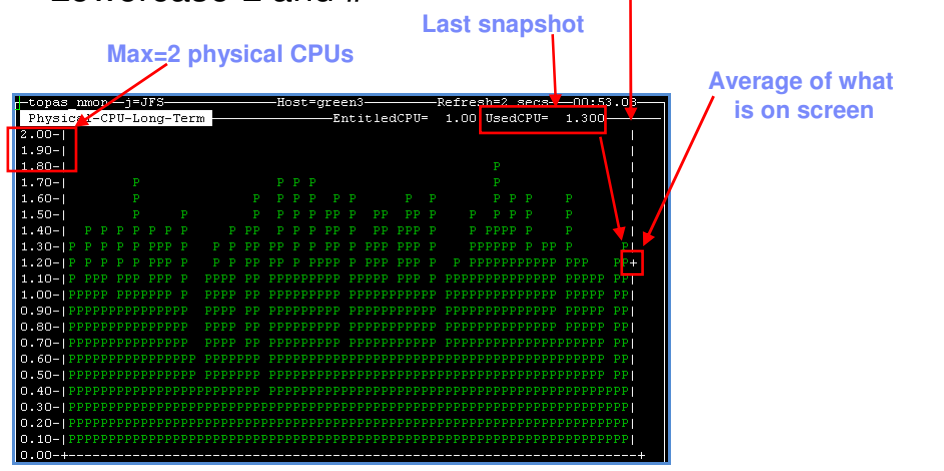
**Max=2**

**Stopped all work**

- Long term Physical CPU view
  - Autoscaling   **Max=0.5**

**Max=0.031**

```
topas nmon   +=slower          Host=green3      Refresh=2 secs   00:58.21
Physical-CPU-Long-Term                    EntitledCPU=  1.00 UsedCPU=  0.012
0.031|
0.030|
0.028|
0.027|
0.025|
0.023|                           P                                    P
0.022| P    P    P    P    P              P  | P    P    P    P    P    P
0.020| P    P    P    P    P    P    P    P  | P    P    P    P    P    P
0.019| P    P    P    P    P    P    P    P  | P    P    P    P    P    P
0.017| P    P    P    P    P    P    P    P  | P    P    P    P    P    P
0.016| P    P    P    P    P    P    P    P  | P    P    P    P    P    P
0.014| P    P    P    P    P  P  P    PP   | P    PP   P    P    P    P
0.012| P    PP    P    P    P   PPP  PP   PP + P   PP   P    P    P P  P
0.011| PPP  PPPP PPPPPPPPP PP    PPPPPPPPPPPPP|P PPPP PPPPPP PPPPPPPPPPPP PPP
0.009|PPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPP|PPPPPPPPPPPPPPPPPPPPPPPPPPPP
0.008|PPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPP|PPPPPPPPPPPPPPPPPPPPPPPPPPPP
0.006|PPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPP|PPPPPPPPPPPPPPPPPPPPPPPPPPPP
0.005|PPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPP|PPPPPPPPPPPPPPPPPPPPPPPPPPPP
0.003|PPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPP|PPPPPPPPPPPPPPPPPPPPPPPPPPPP
0.002|PPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPP|PPPPPPPPPPPPPPPPPPPPPPPPPPPP
0.000+----------------------------------+                            +
```

**Max=0.06**

## Slide 2

# nmon file output

# Started with: nmon -f

## nmon More data saved for AIX6 TL7/AIX7 TL1

In the BBBP section = AIX Parameters
- **Uptime** → long AIX has been running
  - BBBP,000,**uptime**
  - BBBP,001,uptime," 01:13AM up19:18,2 users, load average: 1.91, 1.54, 1.18"
- **lssrad –av** →SRAD and CPU-Memory Affinity
  - BBBP,174,lssrad
  - BBBP,175,lssrad,"REF1 SRAD      MEM      CPU"
  - BBBP,176,lssrad,"0"
  - BBBP,177,lssrad,"     0   1699.37   0-7"
- Next service pack: **emgr -l**
  - For determining if or when eFixes are installed
- I forget when added but it includes
  - **mpstat –b** output = Memory Affinity stats Local, Near, Far references
  - **ifconfig** & **netstat** – may have been there a while!!

---

## nmon More data saved for AIX6 TL7/AIX7 TL1

Even more Disk Statistics

- Below are splitting out the old DISKXFERS to read and write
  - DISKRIO       - Disk IO Read per second
  - DISKWIO       - Disk IO Writes per second

- Experimental
  - DISKAVGRIO - Disk IO Average Reads per second
  - DISKAVGWIO - Disk IO Average Writes per second

## nmon More data saved for AIX6 TL7/AIX7 TL1

- CPU PURR and SPURR based stats
  - PCPU_ALL and PCPU<number 1 to logical processors>
  - SCPU_ALL and SCPU<number 1 to logical processors>

- Power Saving Mode via Systems Director AEM

  On my POWER7 Power 750
  ```
  # pmcycles –M                           ← Undocumented
  This machine runs at 3550 MHz   ← No power saving
  --- Switch on Power saving here ---
  # pmcycles –M
  This machine runs at 2126 MHz   ← Power saving mode
  # pmcycles –M
  This machine runs at 3862 MHz   ← Over-clocking
  ```

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## topas_nmon PURR/SPURR
## for AIX7 TL1 on POWER7 E=0.8 SMT=4 VP=2
## with Power Saving On via Systems Director AEM
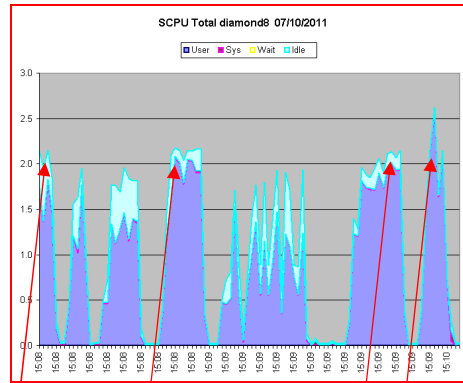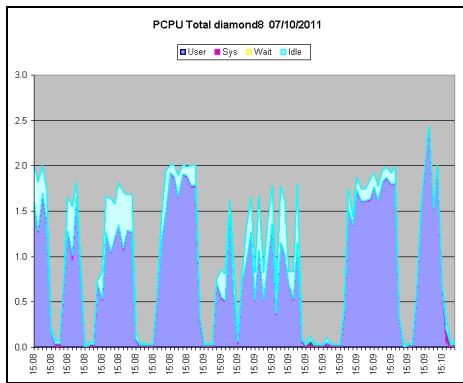


Note: Goes over the VP. It has more clock ticks due to over clocking by ~9% - I think!!

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## Online Disks

nmon then
 DDDD

- New columns

```
┌─topas_nmon──p=Partitions─────Host=green3───────Refresh=2 secs──21:05.44─┐
│ Disk-KBytes/second-(K=1024,M=1024*1024)                                  │
│Disk    Busy    Read    Write Transfers   Size  Peak%    Peak KB/s qDepth  │
│ Name           KB/s     KB/s    /sec     KB          Read+Write or N/A    │
│hdisk0   38%     0.0 12032.0    94.0  128.0    38%   12610.9        --     │
│cd0       0%     0.0     0.0     0.0    0.0     0%       0.0        --     │
│Totals(MB/s) Read=0.0   Write=11.8  Size(GB)=64    Free(GB)=56            │
└─────────────────────────────────────────────────────────────────────────┘
```

```
┌─topas_nmon──W=WLM──────────Host=green3───────Refresh=2 secs──21:05.52─┐
│ Disk-KBytes/second-(K=1024,M=1024*1024)                               │
│Disk       Size  Free Disk  Disk     Volume       Disk                 │
│ Name        GB    GB Paths Adapter  Group        Description          │
│hdisk0       64    56   1   vscsi0 rootvg         Virtual SCSI Disk Drive│
│cd0           0     0   0   vscsi0 None           Virtual SCSI Optical Served│
│Totals(MB/s) Read=0.0   Write=0.0   Size(GB)=64    Free(GB)=56         │
└───────────────────────────────────────────────────────────────────────┘
```

```
┌─topas_nmon──W=WLM──────────Host=green3───────Refresh=2 secs──21:07.32─┐
│ Disk - Service times and Queues                                       │
│Disk      Read Service   Write Service Wait  ServQ  WaitQ  ServQ        │
│ Name     milli-seconds  milli-seconds Size   Size   Full               │
│hdisk0       0.0            4.1         0.0    0.1    0.0    0.0         │
│cd0          0.0            0.0         0.0    0.0    0.0    0.0         │
│Totals(MB/s) Read=0.0   Write=14.1  Size(GB)=64    Free(GB)=56         │
└───────────────────────────────────────────────────────────────────────┘
```

```
┌─topas_nmon──3=Top-by-CPU-use──Host=green3───────Refresh=2 secs──21:07.50─┐
│ Disk-KBytes/second-(K=1024,M=1024*1024)                                  │
│Disk    Busy    Read   Write 0─────────25──────────50──────────75────────100│
│ Name           KB/s    KB/s |           |          |           |         │
│hdisk0   43%     0   14464|WWWWWWWWWWWWWWWWWWWWW      >                     │
│cd0       0%     0       0|                                                │
│Totals           0   14464+───────────|────────────|────────────|─────────+│
└───────────────────────────────────────────────────────────────────────────┘
```

---

## nmon

- While online hit [ to start a capture and then ] to stop

```
┌─topas_nmon──A=Async-I/O──────Host=purple7───────Refresh=2 secs──04:29.58─┐
│ CPU-Utilisation-Small-View                 EntitledCPU=  4.00 UsedCPU=  0.027│
│Logical  CPUs         0─────────25──────────50──────────75──────────100    │
│CPU User%  Sys% Wait% Idle%|          |          |           |          |  │
│  0  0.0   2.0   0.0  98.0|s                                            >  │
│  1  0.0   0.0   0.0 100.0| >                                           |  │
│  2  0.0   0.0   0.0 100.0| >                                           |  │
│  3  0.0   0.0   0.0 100.0| >                                           |  │
│  4  0.0   5.4   0.0  94.6|ss >                                         |  │
│  5  0.0   0.1   0.0  99.9|          >                                  |  │
│  6  0.0   0.1   0.0  99.9|  >                                          |  │
│  7  0.0   0.1   0.0  99.9| >                                           |  │
│  8  0.0   9.1   0.0  90.9|ssss      >                                  |  │
│  9  0.0   1.0   0.0  99.0| >                                           |  │
│ 10  0.0   1.0   0.0  99.0| >                                           |  │
│ 11  0.0   1.0   0.0  99.0| >                                           |  │
│ 12  0.0   0.0   0.0 100.0|>                                            |  │
│ 13  0.0   0.1   0.0  99.9|>                                            |  │
│ 14  0.0   0.1   0.0  99.9|>                                            |  │
│ 15  0.0   0.1   0.0  99.9|>                                            |  │
│ 16  0.0   2.2   0.0  97.8|s  >                                         |  │
│ 17  0.0   1.0   0.0  99.0| >                                           |  │
│ 18  0.0   1.0   0.0  99.0| >                                           |  │
│─On demand Recording started. Press ']' to stop this recording \ ─────────│
└───────────────────────────────────────────────────────────────────────────┘
```

# topas

- Hit Space to FREEZE the output
  - if you want to study the numbers in detail

```
Topas Monitor for host: purple7-AIX71D-1136Bval: 2      Thu Oct 13 04:36:11 2011
================================================================================
REF1    SRAD  TOTALMEM  INUSE    FREE    FILECACHE  HOMETHRDS  CPUS
--------------------------------------------------------------------------------
0        0     7.46G   1.00G   6.46G        305M      293.0    0-7 12-15
1        1     5.59G    759M   4.85G        231M      299.0    8-11
2        2     1.95G    291M   1.66G       80.6M      133.0    24-27
================================================================================
CPU     SRAD  TOTALDISP  LOCALDISP%  NEARDISP%  FARDISP%
--------------------------------------------------------------------------------
0        0     228.0       22.4        0.0       77.6
1        0     139.0       19.4        0.0       80.6
3        0     102.0       11.8        0.0       88.2
2        0     85.00        2.4        0.0       97.6
24       2     61.00      100.0        0.0        0.0
13       0     59.00       88.1        0.0       11.9
19       1     44.00      100.0        0.0        0.0
17       1     41.00      100.0        0.0        0.0
8        1     40.00      100.0        0.0        0.0
18       1     40.00      100.0        0.0        0.0
```