



RHODES UNIVERSITY

Grahamstown • 6140 • South Africa

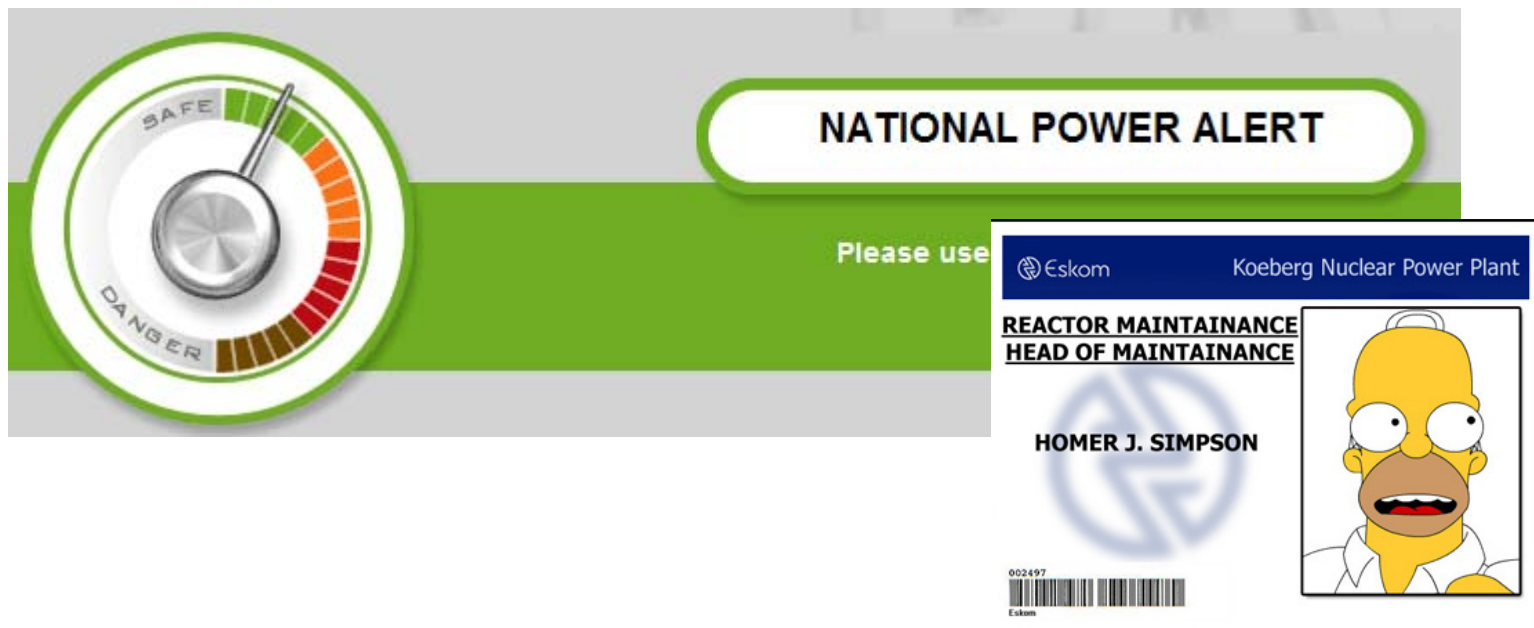
Demand-side Management of Internet Bandwidth

Guy Antony Halse
DITCHE ATE 2008



Demand-Side Management?

- “actions that influence the quantity or patterns of use of energy consumed by end users”
 - Wikipedia

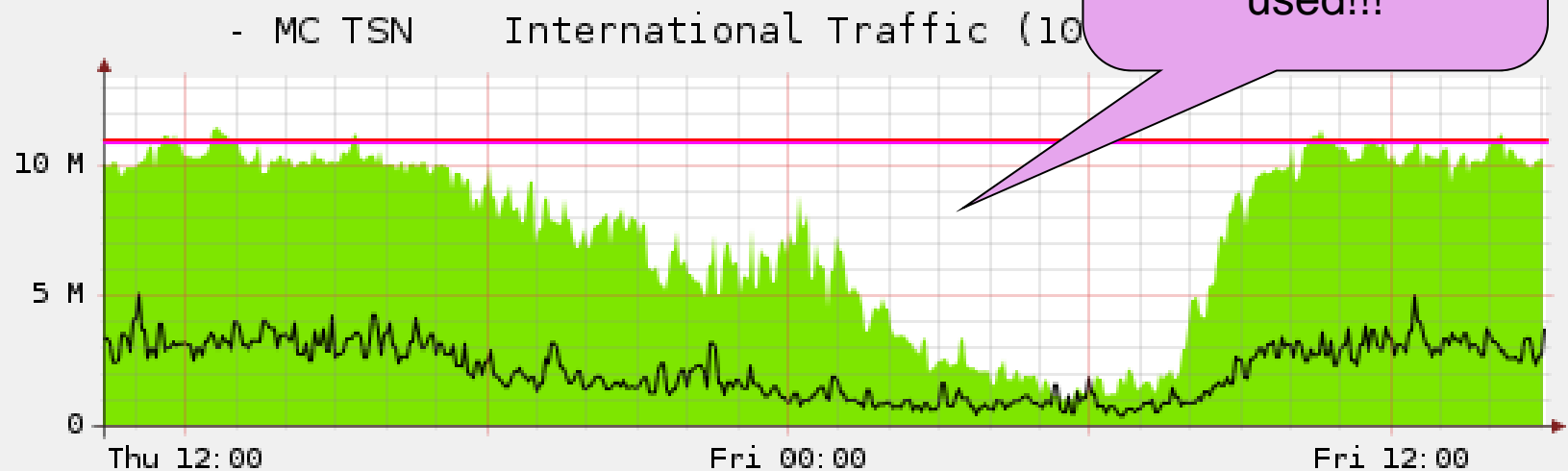


Internet Quotas at Rhodes

- All users have a fixed Internet quota, measured in Megabytes
- Quotas are calculated over a two-week (336 hour) sliding window
- Users who go over quota have their Internet access throttled, and eventually cut off

The Problem

We're paying for Internet bandwidth that is not being used!!!



From 2008/09/11 10:20:32 To 2008/09/12 15:05:41

Current Inbound:	9.82 M	Average:	7.37 M	Maximum:	11.38 M
Current Outbound:	4.79 M	Average:	2.18 M	Maximum:	5.06 M
■ 95th Percentile (Inbound Traffic)	(10.88 mbit inbound)				

Demand-side Management

- Need to encourage users to make use of bandwidth out-of-hours
- We do this by making it seem “cheaper”

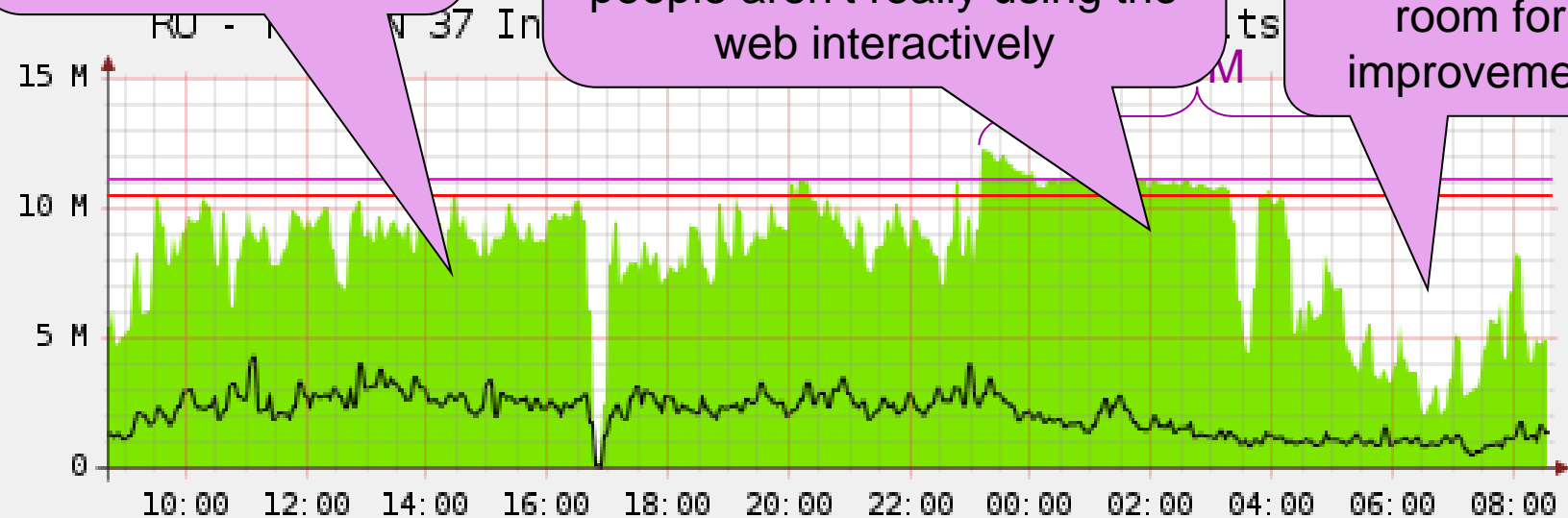
23:00 - 00:59	0.2
01:00 - 06:59	0.04
07:00 - 07:59	0.2
08:00 - 22:59	1.0

The Results

Good utilisation during working hours, but no significant saturation

Extensive use overnight. Saturation occurs, but this isn't particularly a problem as people aren't really using the web interactively

But there's still room for improvement



Current Inbound: 4.58 M Average: 8.33 M Maximum: 12.20 M
Current Outbound: 1.34 M Average: 2.07 M Maximum: 4.28 M
■ 95th Percentile (Inbound Traffic) (11.12 mbit inbound)

Problems

- Users don't know about our DSM scheme
- Users don't know how to schedule downloads
- Download managers are a double-edged sword
- **We still don't have enough Internet bandwidth**

