



# **CISCO IOS WARM RELOAD & WARM UPGRADE**

**INTERNET TECHNOLOGIES DIVISION  
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# High Availability

- **Business depends on anywhere, anytime access to the systems, data, and applications**
- **Customers cite improving High Availability as the highest priority project**
- **Cisco IOS® High Availability infrastructure enhancements are targeted at reducing any and all sources of downtime**
- **Warm Reload & Warm Upgrade**
  - Faster reloads and upgrades for single processor systems**

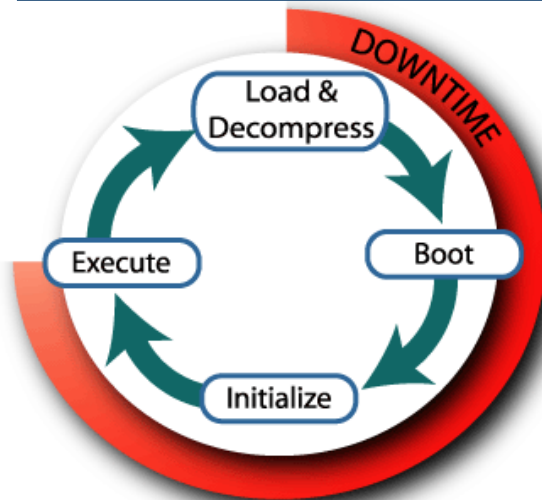
# Warm Reload

- Enables significant reduction in device reboot time by lowering the mean time to repair (MTTR) for software failures

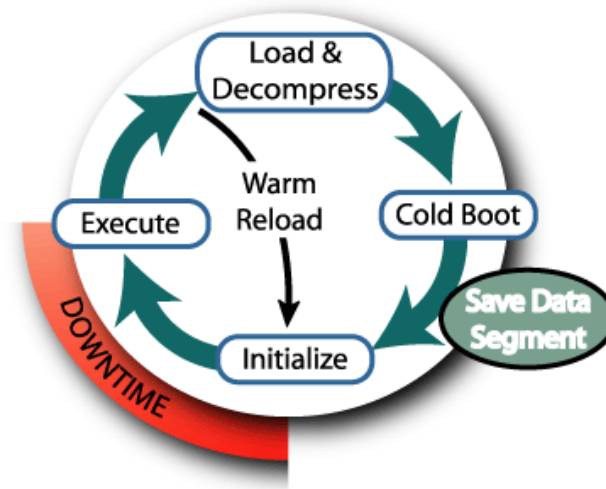
Executing begins during re-run from the start address with previously saved, pre-initialized variables

Particularly applicable to single processor systems

**Boot Process prior to Warm Reload**



**Warm Reload Process**



# Improved Availability of Single Processor Routers and Switches

- **NPE-G1 Setup**

Normal reload: 223 seconds

Warm reload: 32 seconds

Reduced downtime by 86%

3 minutes, 11 seconds

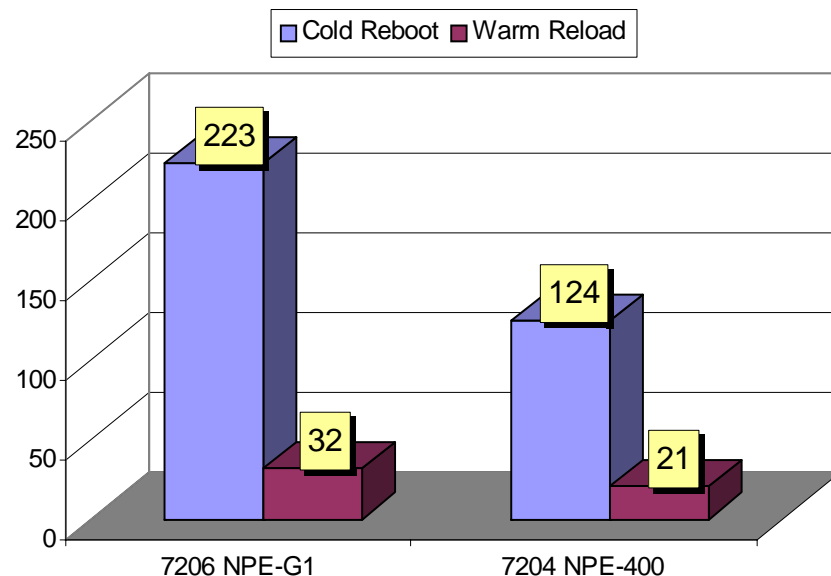
- **NPE-400 Setup**

Normal reload: 124 seconds

Warm reload: 21 seconds

Reduced downtime by 83%

1 minute, 3 seconds



	Downtime Reduction	Percent Improvement
<b>72xx G1</b>	191	86%
<b>72xx 400</b>	103	83%

\* Time is represented in seconds

# Warm Reload Details

- Savings from reading and decompressing of image
- Additional memory consumption to store a compressed copy of initialized variables in read-only section – typically 1-2 MB
- Useful in case of software design error:
  - Software-induced crash
  - Requires restart to repair
- Hardware failure will force the ‘cold’ reboot
- If the router reboots for the same reason within 5 minutes it will ‘cold’ reboot

**Router(config)# warm-reboot *count uptime***

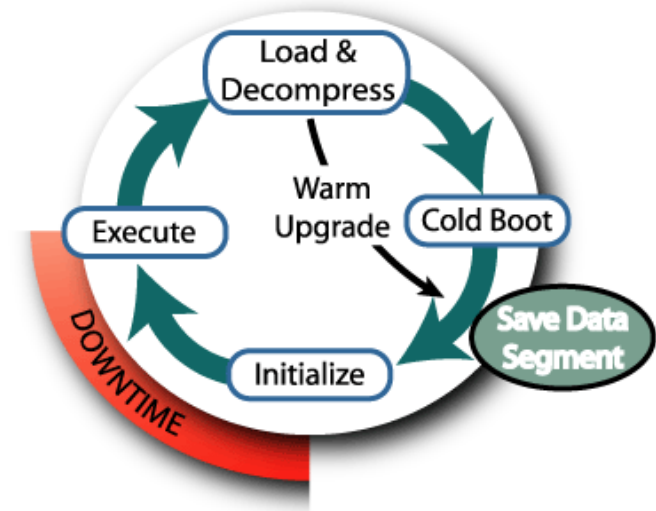
**(Optional) count *number***—maximum number of warm reboots allowed between any intervening cold reboot. Valid values range from 1 to 50. The default value is 5 times.

**(Optional) uptime *number*** - minimum number of minutes that must elapse between initial system configuration and an exception before a warm reboot is attempted. If the system crashes before the specified time elapses, a warm reboot is not attempted. The default value is 5 minutes.

# Warm Upgrade

- Builds on Warm Reload to reduce downtime for planned upgrades and downgrades
- Enables router to read and decompress the new Cisco IOS Software image and then to transfer control to it, while packet forwarding is continued
- Can be used in conjunction with Warm Reload
- If upgrade fails, the current instance of Cisco IOS Software will continue to run, unless the image is partially or fully erased
- Requires router to have sufficient free memory to read and decompress the new image, while the current instance of Cisco IOS Software is running

## Warm Upgrade process



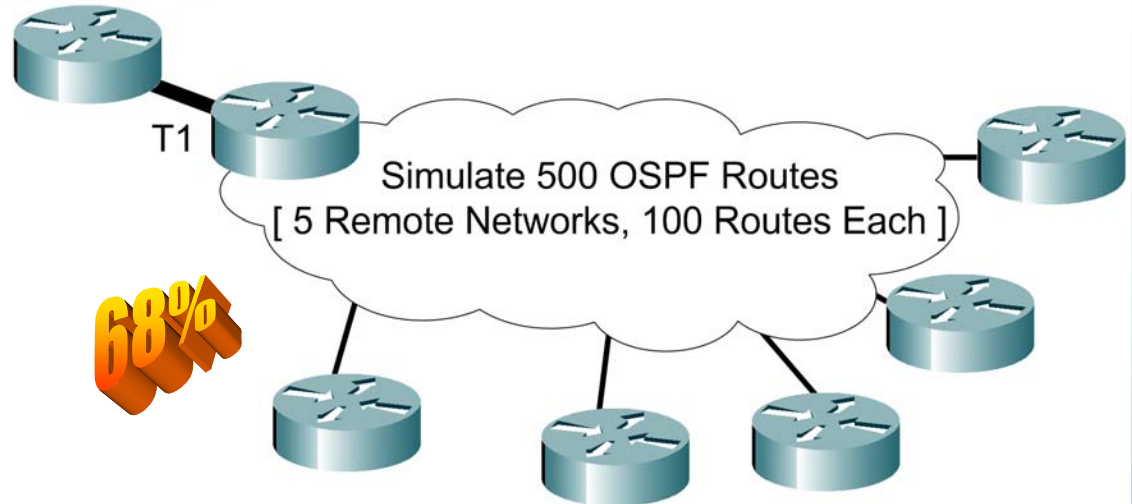
- **Normal Reloading without Cisco IOS Warm Upgrade**  
Router loses packet forwarding for about 3.5 minutes
- **With Cisco IOS Warm Upgrade**  
Router loses packet forwarding for about 30 seconds

**Router# reload warm file disk2:c7200-js-mz.122-18.S3**

# Warm Upgrade Reduces Service Impact

- Before & After
- Reduction in duration of packet loss
- Downtime reduced by at least 2 minutes, 27 seconds
- Less Service Impact

Router Under Test  
7206 - NPE-400



	Without Warm Upgrade	With Warm Upgrade
Reload Start	0:00	0:00
Packet Loss Seen	0:00	0:27 ←
Reload Complete	2:50	1:00 ←
OSPF Adjacency Restored	3:20	1:30 ←
Traffic Flow Restored to All 500 Destinations	3:35	1:35

# References

- **Cisco IOS Warm Reload and Warm Upgrade**  
[www.cisco.com/go/availability](http://www.cisco.com/go/availability)
- **Cisco IOS Software Release 12.3(11)T**  
[www.cisco.com/go/release123t/](http://www.cisco.com/go/release123t/)



# CISCO SYSTEMS

