



CISCO IOS WARM RELOAD & WARM UPGRADE

**INTERNET TECHNOLOGIES DIVISION
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High Availability

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- **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**

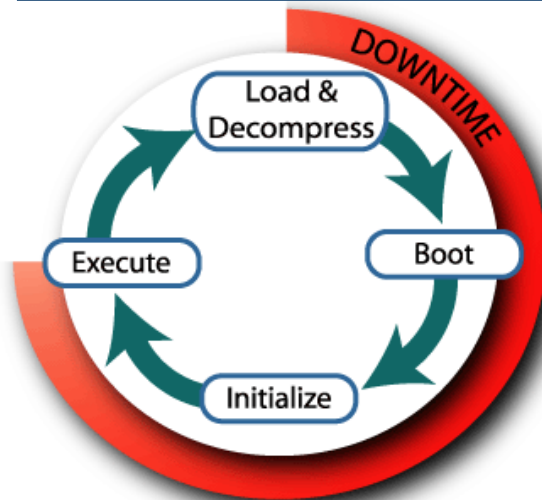
Warm Reload

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

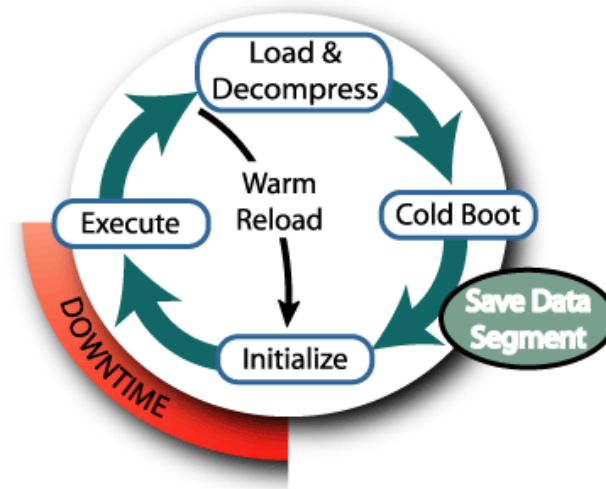
Executing begins during re-run from the start address with previously saved, pre-initialized variables

Particularly applicable to single processor systems

Boot Process prior to Warm Reload



Warm Reload Process



Improved Availability of Single Processor Routers and Switches

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- **NPE-G1 Setup**

Normal reload: 223 seconds

Warm reload: 32 seconds

Reduced downtime by 86%

3 minutes, 11 seconds

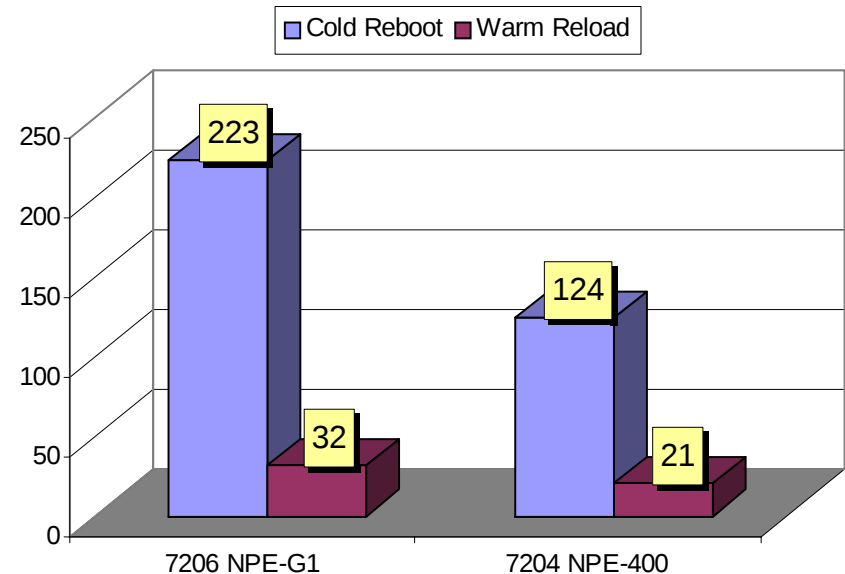
- **NPE-400 Setup**

Normal reload: 124 seconds

Warm reload: 21 seconds

Reduced downtime by 83%

1 minute, 3 seconds



	Downtime Reduction	Percent Improvement
72xx G1	191	86%
72xx 400	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*

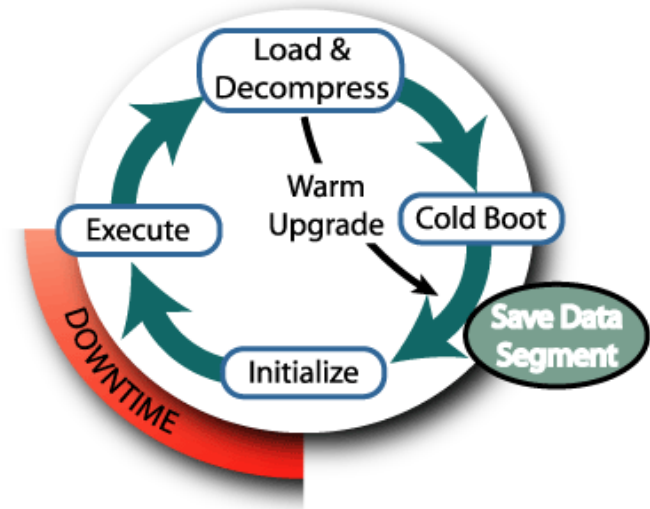
(Optional) count *number*—maximum number of warm reboots allowed between any intervening cold reboot. Valid values range from 1 to 50. The default value is 5 times.

(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

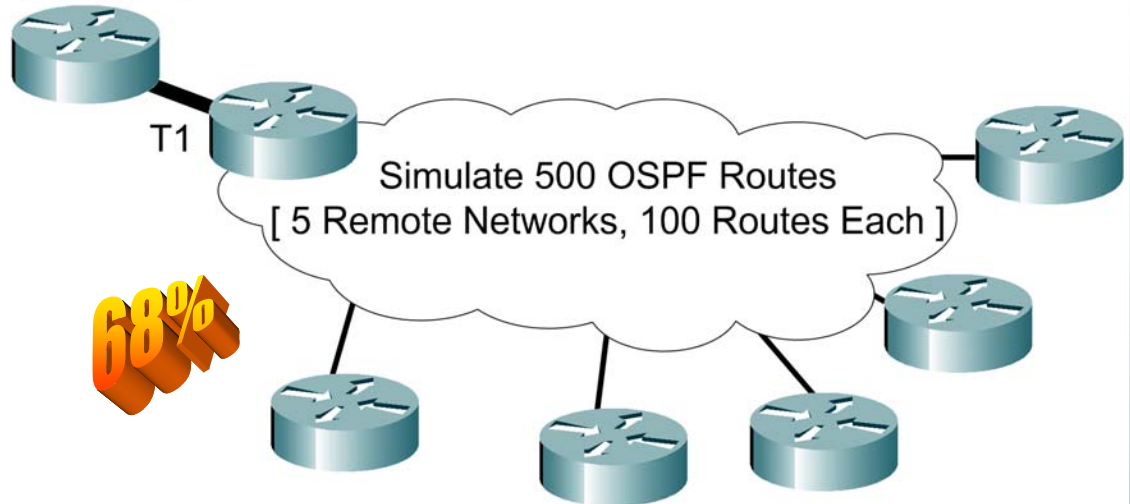
Router# reload warm file disk2:c7200-js-mz.122-18.S3

Warm Upgrade Reduces Service Impact

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- 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

- **Cisco IOS Software Release 12.3(11)T**

www.cisco.com/go/release123t/

