



# G22

## A z990 Performance Update

Walt Caprice

**zSeries Expo**

Nov. 1 - 5, 2004

Miami, FL

# z990 Performance Overview

- z990 much faster than z900s
  - ▶ 50% to 60% faster than turbo models
  - ▶ 80% to 90% faster than base models
  - ▶ (based on LSPR workload ratios at equal levels of multiprocessing)
- speed and size creates more workload variability
  - ▶ workload tuning issues
  - ▶ capacity sizing issues
  - ▶ last commonly seen: moving from G4 to G5
- it is important to do customized capacity sizings
  - ▶ do not use MIPS tables
  - ▶ do make customized use of LSPR, zPCR, or CP2000
  - ▶ especially for upgrades to processors with fewer engines
    - these are where workloads vary the most from average

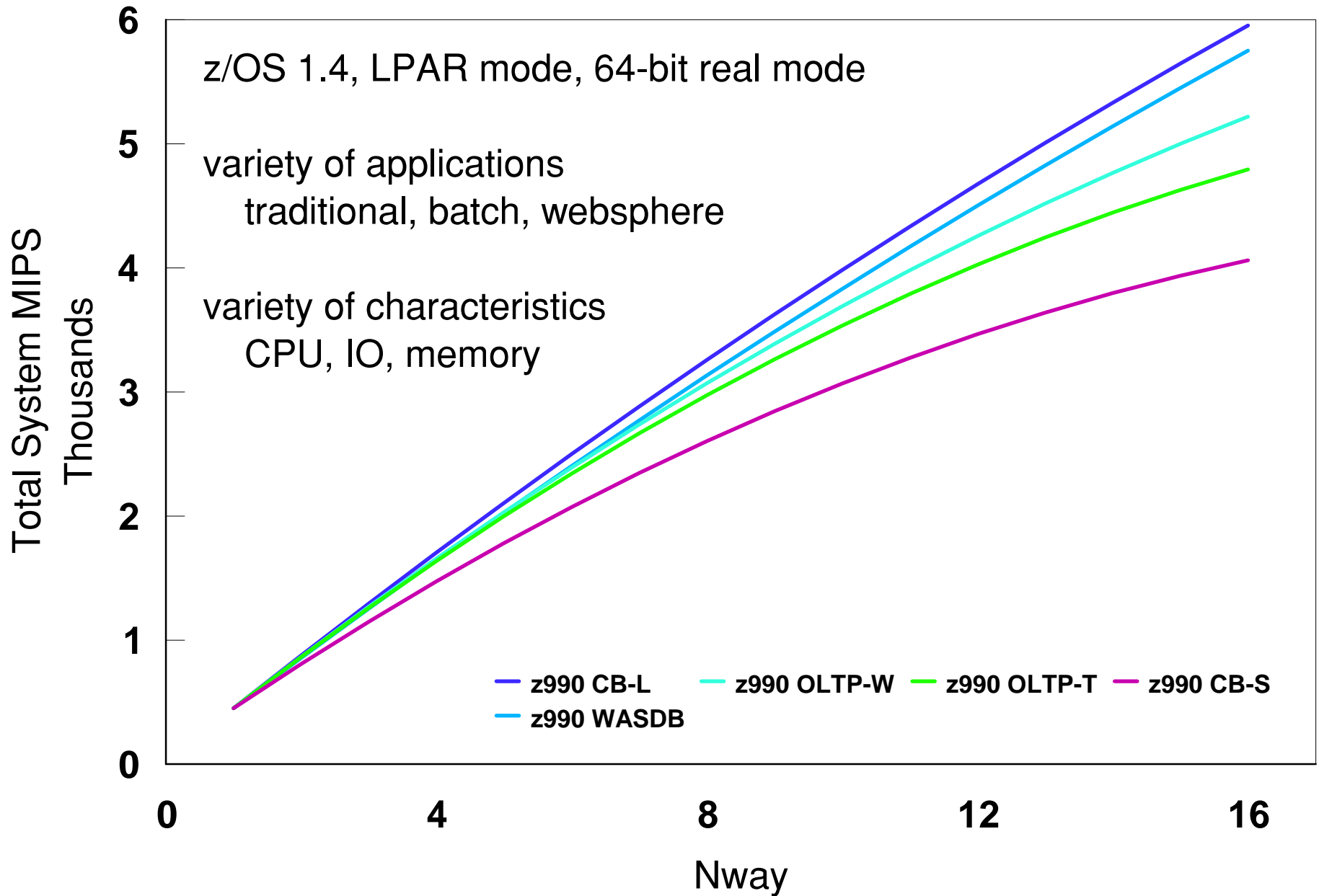
# Workload tuning issues

- When moving workloads to significantly faster processors
  - ▶ Tune and configure for efficiency
    - LPAR weights and number of logical processors
    - coupling technology upgrade may be needed
  - ▶ Tune for importance
    - manage latent demand
    - work may have been constrained by engine speed
      - with faster z990 engines, it may significantly increase
    - WLM policy (or other tuning actions) may have to change

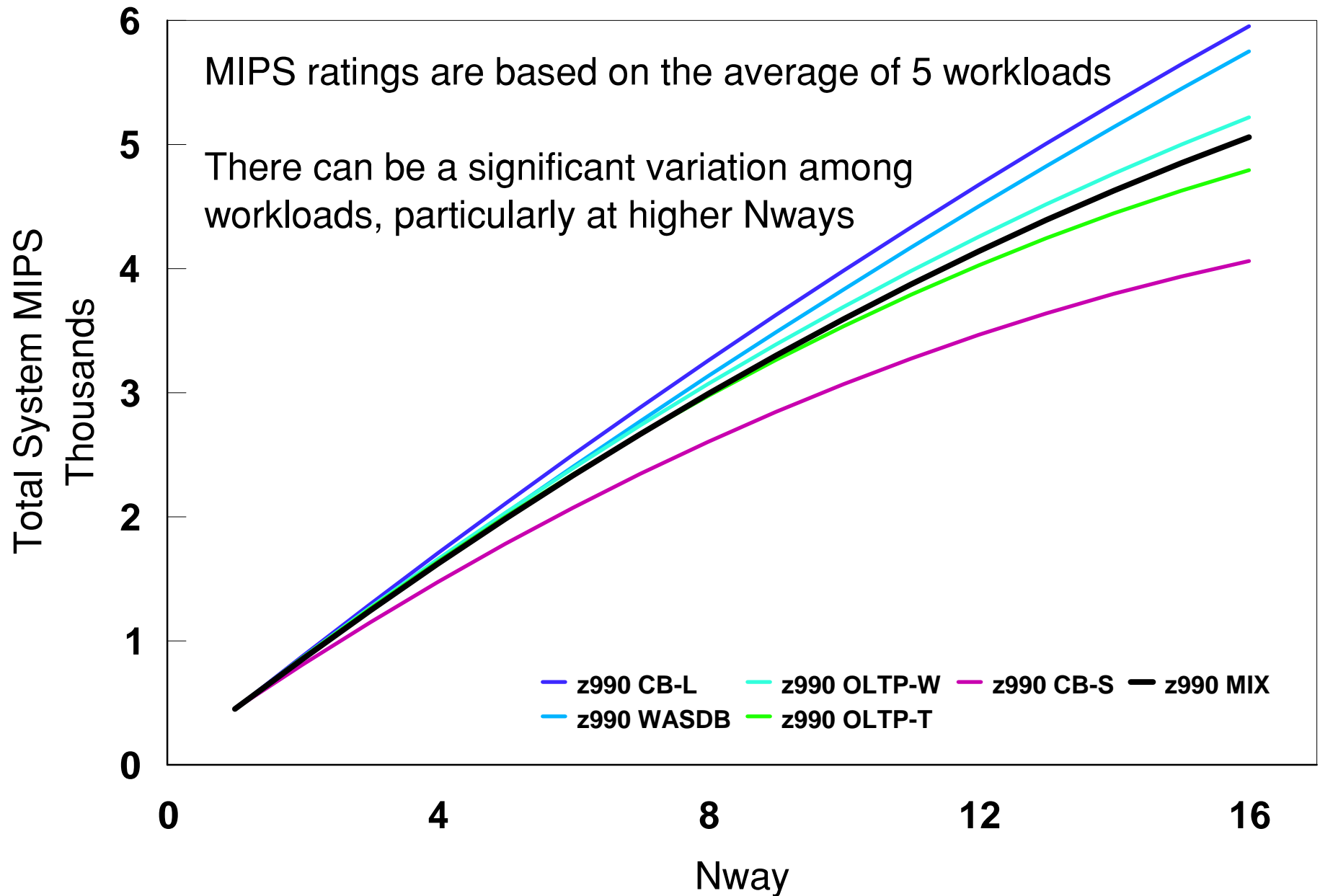
# Capacity Sizing Issues

- Single number metrics - MIPS and MSUs - are based on averages and should not be used for sizing capacity
- Actual workload performance can vary significantly around the average
  - ▶ greatly affected by workload characteristics
    - particularly as pertains to Nway scalability
  - ▶ also affected by LPAR configuration and coupling technology
- Bigger processors have bigger variability
  - ▶ wider variety and changing mix of applications
  - ▶ unexpected latent demand can be "let loose" by significantly faster engines

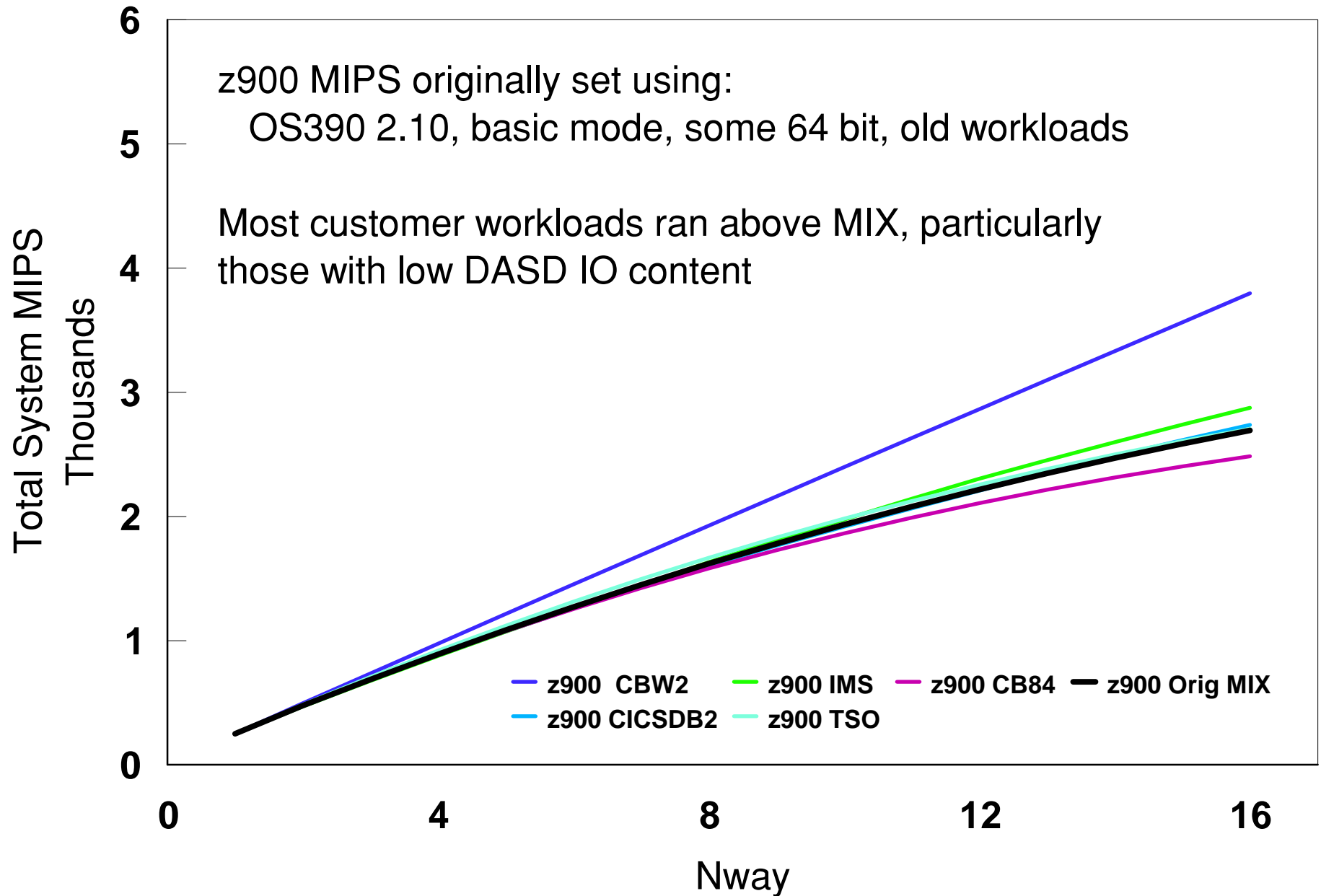
# z990 LSPR Measurements for z/OS



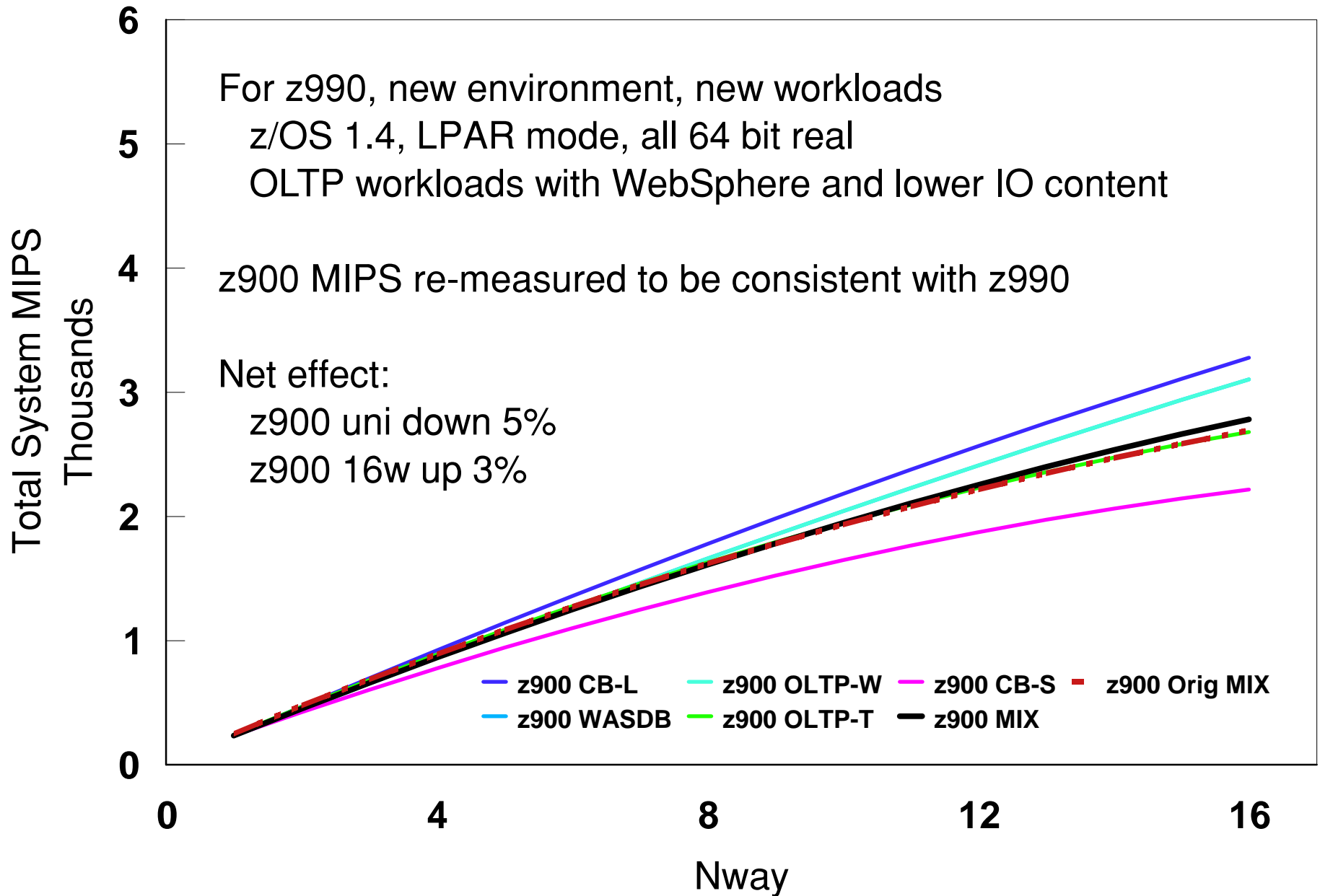
## z990 MIPS ratings - based on average MIX



# z900 MIPS change with new workloads and environment

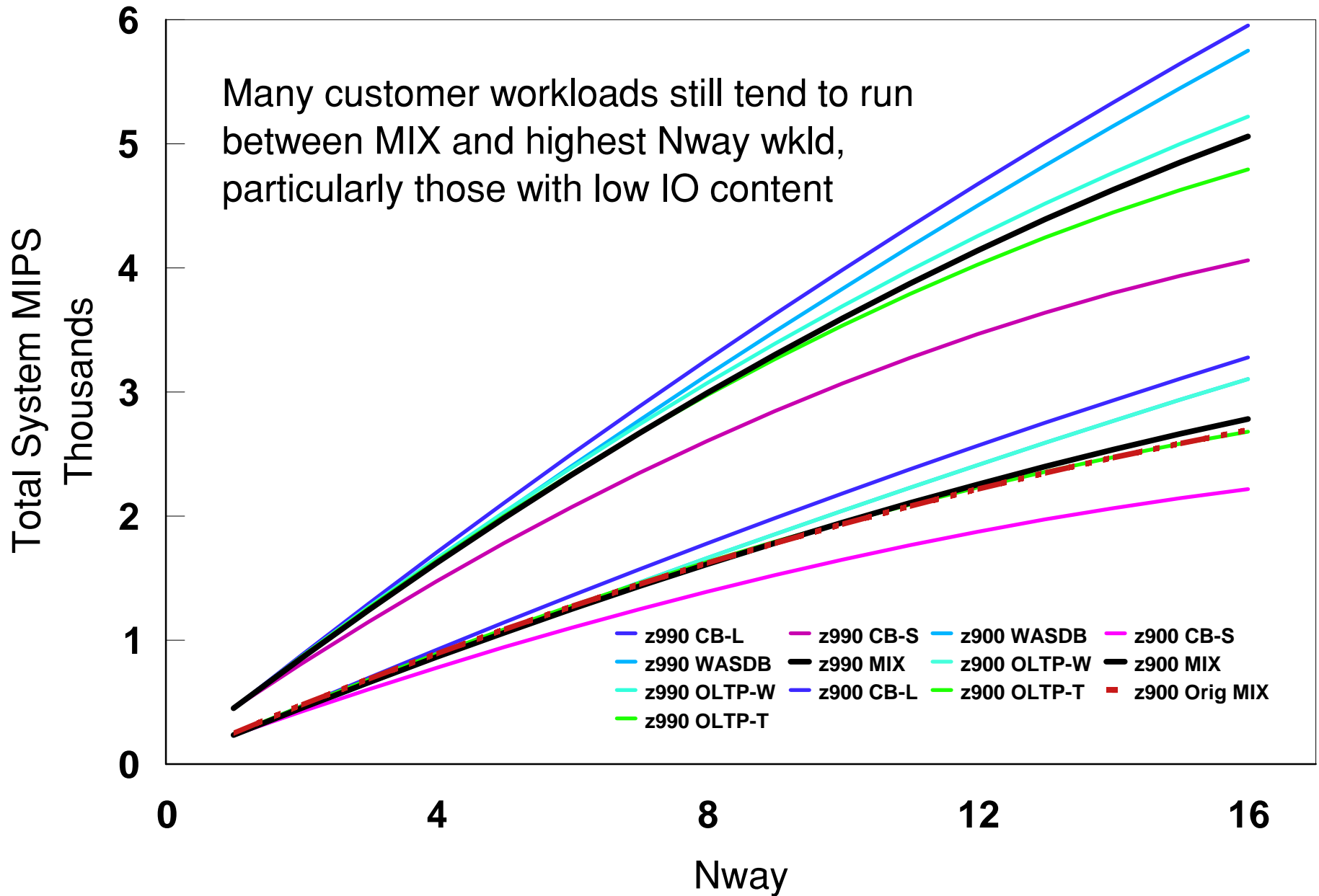


# z900 MIPS change with new workloads and environment



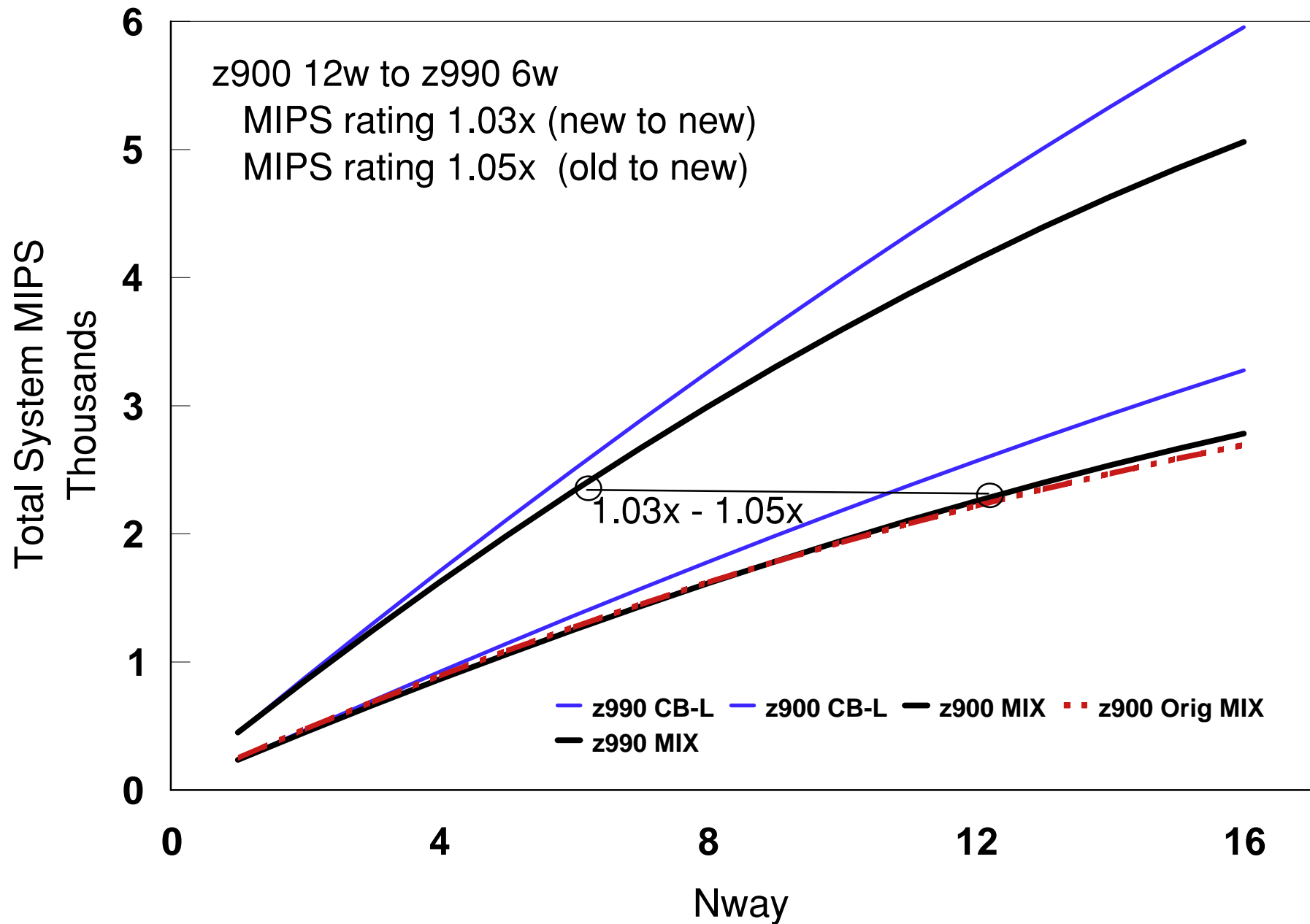


# z900 to z990 upgrades - sensitivity to workload scaling



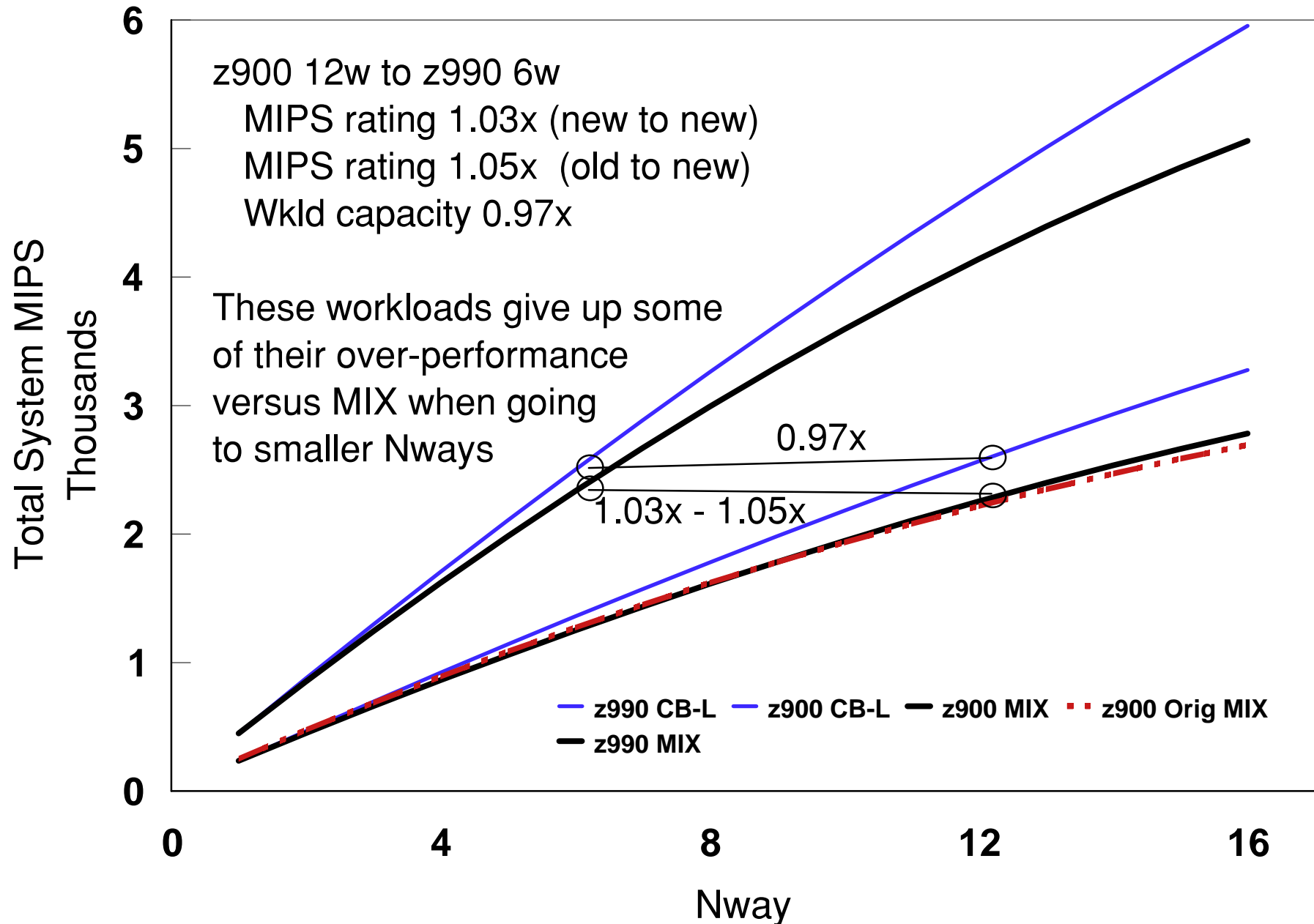
# Example of workload sensitivity effect on capacity sizing

## Upgrade from z900 to z990 for the highest Nway scaling wkld



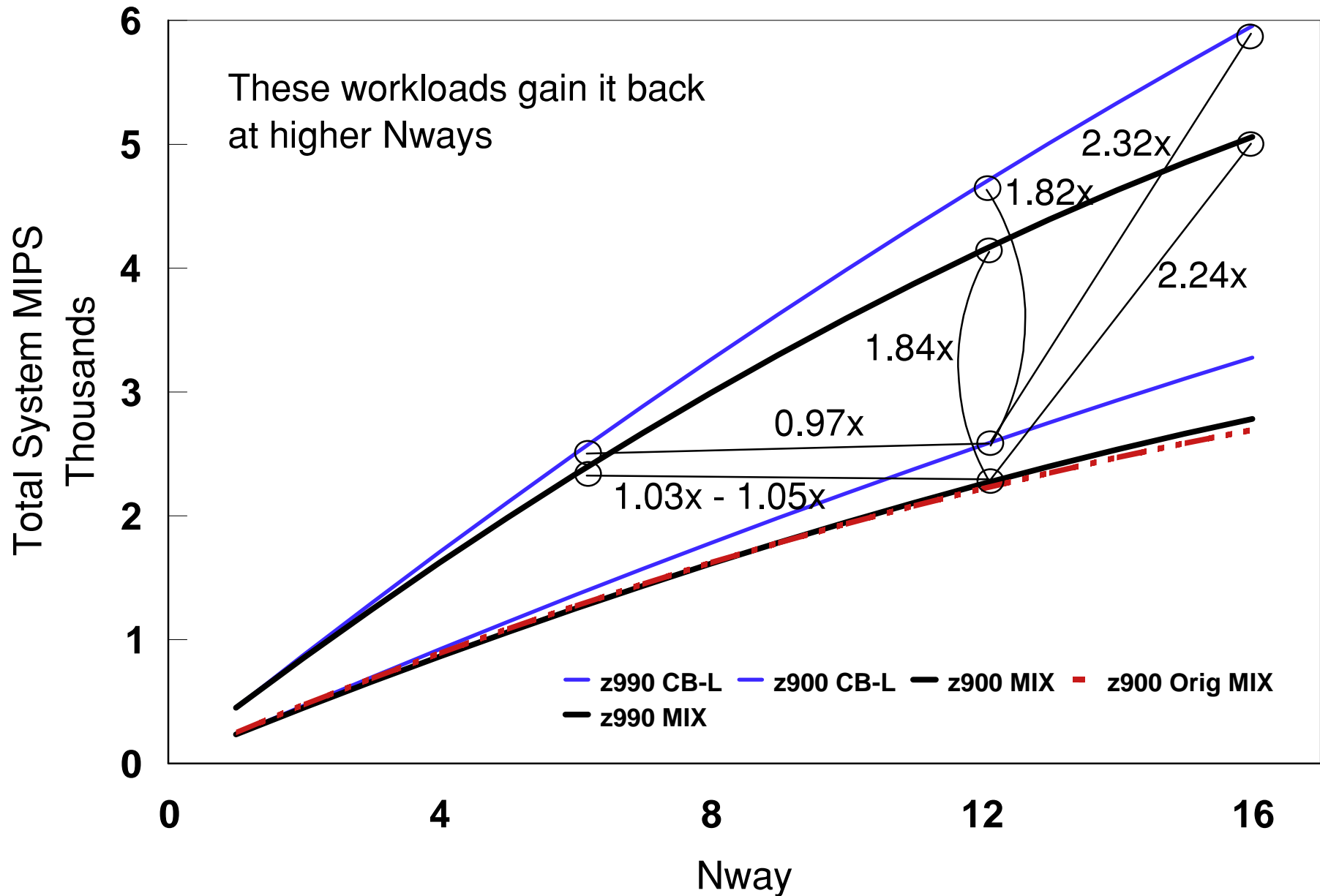
# Example of workload sensitivity effect on capacity sizing

## Upgrade from z900 to z990 for the highest Nway scaling wkld



# Example of workload sensitivity effect on capacity sizing

## Upgrade from z900 to z990 for the highest Nway scaling wkld



# LPAR effect on Capacity Sizings

- LPAR configurations affect the efficiency of the HW and SW
  - ▶ key factors
    - workload characteristics
    - number of LPARs
    - number of logical processors and weight of each LPAR
    - overall ratio of logical to physical processors
  - ▶ example efficiency factors on a 16way processor
    - 1.00 for 1x16w (1x16way partition)
    - 0.97 for 2x16w average MIX workload
    - 0.97 for 2x16w high scaling workload
    - 1.04 for 2x8w average MIX workload
    - 1.02 for 2x8w high scaling workload
    - 1.00 for 4x8w average MIX workload
    - 0.98 for 4x8w high scaling workload

# Coupling Technology effect on Capacity Sizings

- Sysplex configurations affect the efficiency of the HW and SW
  - ▶ key factors
    - workload characteristics - rate of operations to the coupling facility
    - speed of coupling technology (CPU and links) versus speed of host technology
  - ▶ example efficiency factors
    - 0.98 for light coupling workload
    - 0.95 for medium coupling workload with speed-matched CF and host
    - 0.92 for medium coupling workload with "slow" CF versus host speed
    - 0.90 for heavy coupling workload with speed-matched CF and host

# Capacity Planning for Success

- Perform a customized capacity sizing using zPCR or CP2000
  - ▶ customize for workload (check for low DASD IO)
  - ▶ customize for LPAR configuration
- Consider need for tuning changes for LPAR and subsystems
- Consider upgrading coupling technology
  - ▶ understand capacity impacts of not changing
- Closely monitor need to adjust WLM tuning controls
  - ▶ watch out for latent demand

# Capacity Sizing Tool Summary

- CPS Tools
- zPCR
  - ▶ easy to load and use on laptop
  - ▶ most effective when customized to the workload characteristics and LPAR configuration
- CP2000
  - ▶ automated data input from SMF/RMF
  - ▶ smart text output including graphs and charts
- Provide customized capacity sizings
  - ▶ workload mix (for example, low IO content)
  - ▶ LPAR configuration
    - should run "before" and "after" configurations, not just "after"
  - ▶ much more accurate than using "MIPS tables"
  - ▶ particularly important when upgrade involves going backward in Nway



# Questions

What About.....

