

**2nd Conference on  
Enabling Technologies for PetaFLOPS Computing**

**Summary Findings and Recommendations**

by

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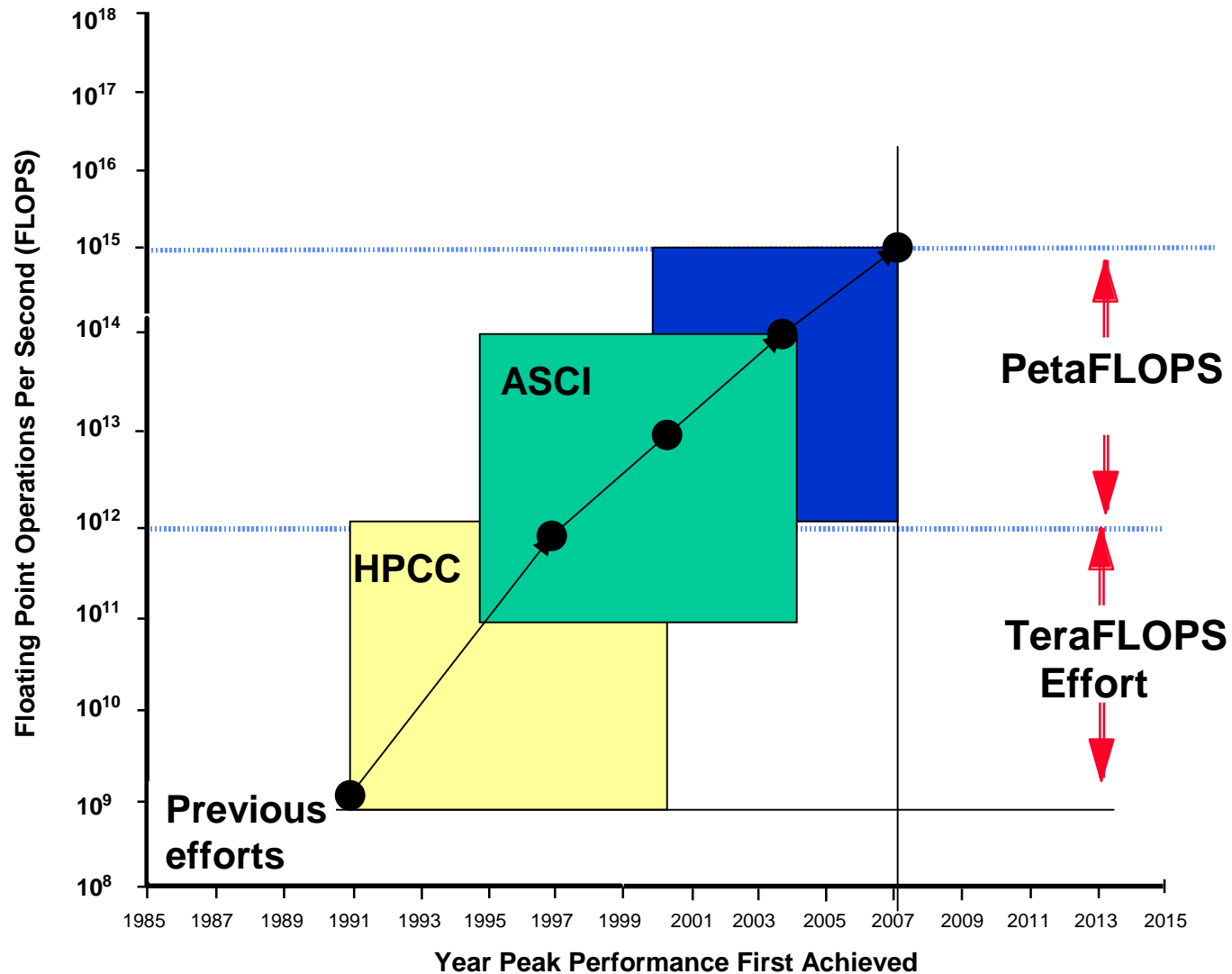
February 19, 1999

# Questions and Answers

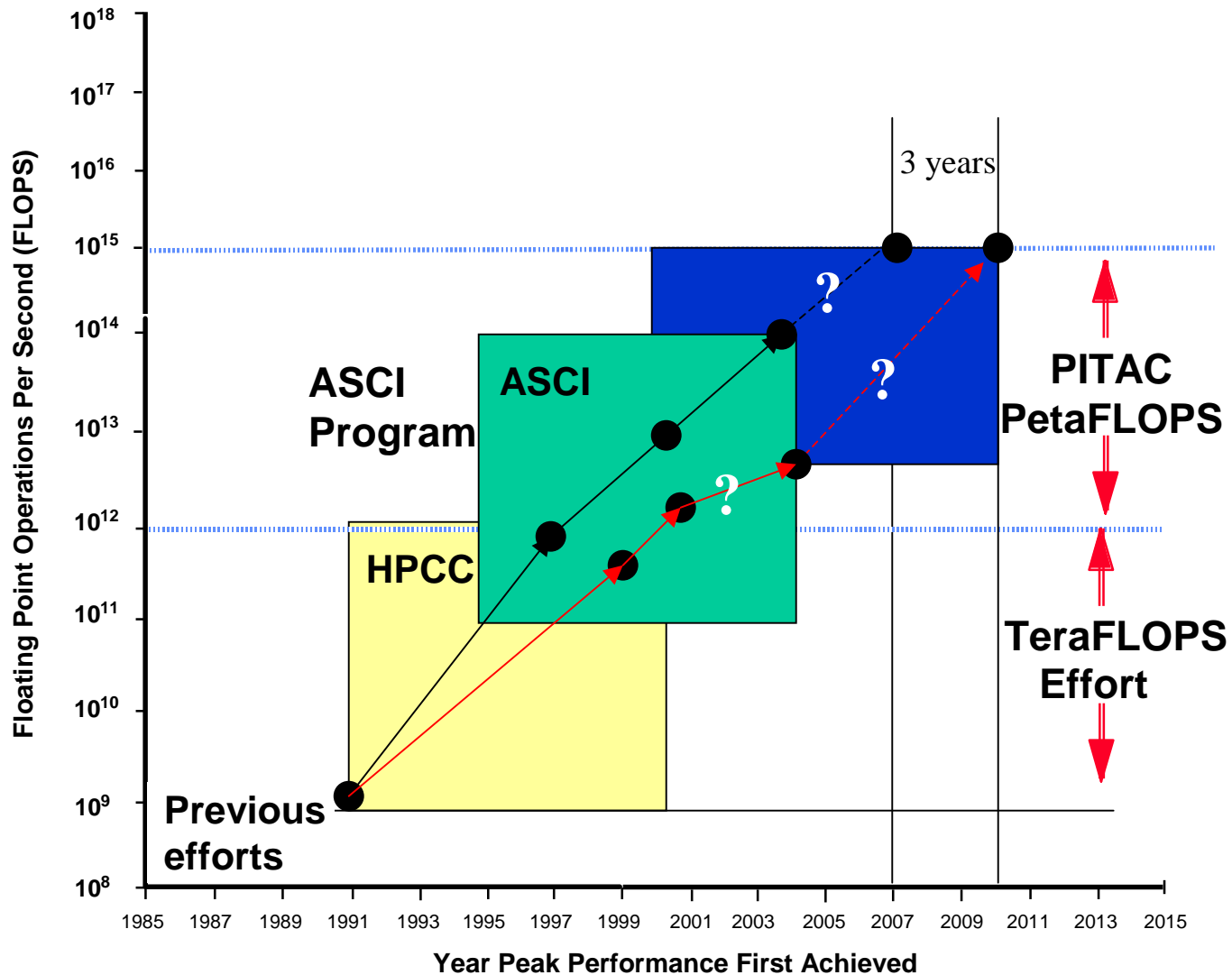
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- Conference presented and updated various PetaFLOPS study results
- Results consistent with previous findings and recommendations, but with more accuracy
  - Progress has been made
- Many obstacles still remain
  - Software, programmability, costs, engineering decisions, etc.
- Need to build prototype systems
- Who will push this ahead?

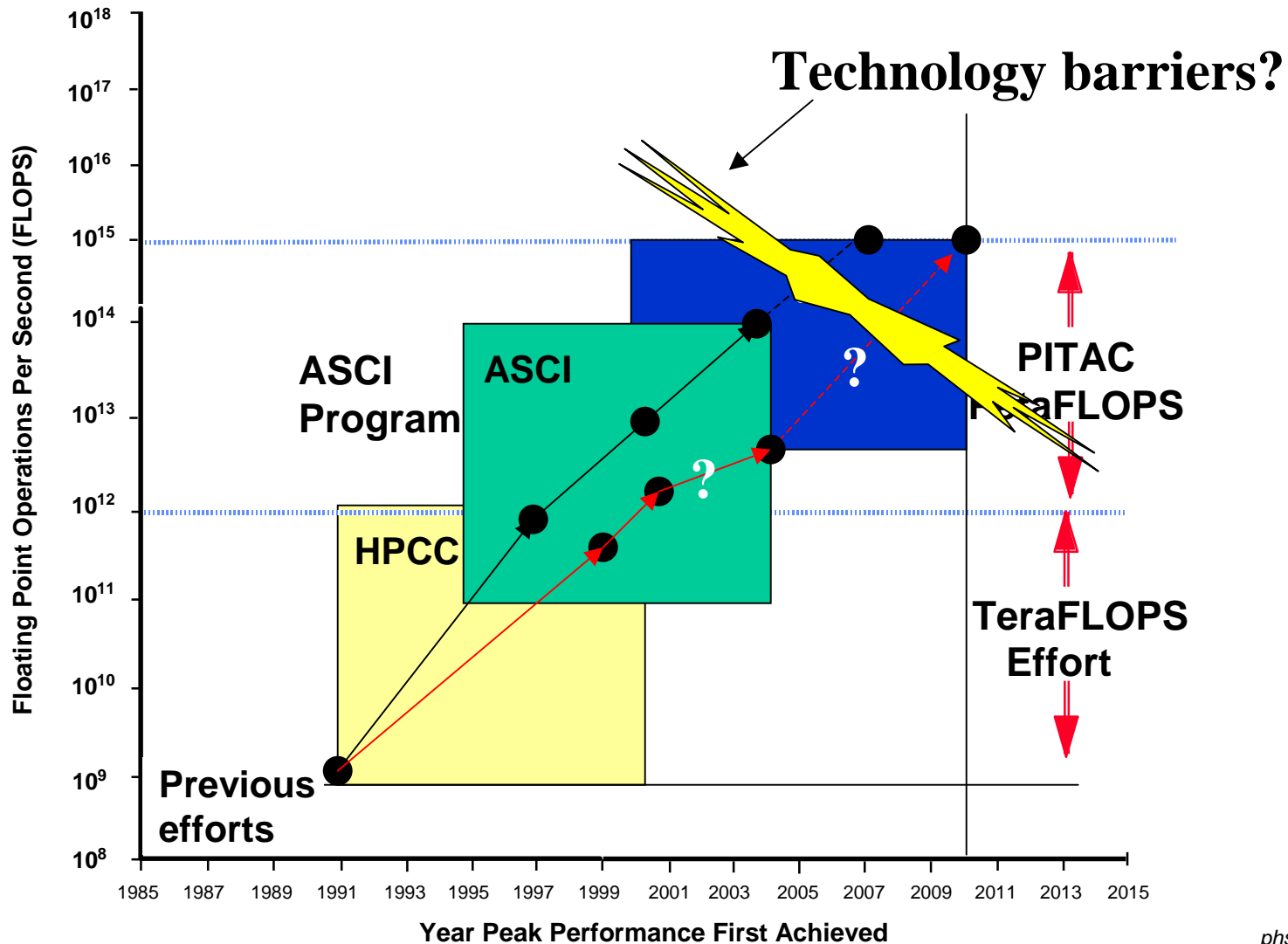
# ASCI contribution to PetaFLOPS



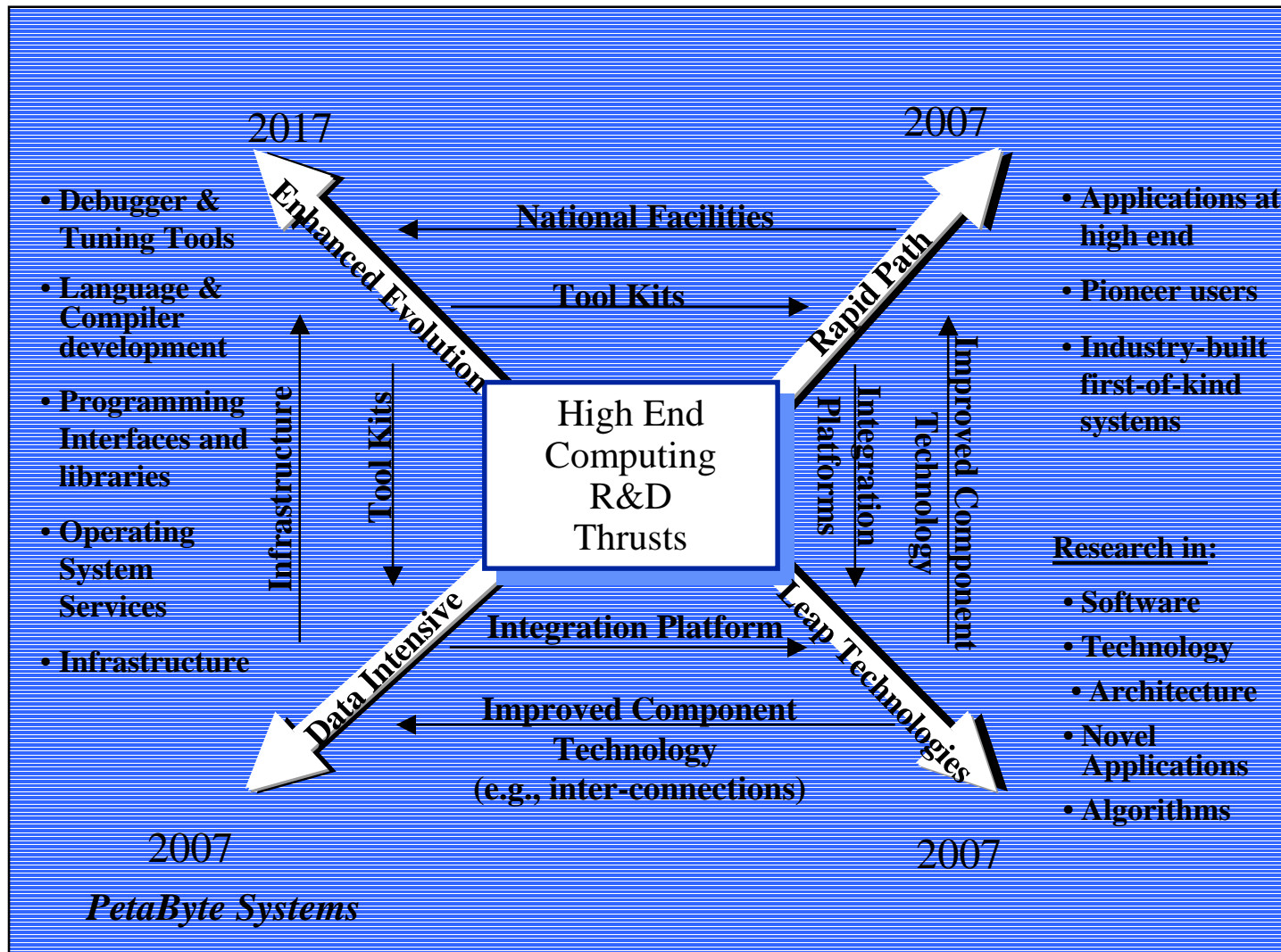
# Which path to PetaFLOPS?



# What Barriers to PetaFLOPS?



# Toward PetaFLOPS Computing



- a vintage slide (1995)

# Recommendations

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- Get PetaFLOPS into the main stream of high end computing
  - SC '99 and beyond
  - IEEE
  - Conferences, workshops, journal papers, etc.
- Form and grow a High End Community
  - These PetaFLOPS Conferences and Workshops have been a good start with a few people, but more is needed
  - Present a coherent position to the companies who we want to develop the systems we subsequently want to buy

## Recommendations (2)

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- Don't settle for a singular (but the wonderful) destination of just PetaFLOPS
  - Rapidly move toward PetaFLOPS, BUT do not want to **stop** when we get there
  - Do not pursue PetaFLOPS just to reach that mountaintop
- Push for a sustained research, development and deployment of the systems
  - Needed for numerous applications that we now know
  - Will also enable future uses which we do not at this point understand

# More Specific Recommendations

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- Conduct Point Design Studies
  - Every 2 years; at 6-12 month duration
  - Do about 4-6 in each period
  - Harvest the results
  - Builds basis for future development
  - NSF must do this
- Develop laboratory prototype systems
  - Do one to two concurrently
  - Fund at \$2M - \$10M/yr. depending on the project
  - NSF could do this
  - DARPA has done this in the past; needs to be re-engaged

## More Specific Recommendations (2)

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- Construct industrial prototype systems
  - Development and engineering activity needed
  - Do only for “non-market” driven capabilities
  - Today in Washington the proposal is that NSF is leading
    - NSF will need help
- Develop the **software** needed for TeraFLOPS systems
  - This will help the PetaFLOPS
  - Do it in a major way

# Workshop Recommendations

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- PetaFLOPS systems possible:
  - in 20 years with COTS technology or
  - accelerate to 10 years with new technology
- Essential for many important applications
- Memory, cost, power & efficiency dominate
- New technology means paradigm shift—Innovation critical
- Fundamental systems software scaling problems
- Role of algorithms must improve
- Conduct point design studies
  - in hardware and software
- Develop engineering prototypes
  - multiple technology track demonstrations