

# **MODELING THE INTERNET**

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# MODELING THE INTERNET

## OUTLINE

### WHAT SHOULD BE MODELED?

overlays and aspects of overlays

covering common functions across application, middleware, and network levels

### HOW SHOULD IT BE MODELED?

using "lightweight modeling" tools

using the right language for each purpose

### WHY SHOULD IT BE MODELED?

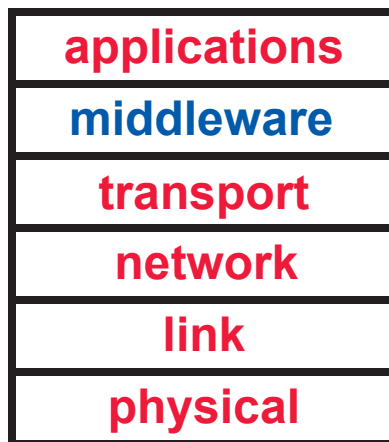
because functional modeling (as opposed to performance modeling) is almost unknown in networking . . .

. . . and is badly needed

# THE STATE OF INTERNET ARCHITECTURE

## THE "CLASSIC" INTERNET ARCHITECTURE

- defined in terms of layers with different functions



- designed to empower users and encourage innovation
- has succeeded beyond anyone's wildest dreams
- made obsolete by explosive growth in . . . users
  - . . . traffic
  - . . . applications
  - . . . security threats

## THE REAL INTERNET

- does not meet current or future needs for . . .
  - . . . mobility,
  - . . . security,
  - . . . reliability,
  - . . . quality of service,
  - . . . scale,
  - . . . network management,
  - . . . balancing the interests of diverse stakeholders
- "classic" architecture is eroded badly by exceptions
- separation of concerns always loses to the desire for efficiency (or to tussles between stakeholders, or to anything else)
- as a result of all these factors, it is much too difficult to build, deploy, and maintain networked applications

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# REFERENCES

- [Day 2008]** John Day, *Patterns in Network Architecture*, Prentice Hall, 2008.
- [Zave 2010]** Pamela Zave, Internet evolution and the role of software engineering, Proceedings of the Symposium on the Future of Software Engineering, Springer Lecture Notes in Computer Science, 2010.
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