Münchner Kreis - BMBF

Brainstorming Sitzung

Forschungsförderung 2006-201x

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NSF (USA): Global Environment for Networking Investigations (GENI)

- Creating new core functionality: Going beyond existing paradigms of datagram, packet and circuit switching; designing new naming, addressing, and overall identity architectures, and new paradigms of network management;
- Developing enhanced capabilities: Building security into the architecture; designing for high availability; balancing privacy and accountability; designing for regional difference and local values;
- Deploying and validating new architectures: Designing new architectures that incorporate emerging technologies (e.g., new wireless and optical technologies) and new computing paradigms enabled by pervasive devices;
- Building higher-level service abstractions: Using, for example, information objects, location-based services, and identity frameworks;
- Building new services and applications: Making large-scale distributed applications secure, robust and manageable; developing principles and patterns for distributed applications; and
- Developing new network architecture theories: Investigating network complexity, scalability, and economic incentives.

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Einige technologische Schlüsselthemen

- Was kommt nach dem Internet?
- Informationssicherheit
- Verfügbarkeit
- Selbstmanagement und Selbstorganisation
- Bedienbarkeit
- Offene Plattformen
- Service Oriented Architecture SOA
- Peer to Peer Kommunikation, Overlay Strukturen
- Seamless Wireless
- Transparent optical packet networks
- Positioning and Location
- Multimediale Suchmaschinen
- Semantic Web
- Anwendungs-Support: Accounting, Billing, Personalisierung,…

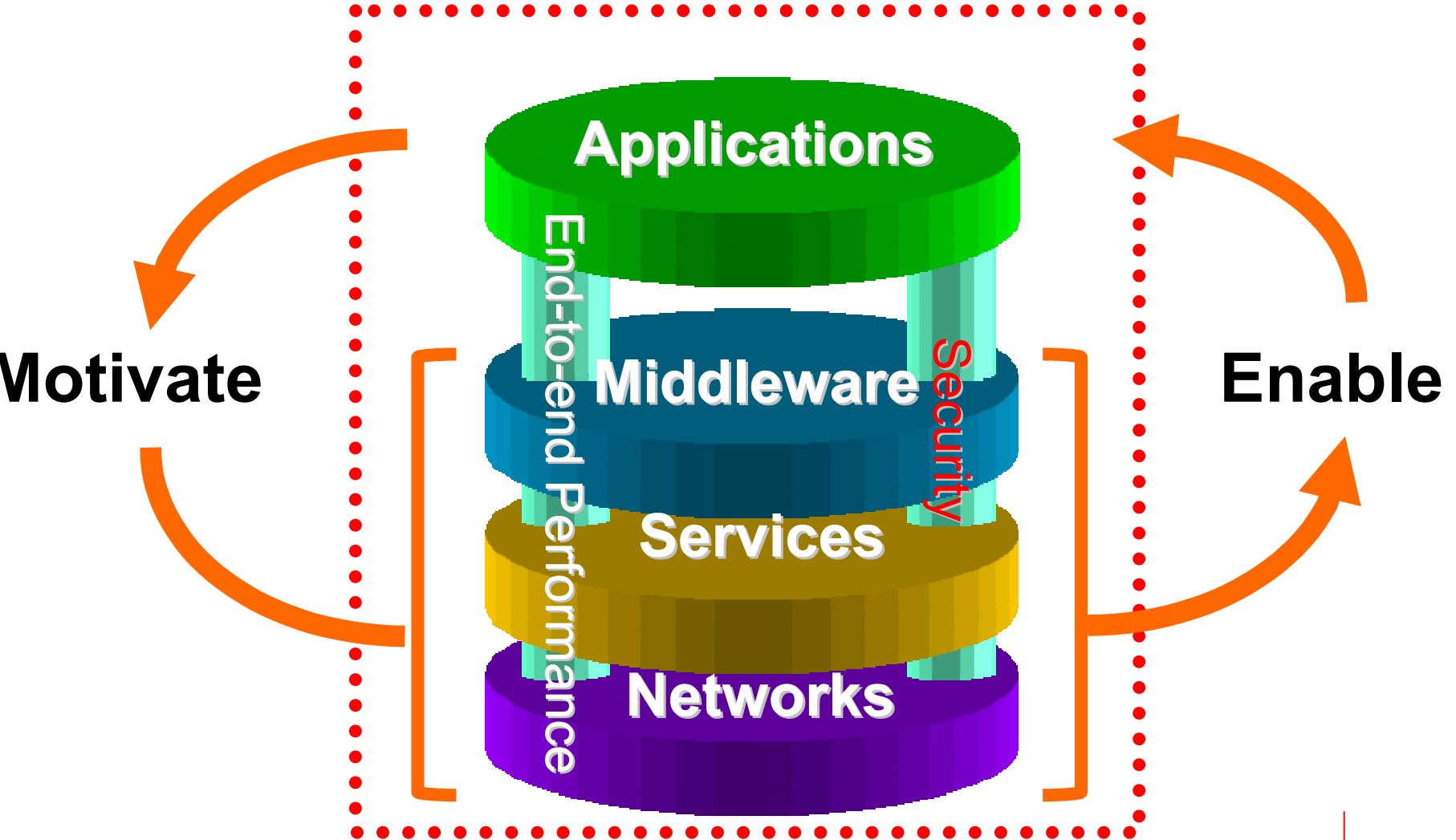
Challenges to the Future of the Internet

- End-to-end performance
- Network architecture scalability
- Limited reach of advanced capabilities
- Abuse of network resources by applications
- Security: Authentication & privacy
- Reduced investment in the Internet commons

Keys to the Future of the Internet

- Connectivity
  - Scalable
  - Reliably high end-to-end performance
- End-to-end architecture
  - IPv6
  - Security without NAT
- Reach
  - Disseminate multicast, end-to-end architecture
  - Integrate packet switched and circuit facilities
- Ease of use, privacy, and security
  - Standard core middleware
  - Authenticated Internet within & between trust communities
- Integration with advanced applications

Internet2 Today (and Tomorrow)



Internet2 Programs

- Network Infrastructure
  - Abilene, Fiberco, NLR Support, HOPI
- Network Services
  - IPv6, multicast, end-to-end performance
- Middleware
  - Authentication, trust federations (InCommon)
- Security
  - Security at Line Speed
- Applications

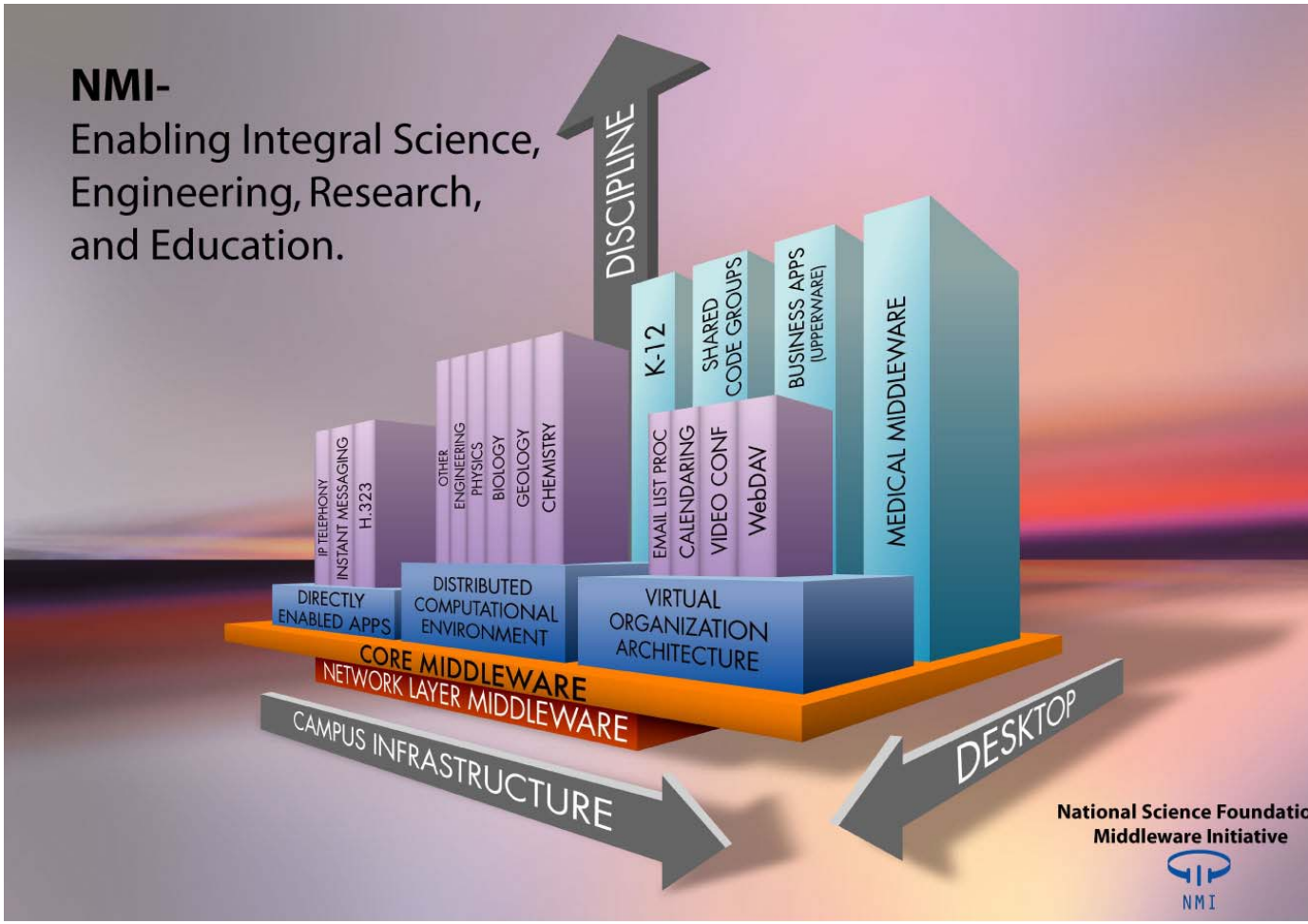
  Collaboration environments (Internet2 Commons), SIP, high performance file transfer
- International
  - Coordination with regional & national network organizations

End to end Performance

- View whole path as system
- Give end users (and their system/network admins) tools to discover, diagnose, fix (or learn who to contact to fix) problems
- Network measurement and monitoring framework (piPEs)
  - Use data from regularly-scheduled tests; archived data from others' tests
  - Provides capability to support HOPI efforts

Middleware

- Middleware is the stuff that makes “transparent use” happen, providing persistency, consistency, security, privacy, and capability



http://middleware.internet2.edu

Security

- Require network security approaches that:
  - Minimally compromise network performance and allow applications requiring advanced network services to function
  - Sustain, in so far as possible, the end-to-end nature of the Internet architecture
- Network security, host software, and middleware become inter-dependent
- Security at Line Speed
  - NSF-funded workshop
  - SALSA steering group
- Outcome – An authenticated Internet based on trust communities?