Evolution of (C/S) Technology

Anatomy of a wave

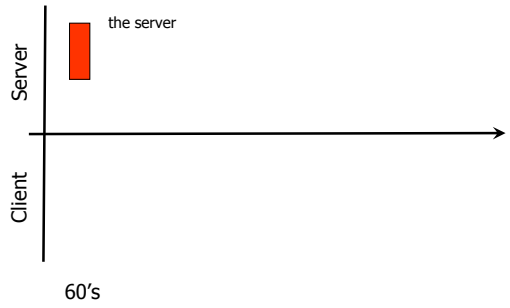
- Enabling Technology
- Disruptive Innovation(s)
- Standards and languages
- Platform (usually only one!)
- Applications Framework(s)

[Bosworth, VLDB02]

Waves - Mainframes

- 60's
- COBOL/FORTRAN
- VM
- Automate mission critical systems
- Time-sharing

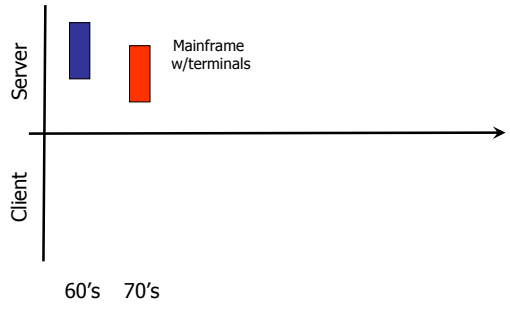
Evolution – 60's



Waves - Minis

- 70's
- C
- Unix
- Automate big departmental systems
- reduce cost of MIS and other automation

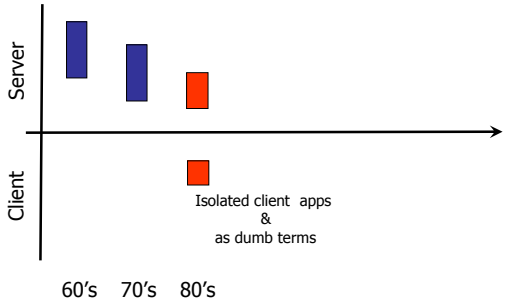
Evolution – 70's



Waves - PC's

- 80's
- Pascal
- DOS
- independence from MIS departments

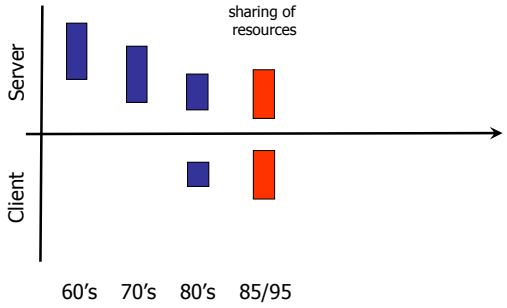
Evolution – 80's



Waves – LAN's (I)

- 85/95 on
- C++
- Share resources in enterprise

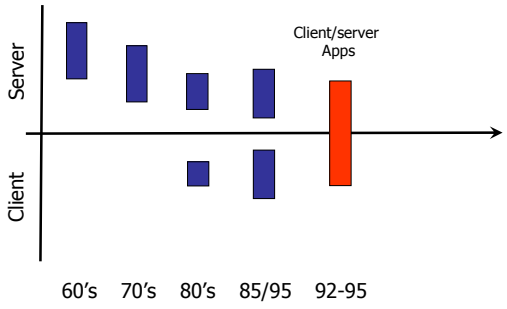
Evolution – 85-95



Waves - LAN's (II)

- 92-95
- TCP/IP any app can talk to any app in the enterprise or any data in the enterprise
- Asynchronous
- Tightly coupled

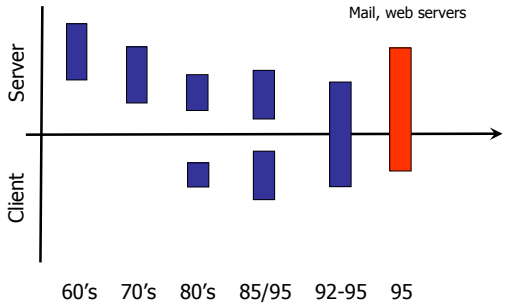
Evolution – 92-95



Waves – Internet (I)

- 95
- HTTP/HTML
- IMAP/POP
- anyone can connect to anyone in the world
- anyone can connect to any application in the world
- Synchronous
- Loosely coupled

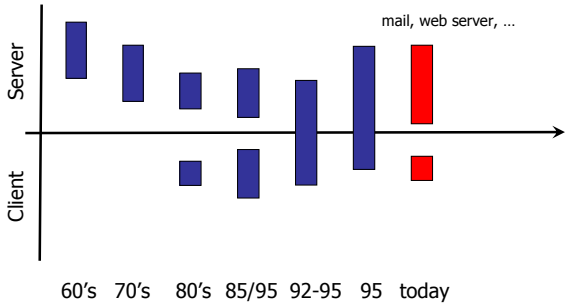
Evolution - 95



Waves – Internet (II)

- today
- Mobile
- XL/XQuery?
- WSDL/XML
- any application can connect to any application/data in the world
- Asynchronous
- Loosely coupled

Evolution - today



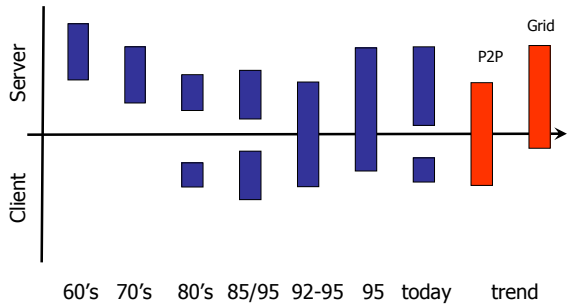
Internet (II) today

- What the Net added is the ability to connect to anything or anyone
  - Talking to people means you can talk to anyone
  - Talking to apps means you can talk to anything
- This dramatically raises the marginal value of communications and that, in turn, drives standards
- App to App is the next big win

Internet (II) today – Benefits

- Reuse of Information
  - Weather, Stock Prices, Items for sale
- Scalable access to information and Services
  - Fed Ex, Travel, Schedules
- Automatic execution of manual processes
  - Car Rentals, Purchasing, Meeting Coordination

Evolution – trend



Peer-to-Peer

- Provides network overlay
  - good substrate for creating large-scale apps
    - data sharing
    - content distribution
    - app-level multicast
  - self-organizing
    - dynamic collaboration of peers
  - massively scalable
  - failure-tolerant
- Symmetry in roles
  - client may also be a server
- Resource sharing
  - content, storage, CPU

Grid Computing

- Enable large-scale coordinated use and sharing of geographically distributed resources
  - based on persistent, standards-based service infrastructures
  - often oriented to high-performance
  - not oriented to failures

P2P & Grid

- Strong convergence is expected, providing:
  - scalability
  - self-adaptation
  - failure-recovery
  - persistent and standardized infrastructure for interoperability