




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]

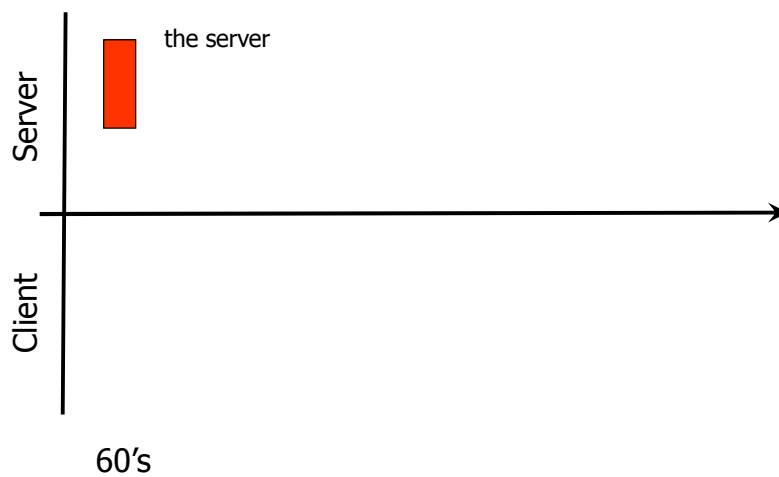


Waves - Mainframes

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



Evolution – 60's



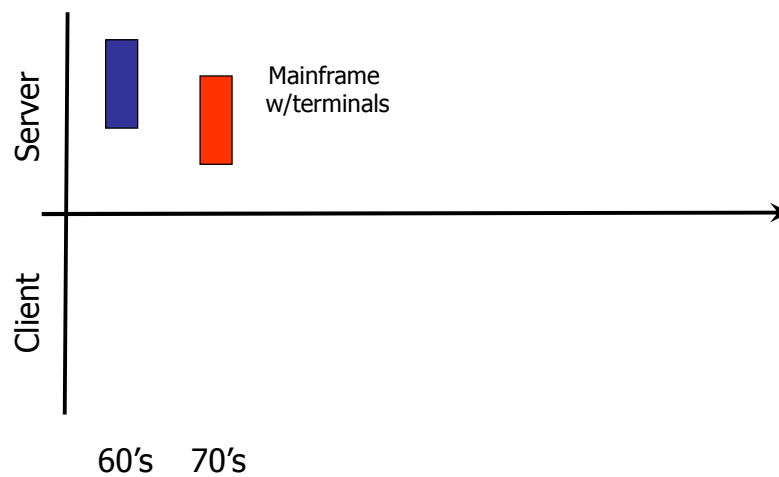


Waves - Minis

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



Evolution – 70's



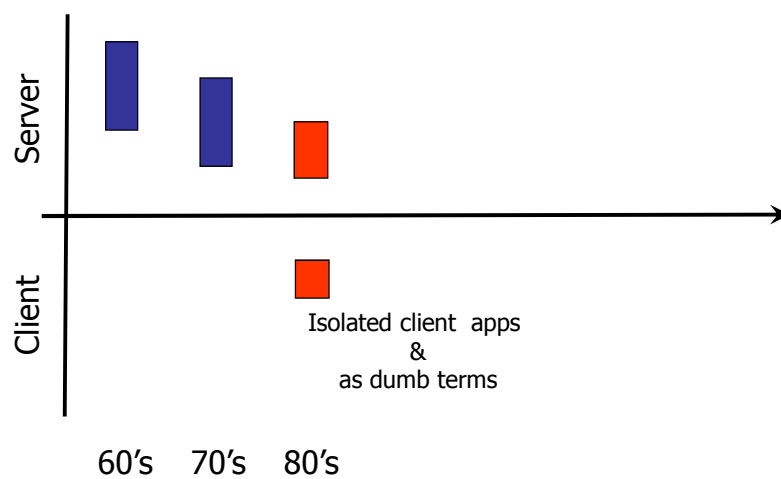


Waves - PC's

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



Evolution – 80's



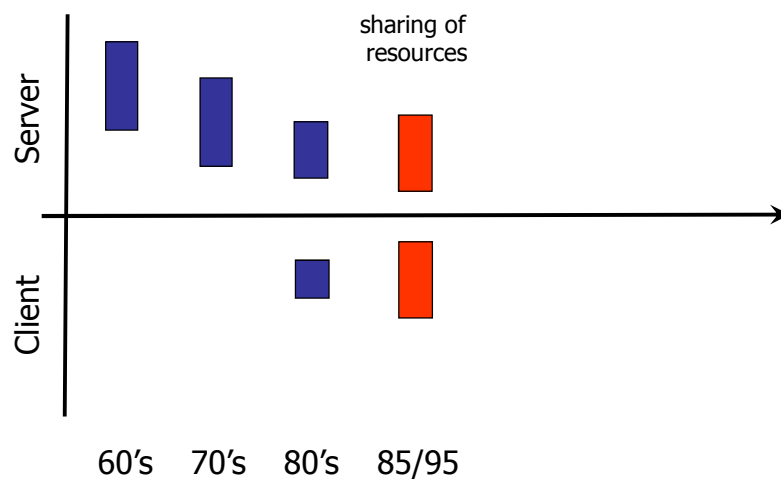


Waves – LAN's (I)

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



Evolution – 85-95



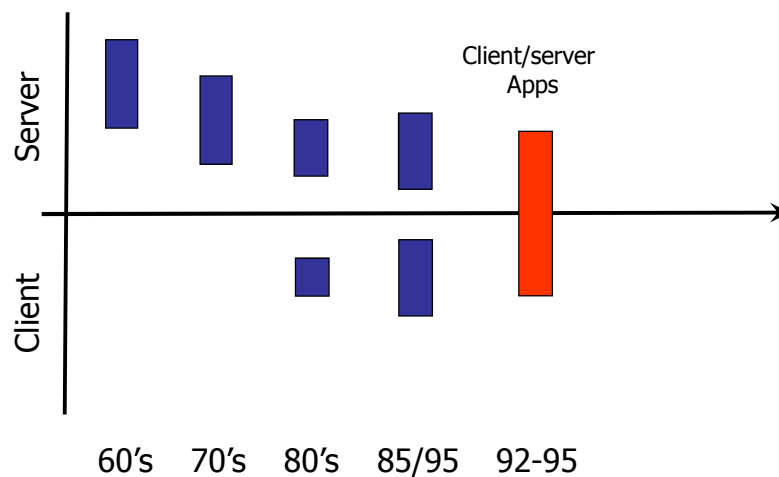


Waves - LAN's (II)

- 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



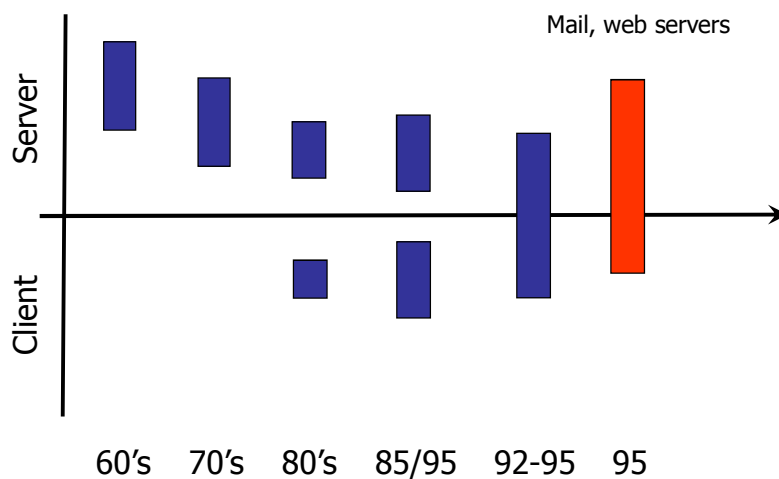


Waves – Internet (I)

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



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

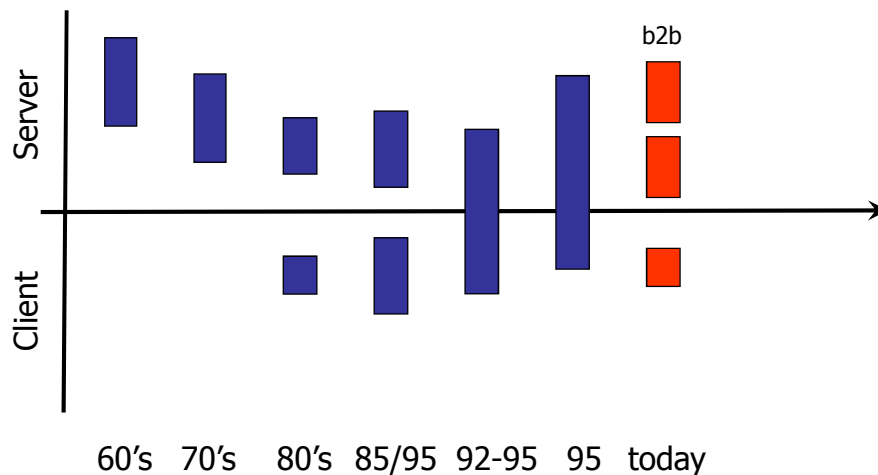


Internet (II) today – Benefits

- 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 - today





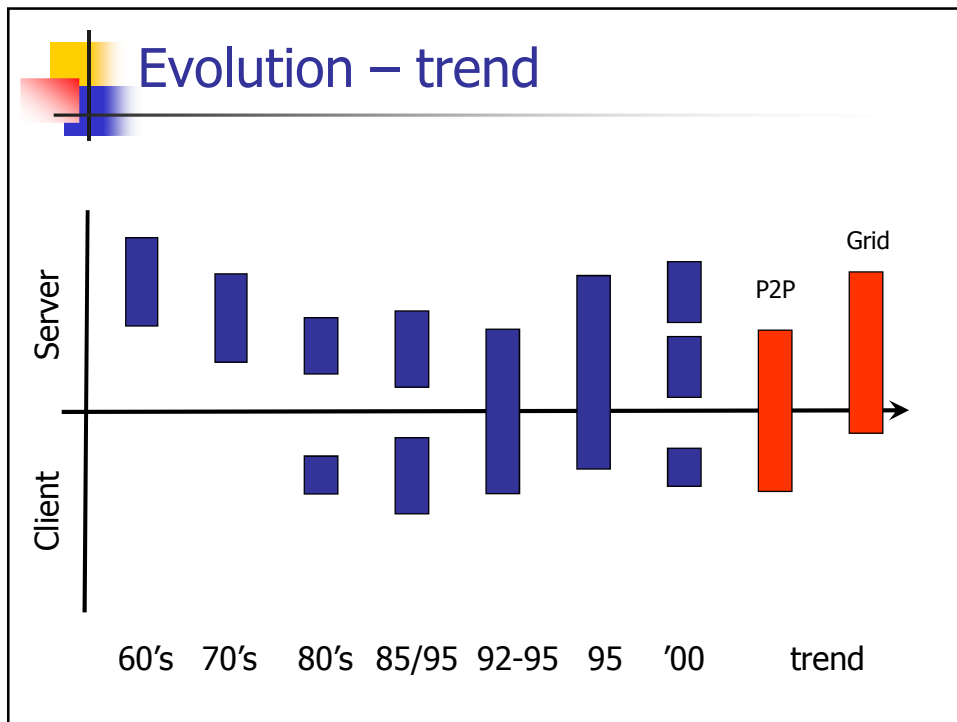
Peer-to-Peer

- 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 → cloud computing

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

