

Summary of Distributed Systems
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| | Overview of Architecture | Execution 1. Local/Distr 2. Special/Gen workstations | Process / Objects / etc. | DSM/Messages Caching / Consistency | Naming | Features (e.g. Migration) |
|---|---|---|---|--|--|--|
| Grapevine 1982 PARC Birrell, Needham | Wide-area. Fast local net, slow WAN. Store-and-forward email. Get email from anywhere. | Local exec. Special mail servers, general workstations. | Normal processes. | Registration server updates hard. | Registration servers – replicated. | |
| Emerald 1988 UW | Bunch of objects. Mobility primitives. Comm w/ RPC. | Dist exec. Dynamic load balancing. | Objects. | Problem of object locality → references to nonlocal objects → which to migrate? | Location-independent obj Ids. (Global namespace). | “Fine-grained” migration. |
| Sprite 1988 Berkeley | UNIX + 1 filespace + process migration. | Dist + dynamic load balancing. Thick or thin clients. | Processes. | File consistency – no cache on write. Problem with weird UNIX semantics (file open/close/delete). | Global file namespace. | Migration (FFS, LFS, ...). |
| Hydra 1974 CMU | Microkernel. Capability-based protection. Separation of mechanism and policy. User-implemented policy. | Local. | Processes for execution. Fine-grained protection. | N/A | Kernel keeps capability lists. | |
| V 1988 Stanford Cheriton | “Software backplane” Microkernel. Fast communication. | Totally distributed. General workstations. | Process-oriented. | Clients cache files. | Global name server. OIDs for everything. | |
| Amoeba 1990 Amsterdam Tanenbaum | Microkernel. Capabilities (crypto to prevent forging). | CPU servers/Dist. Thin clients. | Process. RPC w/ IDL (Interface Definition Language). | RPC – fast. Crazy FS → fast. | Single filespace. Capabilities for naming. Sketchy port obscurity. | “Bullet FS” → write once. |
| Chorus 1991 INRIA | Microkernel. Lots of multicast. | Dist execution. | Processes. Location-independent IPC. | Message-passing. Distributed virtual memory (VM). | UNIX file naming. 64-bit OID. | |
| Plan 9 1990 Bell Labs | Everything is a file. Special CPU, file servers. | Dist execution. Thin client (diskless terminal). | File-oriented. Processes. | N/A | Per-process namespace. Import service == import NS. | |