

Papers We Love 2017

The Styx Architecture for Distributed Systems

Rob Pike and Dennis M. Ritchie, 1999

Definitions

- Plan 9 (from Bell Labs)
 - a distributed operating system
- 9P
 - a simple message-oriented file system protocol
- Inferno
 - a commercialized distributed portable operating system
- Styx
 - an update of 9P for Inferno, officially '9P2000'

What?

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9p operations

version : start a new session

attach/auth : attach/auth to the root of a file tree

walk : walk up or down in the file tree

open : open a file (directory) checking permissions

create/remove : create or remove a file

read/write : read or write data from an open file

stat/wstat : retrieve or write a file's attributes

flush : flush pending requests (eg, on interrupt)

clunk : discard a file tree reference (ie, close)

error : (not an operation) error reply with
diagnostic

OS-level operations

bind: create a new reference to another file/directory

- (the original union mount!)

mount : create a reference to a file server on an existing directory

unmount : remove a bind or mount reference

exportfs : translates file calls into system calls and vice-versa, *itself as a file server*

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- open /net/tcp/clone -> /net/tcp/42
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 - do it again -> /net/tcp/43

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 - Message-send and truly private variables (ok, reaching)

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- IDE!
 - acme

Styx On A Brick

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(a serious write-up)

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...but done as a LAN over exotic data links

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- Can fake qids or subsidiary nodes to reduce code size

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 - For the most part, it is very simple, but people see need to extend it to fit their environments.
 - Luckily this is done in ways that are often backwards compatible.

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- Let the bind'ee determine how to use them!

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- McIlroy vs. Knuth
 - 6 lines and 4 Unix commands to replace an entire literate program
- It may not be safe, but that's not what it's for

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- QEMU: libvirt
- Erlang-on-Xen: code loading, storage access, node monitoring, message passing, goofs(filesystem)
- <https://github.com/chaos/diod> : supercomputing interconnect
- Forsyth's use of inferno for grid computing

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"Everything falls out of doing the little stuff right"

It gives discoverability back to the user, doesn't
remove need for docs/protocols/agreements

Further reading/watching

The Ubiquitous File Server in Plan 9 :

http://doc.cat-v.org/plan_9/misc/ubiquitous_fileserver/ubiquitous_fileserver.pdf

LP49: Embedded system OS based on L4 and Plan 9 :

http://lsub.org/iwp9/cready/lp49_iwp9_camera_ready.pdf

OSHUG 46 — The Name Game, feat. Plan 9 & Inferno, Dr Charles Forsyth :

<https://www.youtube.com/watch?v=3d1SHOCCDn0>