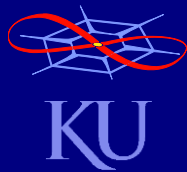


To the Cloud, and Beyond!

Back to the Future Again, and Again, *and Again...*

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司徒傑莫 Джеймс Ф.Г. Штербэнз 송재윤



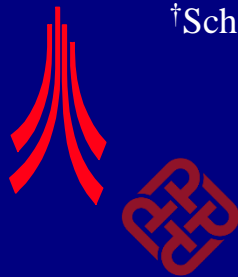
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<http://www.ittc.ku.edu/~jpgs>
<http://wiki.ittc.ku.edu/resilinet>



To the Cloud!

Introduction

- There's something familiar about this...

To the Cloud!

Introduction

- There's something familiar about this...
- Have we been here before?

To the Cloud!

Introduction

- There's something familiar about this...
- Have we been here before?
...multiple times?
- Not news to us old farts
 - but I wanted to document the cycles

To the Cloud!

Motivation and Disclaimer

- Motivation
 - curiosity on the number and periodicity of cycles
 - comparison to other cycles
- Disclaimer
 - difficult to pin exact dates on majority paradigm
 - overlapping technologies
 - consumer cycle a bit different in early years
 - based in part on personal observation since early 1970s
 - Basic timesharing; had PDP-8/L in high school
 - IBM mainframe batch and PDP-11 RSX / VAX/VMS undergrad
 - personal IBM 370/158 in early 1980s

Single User to Multiuser

Swing 1

- 1950s: single user mainframes
 - IBM 701 1952, IBM 709 1958
 - ICT/ICL, RCA, Univac, Burroughs, Honeywell, NCR, CDC, ...

Single User to Multiuser

Swing 1

- 1950s: single user mainframes
- 1960s: time sharing and multitasking
 - Plato ~1960 UIUC ILLIAC I → CDC 6600
 - CTSS 7090 MIT 1961
 - DTSS GE-200 Dartmouth 1964
 - SDS-940 1966 Tymshare and other outsourced services
 - MULTICS, TSS/360 ...
 - mainframes go multitasking (batch) to timesharing

Motivation: cost saving and resource sharing

Minicomputers to Workstations

Swing 2

- 1970s: minicomputers
 - some timeshared, but many single user
 - e.g. PDP-8/L 1968, -8/E 1971
 - IBM 3270 terminals 3272 controllers 1971
 - for time sharing, but could have evolved to workstations
 - block I/O: 300 ms response time 10s users 1 MIPS 370/158

Minicomputers to Workstations

Swing 2

- 1970s: minicomputers; many single user
- 1980s: diskless workstations and file servers
 - IBM PC 1981
 - Note: IBM 3270 terminals 3272 controllers 1971
 - workstations originally had local disc
 - e.g. Apollo 1980, Sun-2 1983, Sun-3 1985, ...
 - file servers and remote mounts (e.g. NFS)
 - discless: network boot and swap

*Motivation: cost saving and resource sharing
with terrible performance discless*

Personal Machines to the Web

Swing 3

- 1990s: individual machines
 - powerful workstations e.g. SPARC, RS/6000
 - home PCs; initially only modem access to services
 - AOL, CompuServe, Prodigy
 - laptops, e.g. IBM ThinkPad 700 1992
- 1990s: thin clients (minor off-cycle swing)
 - brief flirt at moving processing back to the cloud
 - WebTV 1996 and other thin-client STBs
 - as bad an idea as were discless workstations

Personal Machines to the Web

Swing 3

- 1990s: individual machines
- 2000s: individual machines on the Web
 - broadband Internet access allows access to the “cloud”

To the Cloud and Back

Swing 3+

- 2010s: Internet of Sh@# and The Cloud
 - *aaS NIST architecture 2011

Motivation: outsourcing and resource sharing



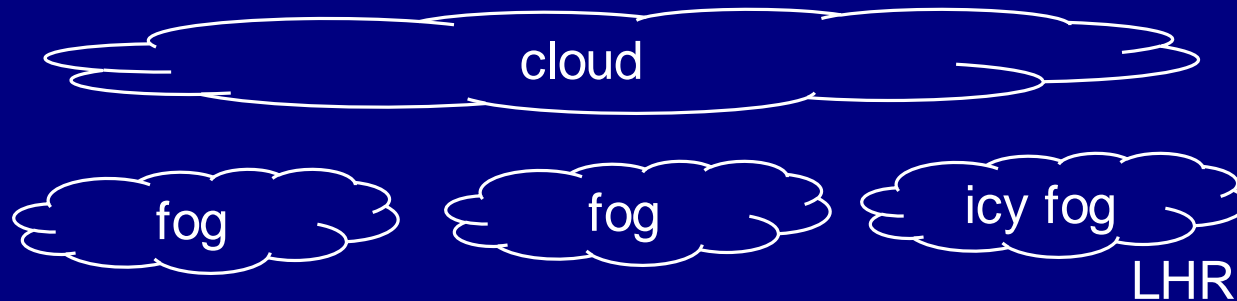
To the Cloud and Back

Swing 3+

- 2010s: Internet of Sh@# and The Cloud
 - *aaS NIST architecture 2011

Motivation: outsourcing and resource sharing

- opportunity for lots of new jargon



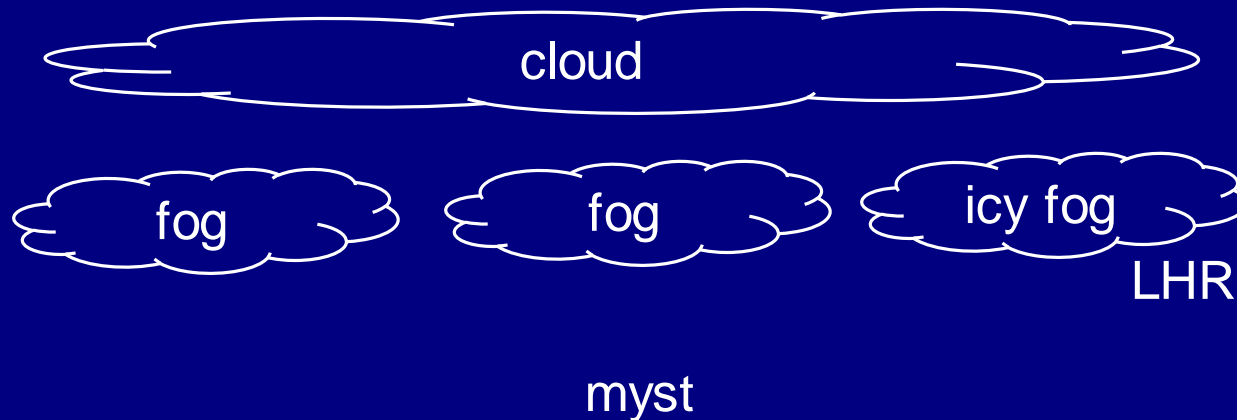
To the Cloud and Back

Swing 3+

- 2010s: Internet of Sh@# and The Cloud
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Motivation: outsourcing and resource sharing

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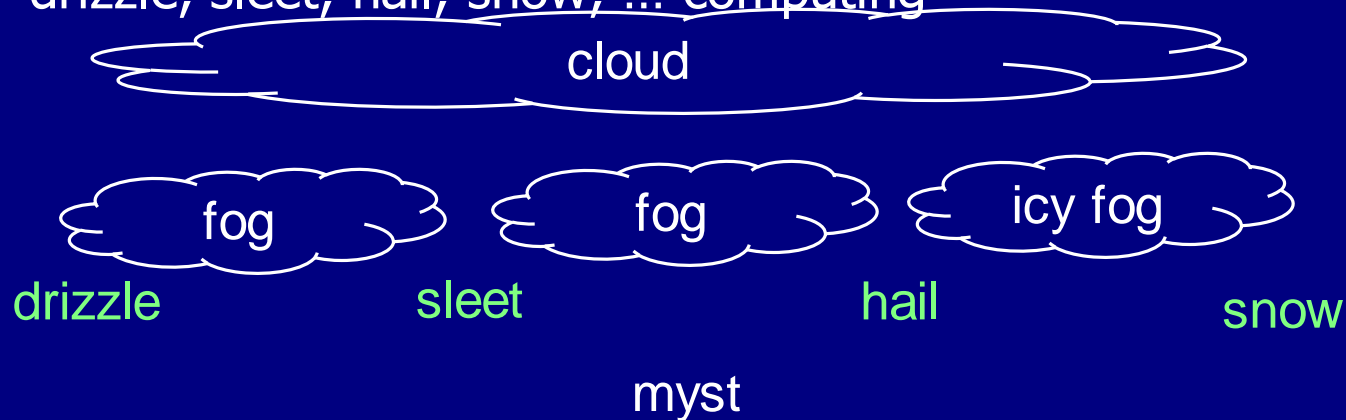
To the Cloud and Back

Swing 3+

- 2010s: Internet of Sh@# and The Cloud
 - *aaS NIST architecture 2011

Motivation: outsourcing and resource sharing

- opportunity for lots of new jargon
- drizzle, sleet, hail, snow, ... computing



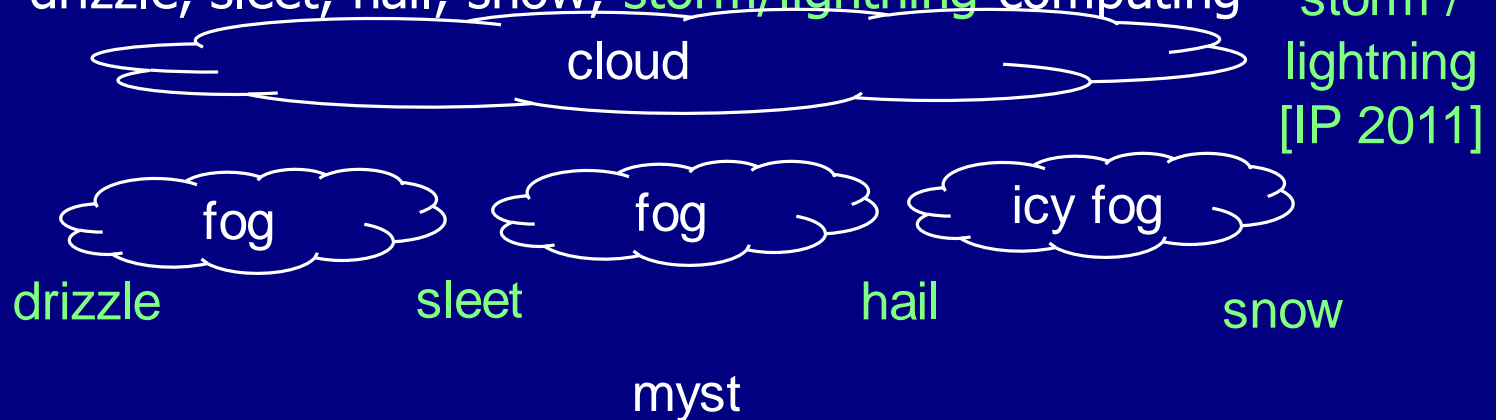
To the Cloud and Back

Swing 3+

- 2010s: Internet of Sh@# and The Cloud
 - *aaS NIST architecture 2011

Motivation: outsourcing and resource sharing

- opportunity for lots of new jargon
- drizzle, sleet, hail, snow, storm/lightning computing



To the Cloud and Beyond!

Swing 4

- 2010s: Internet of Sh@# and The Cloud
 - diskless and thin client redux
 - outsourcing (timesharing service) isn't necessarily cheaper
 - assumes constant connectivity
 - bad assumption for mobile devices
- 2020s: ?

To the Cloud and Beyond!

Summary

- Exhaustive non-rigorous qualitative analysis
- local—remote shift ~every decade (20 year cycle)
 - doesn't accelerate with Moore's Law
 - last period a bit longer
- Prediction: we'll dump the cloud in the 2020s
 - and be reinventing it in the 2030s
- Similar period to other reinventions
 - programmable networks: AN/IN → SDR
 - parallel computing: multicomputers → parallel → multicore

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