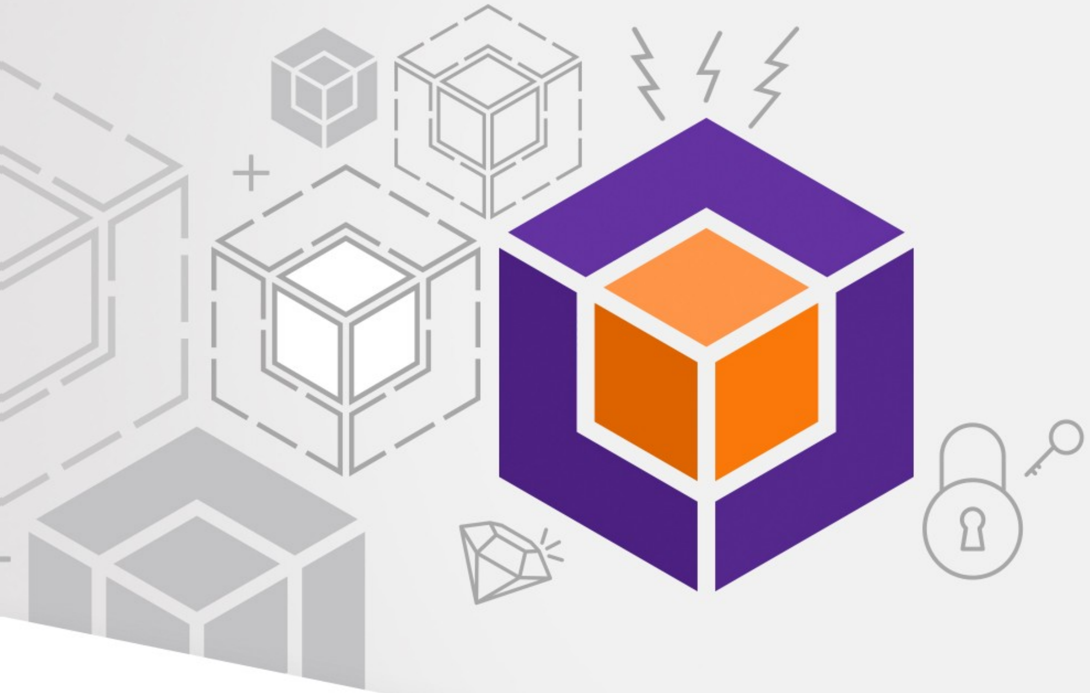
September 2023



Fun With Forensics

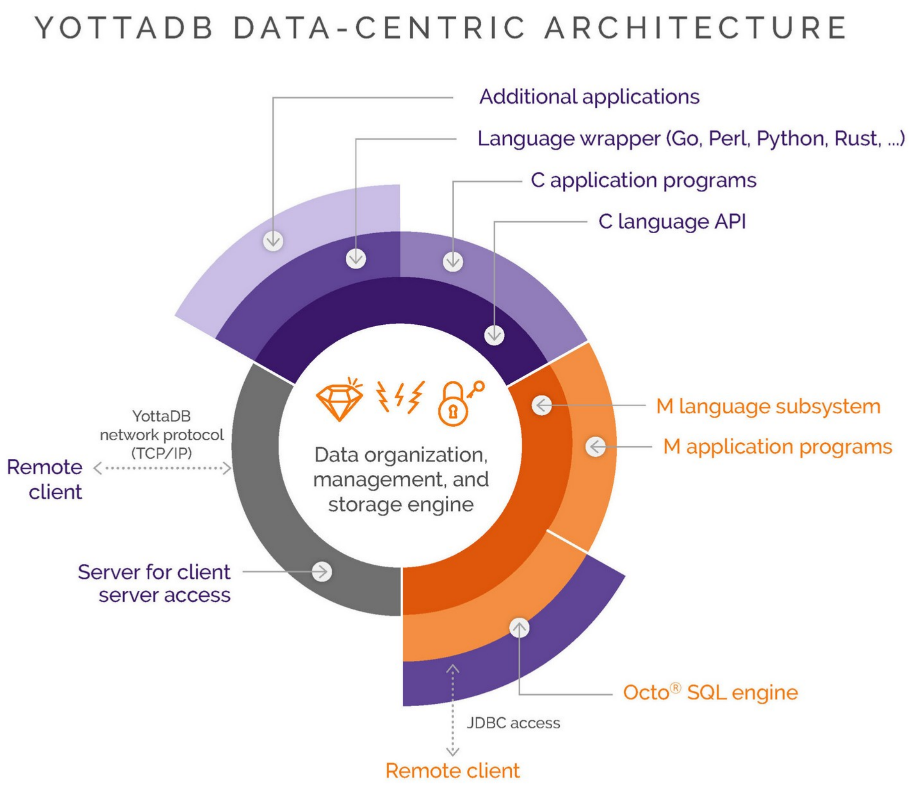
Troubleshooting, analytics and forensics with journal files and the syslog

YottaDB® – https://yottadb.com

- A mature, high performance, hierarchical key-value, language-agnostic, NoSQL database whose code base scales up to mission-critical applications like large real-time core-banking and electronic health records, and also scales down to run on platforms like the Raspberry Pi Zero, as well as everything in-between.
- *Rock Solid. Lightning Fast. Secure. Pick any three.*

- Octo is a SQL database engine that whose tables are stored in YottaDB hierarchical key-value nodes

Architecture


YOTTADB DATA-CENTRIC ARCHITECTURE
Additional applications
Language wrapper (Go, Perl, Python, Rust, ...)
C application programs
C language API
M language subsystem
M application programs
Data organization, management, and storage engine
YottaDB network protocol (TCP/IP)
Remote client
Server for client server access
Octo® SQL engine
JDBC access
Remote client

Database State Changes

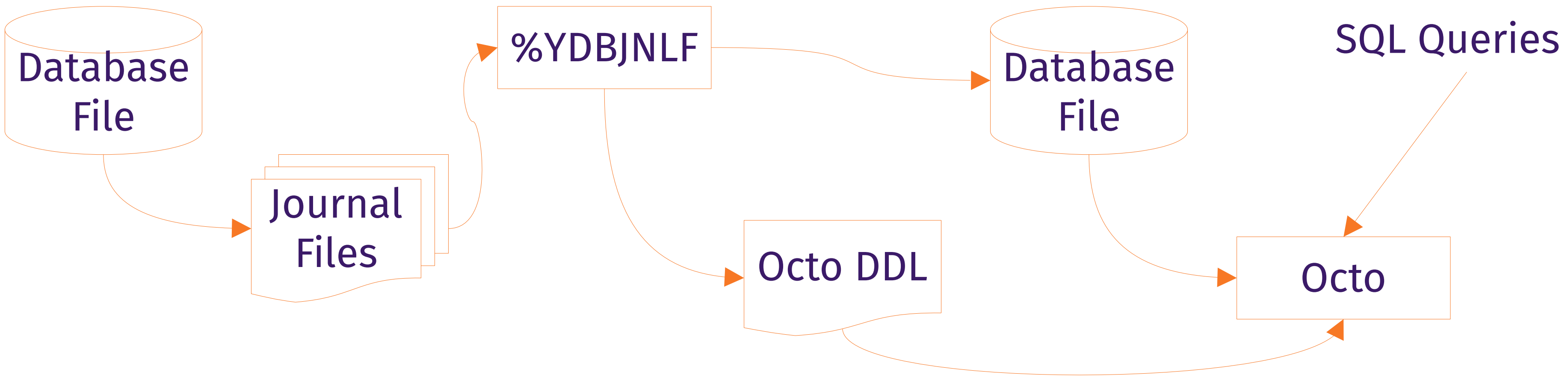
What Changed and When

State Machines and State Changes

- Databases are state machines, e.g., a brain transplant has been ordered for Bhaskar
- But the path through state space is also important, e.g., who ordered said brain transplant
  - Journal files capture database state changes
- Yabut… database changes can outnumber database state
  - How do you find a needle in a haystack?

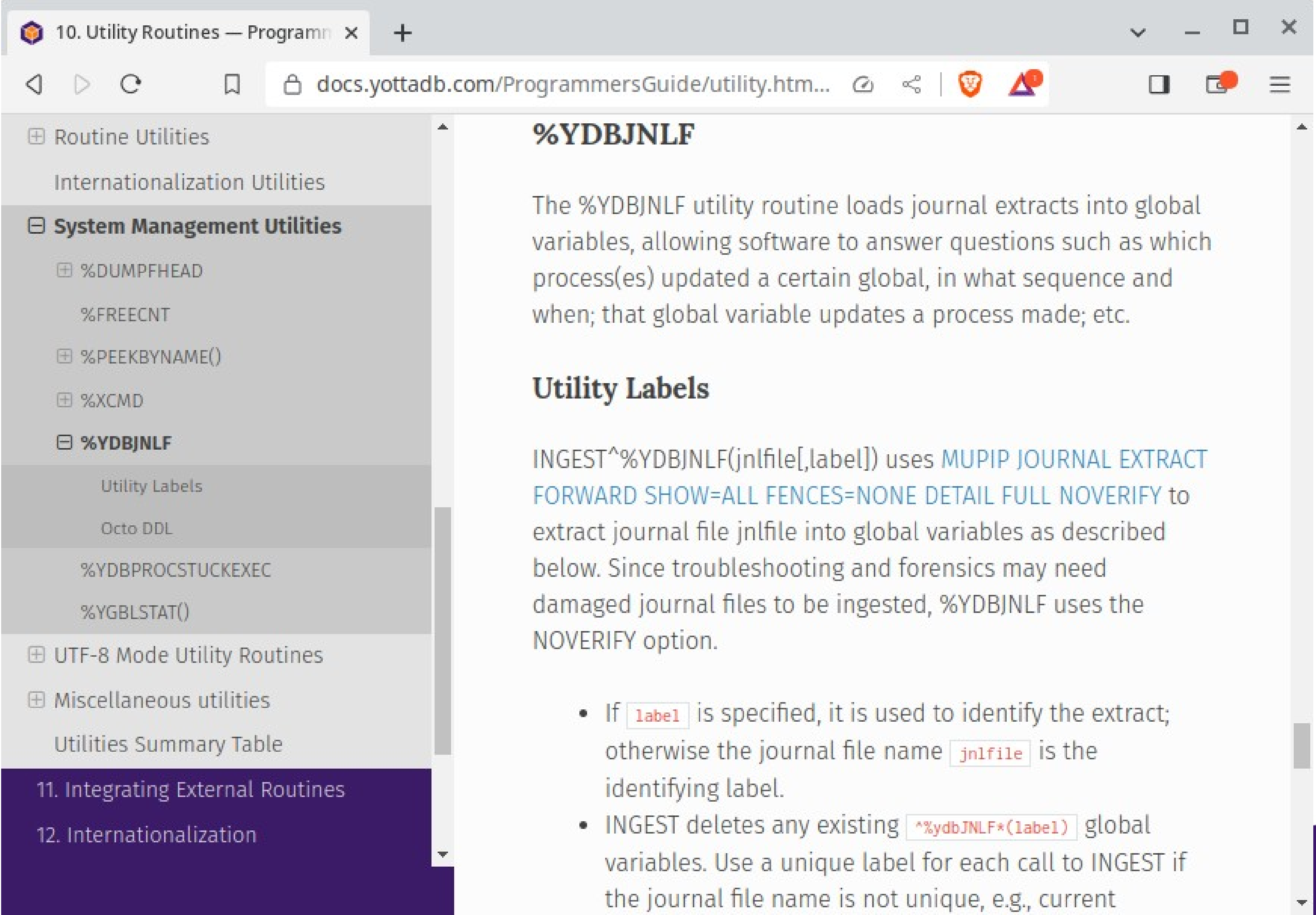
%YDBJNLF + Octo

- YottaDB databases store large amounts of data
- Octo SQL can query large amounts of data



%YDBJNLF

- Standard YottaDB utility routine
  - https://docs.yottadb.com/ProgrammersGuide/utility.html#ydbjnlf
- `INGEST^%YDBJNLF(`*`jnlfile`*`[,`*`label`*`])` reads `jnlfile` into `^%YDBJNLF`
- `OCTO^%YDBJNLF` produces a DDL that Octo can read
- Automatically creates YDBJNLF region if needed


10. Utility Routines — Programm
docs.yottadb.com/ProgrammersGuide/utility.htm...

%YDBJNLF

The %YDBJNLF utility routine loads journal extracts into global variables, allowing software to answer questions such as which process(es) updated a certain global, in what sequence and when; that global variable updates a process made; etc.

Utility Labels

INGEST^%YDBJNLF(jnlfile[,label]) uses MUPIP JOURNAL EXTRACT FORWARD SHOW=ALL FENCES=NONE DETAIL FULL NOVERIFY to extract journal file jnlfile into global variables as described below. Since troubleshooting and forensics may need damaged journal files to be ingested, %YDBJNLF uses the NOVERIFY option.

- If `label` is specified, it is used to identify the extract; otherwise the journal file name `jnlfile` is the identifying label.
- INGEST deletes any existing `^%ydbJNLF*(label)` global variables. Use a unique label for each call to INGEST if the journal file name is not unique, e.g., current

Demo %YDBJNLF + Octo

- *Never call a pool shot with anything other than “Watch this!”*

Syslogs

Computers are where
Software lives

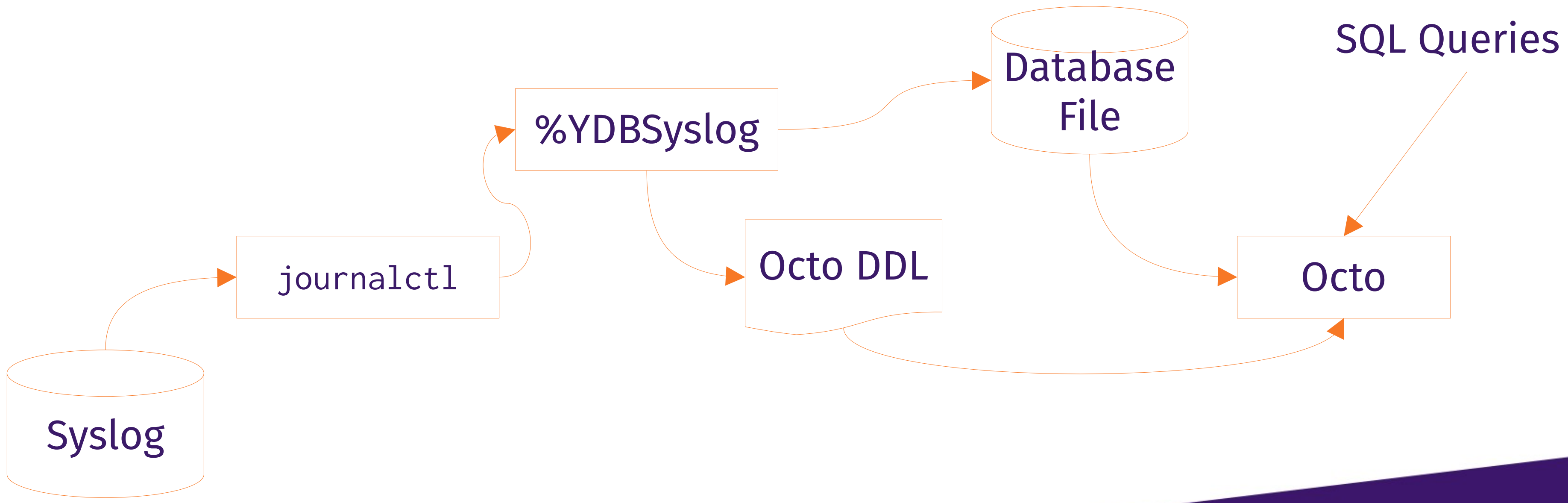
Syslogs

- Computers are bigger state machines than databases
- Networks of computers are bigger yet
- Forensics and troubleshooting often requires looking across multiple computers for events

%YDBSyslog

- YottaDB plugin https://gitlab.com/YottaDB/Util/YDBSyslog
- Documented in plugins manual

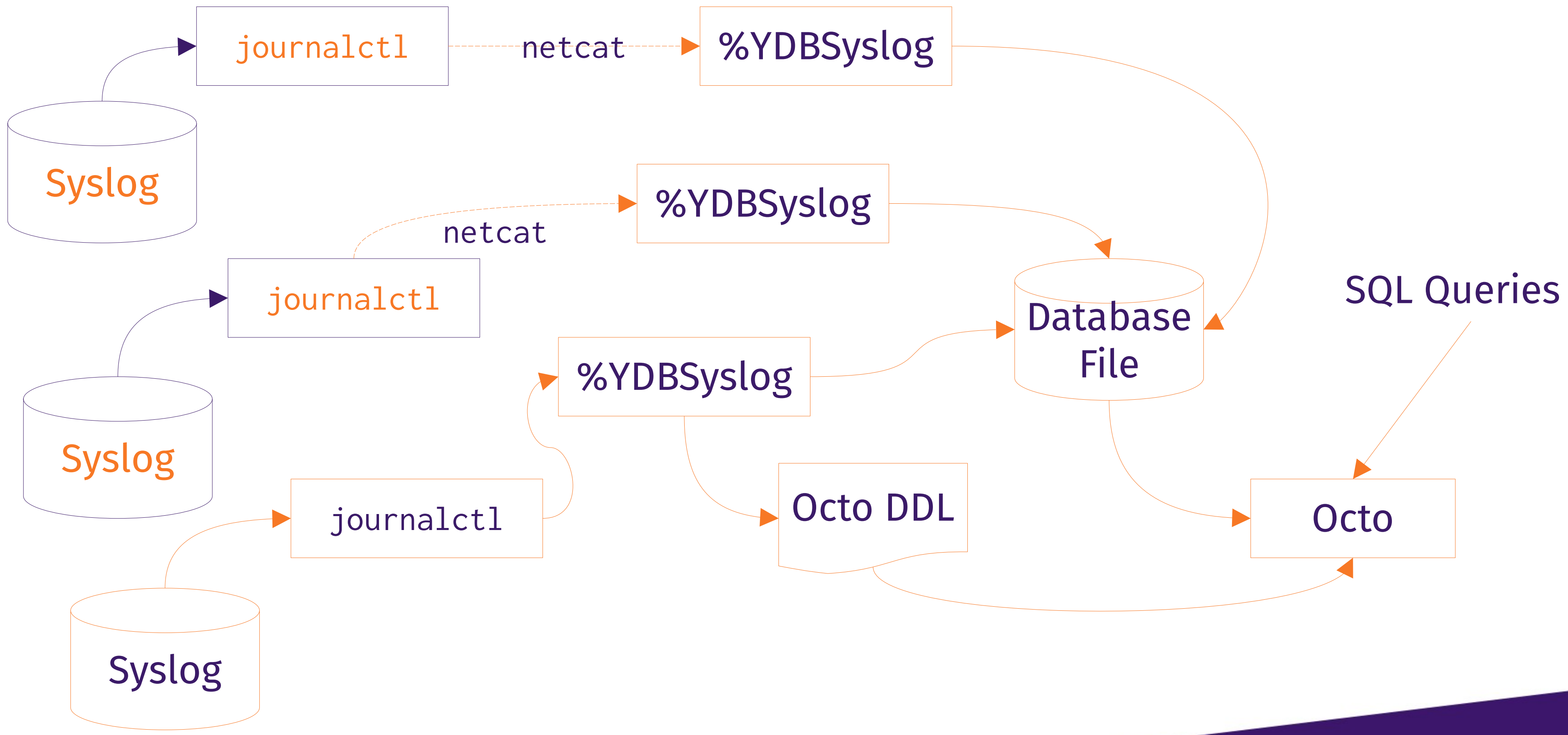
%YDBSyslog + Octo



Demo %YDBSYSLOG + Octo

- *Never call a pool shot with anything other than "Watch this!"*

Multiple Machines



YottaDB

Thank You!

K.S. Bhaskar
bhaskar@yottadb.com