Home of Redis

Power to the people: Redis Lua Scripts
Redis Day TLV, March 9th, 2016

@itamarhaber

A Redis Geek, Disque Freak... and Lunatic!

Chief Developer Advocatique at redislabs

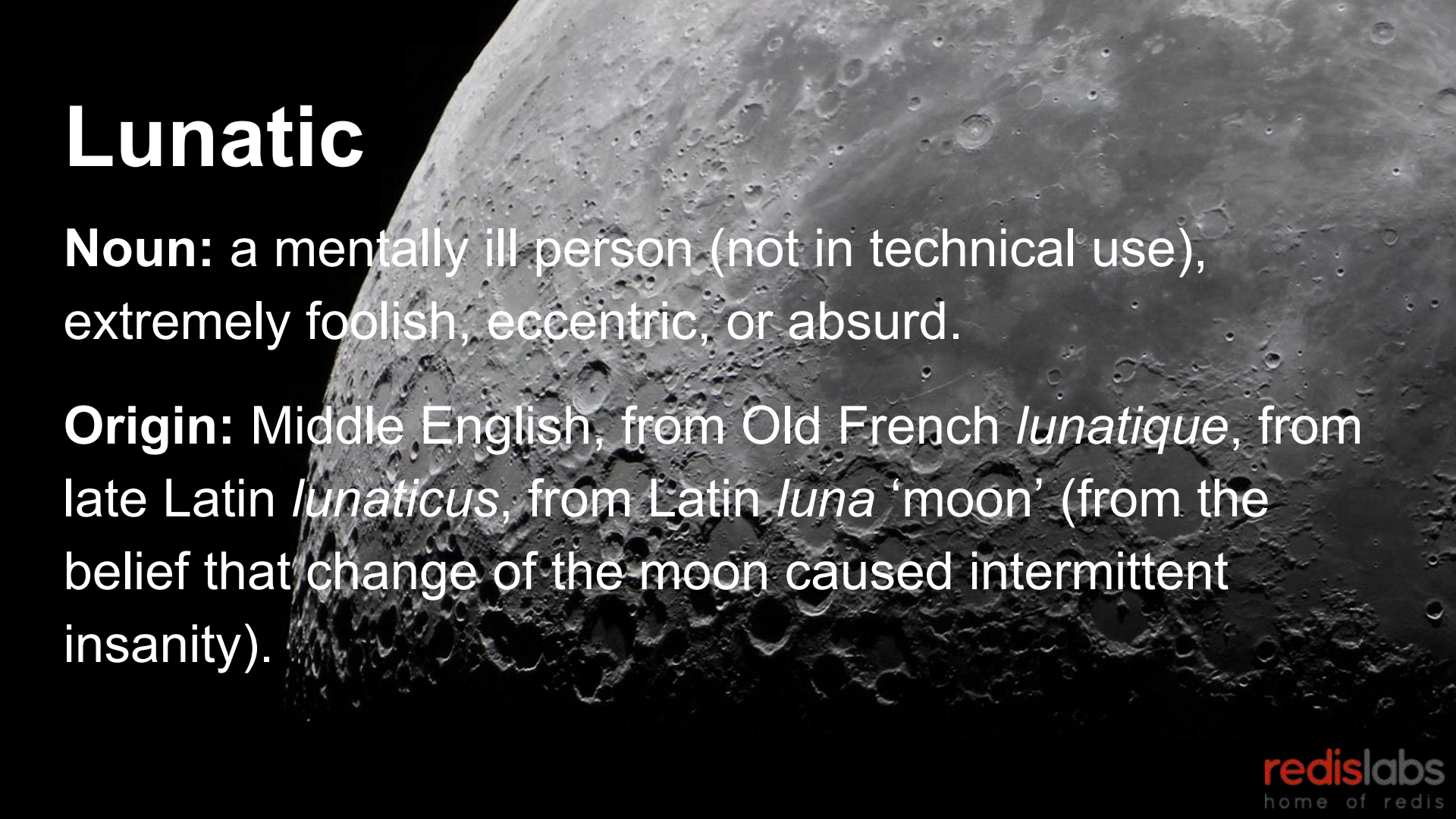
Have you signed for rediswatch newsletter?
http://bit.ly/RedisWatch

...is a powerful, fast, lightweight, embeddable scripting language.

...(pronounced LOO-ah) means "Moon" in Portuguese.

Please do not write it as "LUA", which is both ugly and confusing...

http://www.lua.org



Lunatic

Noun: a mentally ill person (not in technical use), extremely foolish, eccentric, or absurd.

Origin: Middle English, from Old French *lunatique*, from late Latin *lunaticus*, from Latin *luna* ‘moon’ (from the belief that change of the moon caused intermittent insanity).

Luaphobia is pure lunacy

Redis does Lua since v2.6 (Oct 23, 2012)

Scripts are atomic, have (practically) local data access

Lua ~~is pretty and/or ugly~~ isn't perfect, but …

… having the option to use it beats not.

(mea culpa: when all you have is a hammer)

Lua Redis language, primer (1/2)

```
--[[
   this is a multi-line comment
]]
local t = { 1, 2, foo = "bar", nil, false }
for i, v in ipairs(KEYS)
   if i % 2 ~= 0 then
      redis.call('SET', ARGV[1],)
   end
end
```

Lua Redis libraries, primer (2/2)

Core Lua:	**`base, table, string, math & debug`**
Also included:	**`bitop, struct, cmsgpack & cjson`**
`redis` *library:*	**`call, pcall, log, status_reply, Error_reply & sha1hex`**
[v3.2 spoiler]:	**`debug, breakpoint, set_repl & replicate_commands`**

Lua crash course...

ceci n'est pas Le Voyage Dans Le Lune

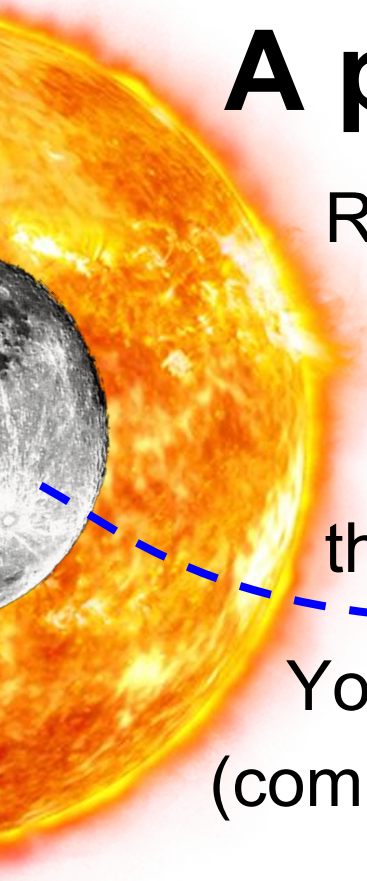
For your future reference:

RTFM - http://www.lua.org/pil

Redis - http://redis.io/commands/eval

15min - https://gist.github.com/tylerneylon/5853042

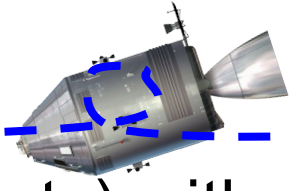
A poor & not to scale analogy



Redis is the Sun.

Earth is your application.

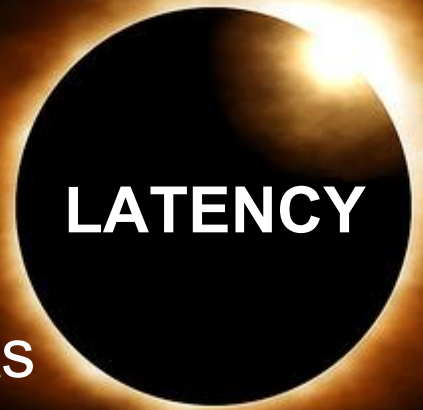
Imagine that the Moon is stuck in the middle of the Sun.



You send non-melting rockets (scripts) with robots (commands) and cargo (data) back and forth…

A helluava use case #1

Save the bandwidth, save the LATENCY



- Cached compiled multi-operations scripts
- **Variadic** keys & **variable arity** arguments (i.e. lots)
- Server-side processing for: exploding input, data transformation & manipulation, JSON/MessagePack (de)serialization, imploding (aggregating) output...

UC#1 example: GEOPATHLEN

Meet https://github.com/RedisLabs/geo.lua (WIP)

A (metric only) helper library for Redis geospatial indices

Redis API:
```
GEODIST key elem1 elem2
+ GEODIST key elem2 elem3
+ ...
```
Lua library:
```
GEOPATHLEN key elem1 elem2 elem3...
```

Winning use case #2

Transact with intelligence

- Scripts are atomic & blocking
- Comments, variables, data types, operators, control structures & (some) libraries
- Do you really want to `WATCH/MULTI/DISCARD/EXEC`?

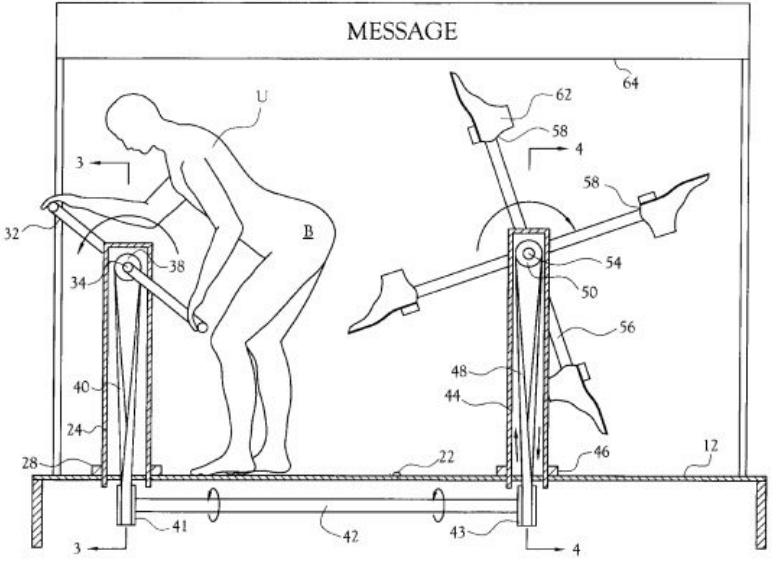
Lua.tx "recipe": 1) assert 2) process 3) check 4) commit

Liberating use case #3

Patent APIs & data structures

Remember geo.lua?

- GEODEL
- xyzsets (geosets w/ attitude)
- GeoJSON - encode/decode
- ...and ME TRY FILTER!



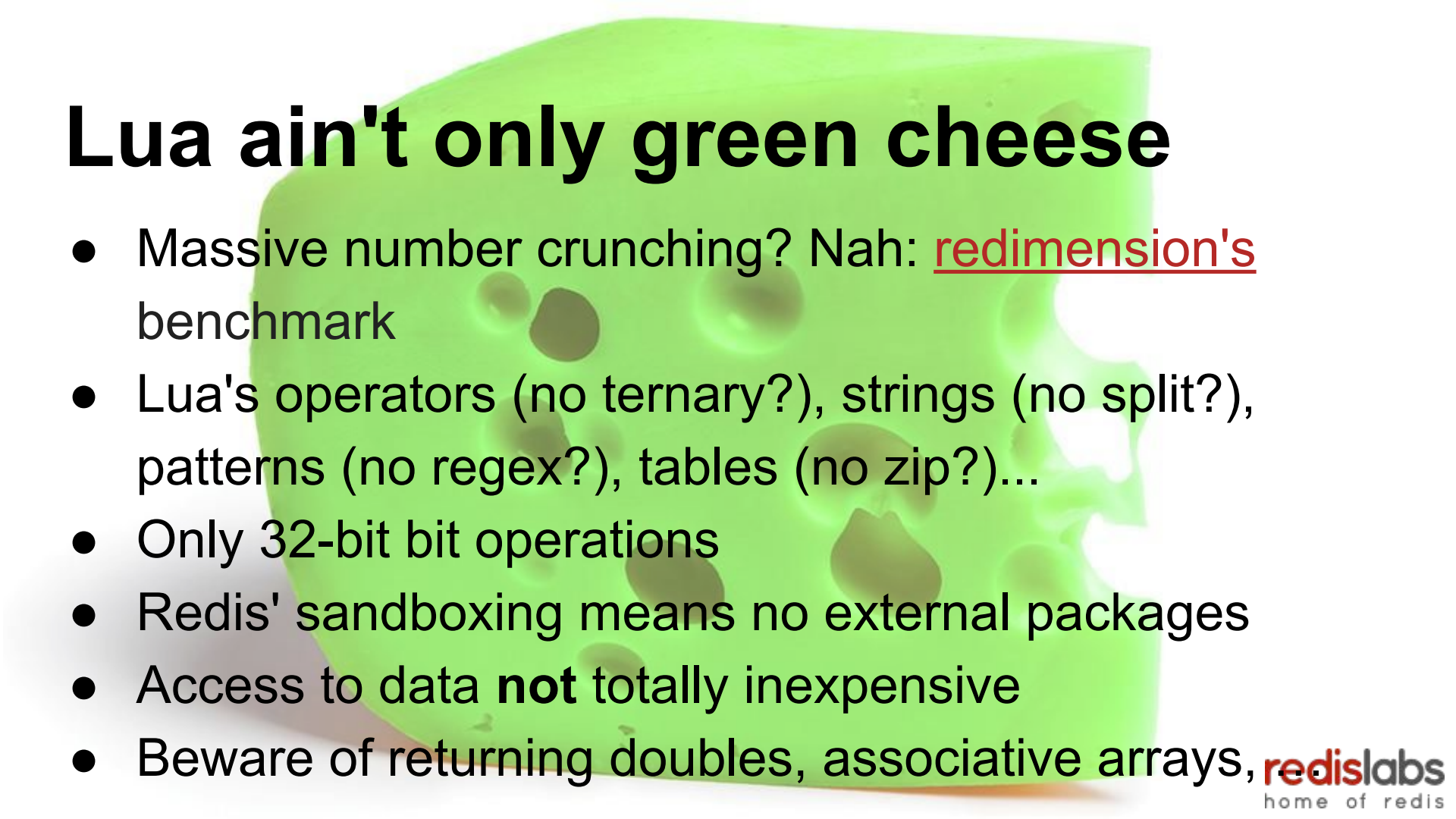
GEORADIUS -> GEOMETRYFILTER

Find the geoset members in polygon p

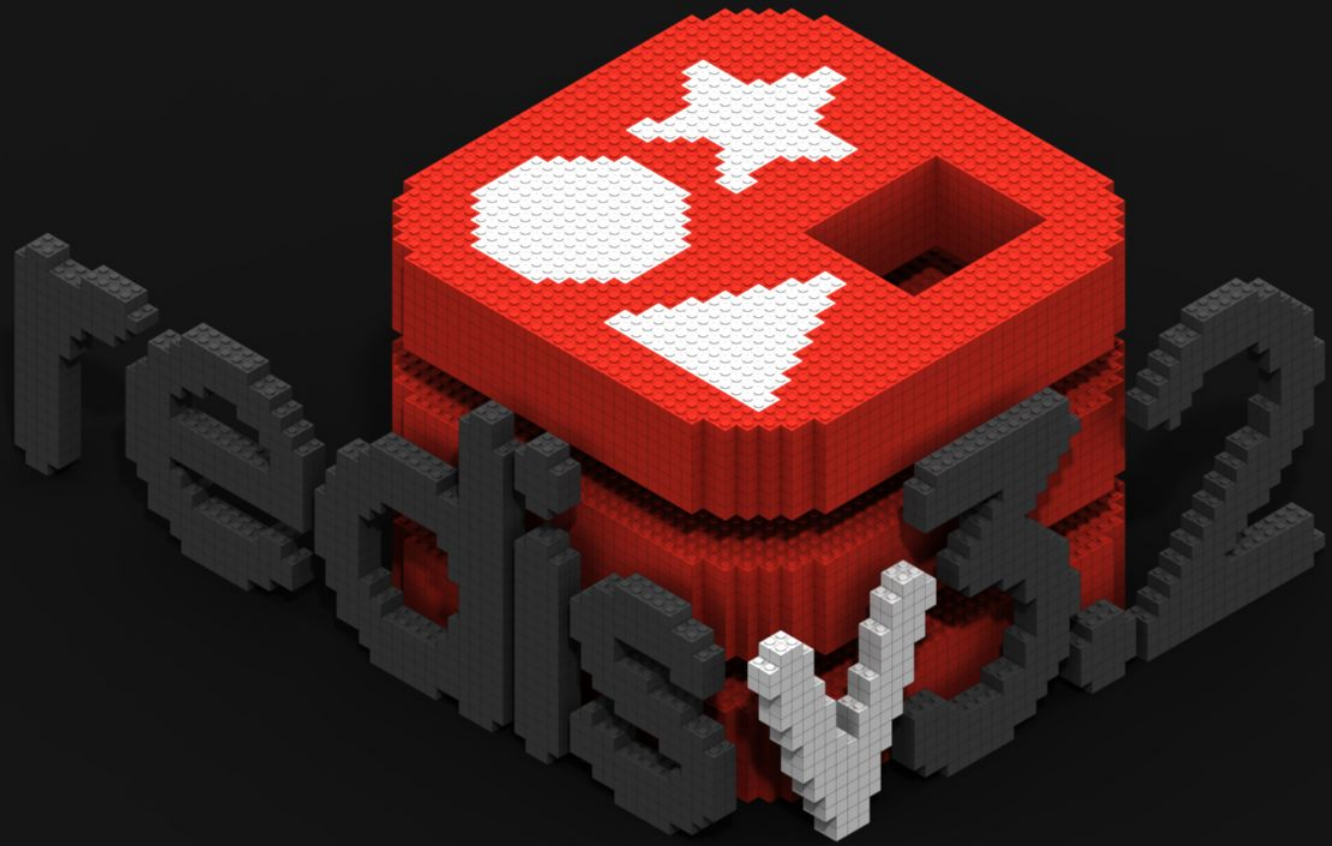
1. Read p's definition from geomash
2. Compute p's bounding box
3. Radius search from pbb's center
4. Filter anything out of pbb
5. Use a semi-infinite ray (PNPOLY)

redislabs
home of redis

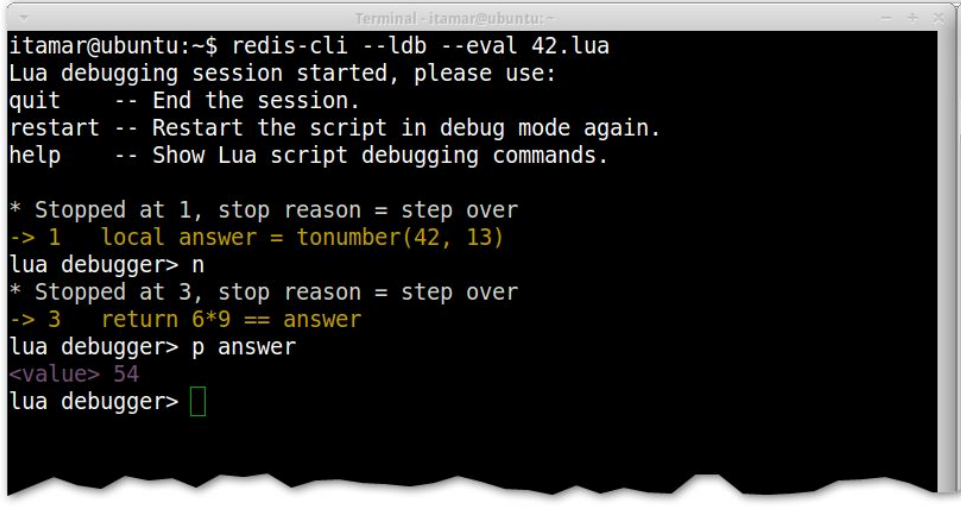
Lua ain't only green cheese

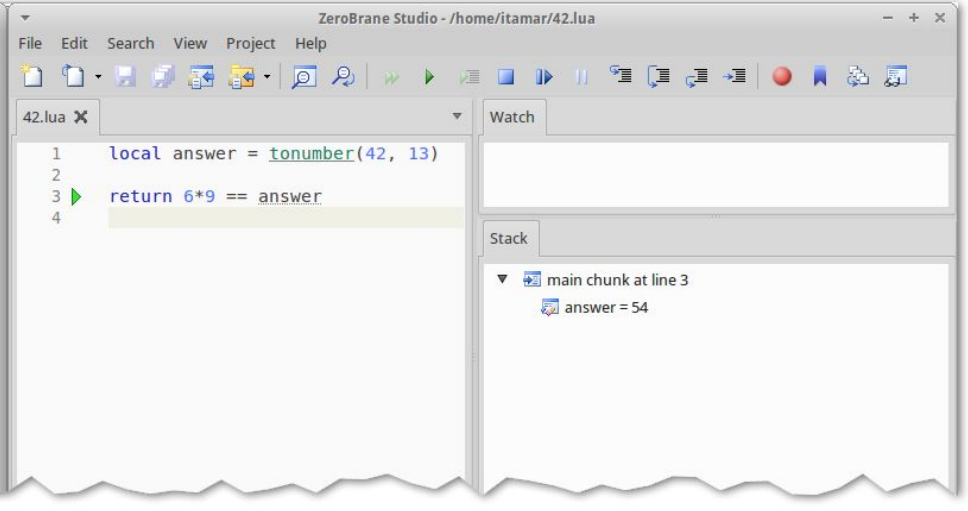


- Massive number crunching? Nah: redimension's benchmark
- Lua's operators (no ternary?), strings (no split?), patterns (no regex?), tables (no zip?)...
- Only 32-bit bit operations
- Redis' sandboxing means no external packages
- Access to data **not** totally inexpensive
- Beware of returning doubles, associative arrays, ...



SCRIPT DEBUG, YES PLEASE!





[Integral Redis Lua scripts debugger]

[ZeroBrane Studio Plugin for Redis]

redislabs
home of redis

Lua replication < v3.2

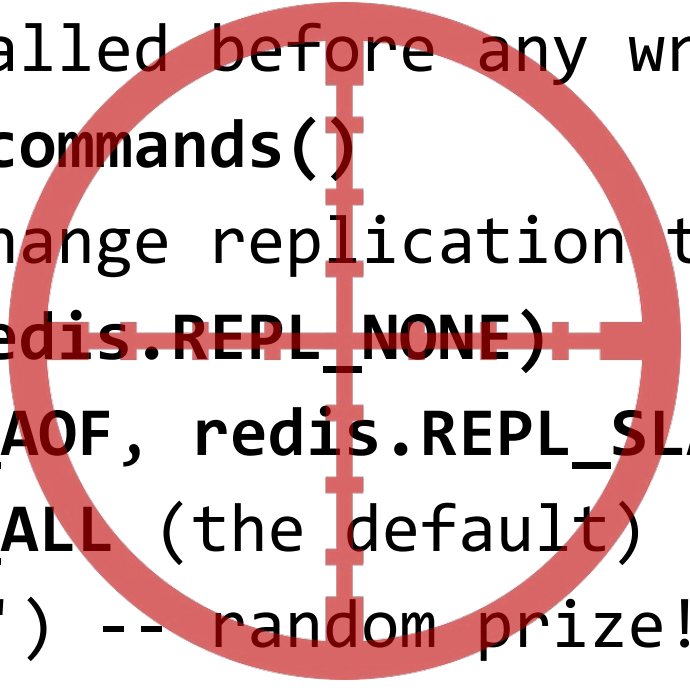
Script source is sent to slaves, reduces wire traffic:

```
for i = 1, 100 do
   redis.call('INCR', KEYS[1])
end
```

Disadvantages: wasteful (1 + n slaves), long recovery from AOF, no non-determinism, no "transient" keys

Effects & target replication 3.2

```
-- succeeds if called before any write
redis.replicate_commands()
-- optionally, change replication target
redis.set_repl(redis.REPL_NONE)
-- or redis.REPL_AOF, redis.REPL_SLAVE
-- or redis.REPL_ALL (the default)
redis.call('TIME') -- random prize!
```



Lua versions

- Redis: 5.1.5 2012-02-17
- Current: 5.3.2 2015-11-30
- No major changes to language, upgrade TBD soon™

Scripts graveyard:

infospect.lua, hitman.lua and redis-lua-debugger… but I can still add port 6379 to `/etc/services` with Lua though ;)