

TOWARDS
annex

@markhibberd

“The enemy is the gramophone
mind, whether or not one
agrees with the record that is
being played at the moment.”

George Orwell - *The Freedom of the Press*

ONE
—
MOTIVATION

ONE
—
OR, WE ARE DOING IT ALL WRONG

2.0.1

2.0.2

2.1.0

3.0.0

SURELY

THIS IS A JOKE

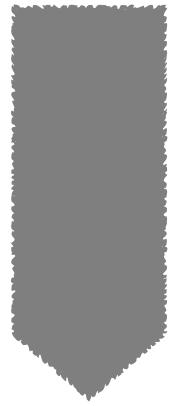
LANGUAGE WARS ARE PASSE



TIME IS A THING



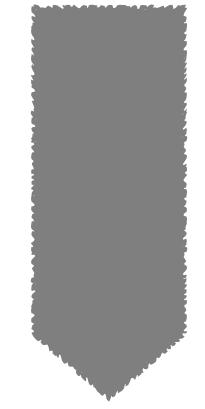
COMMIT



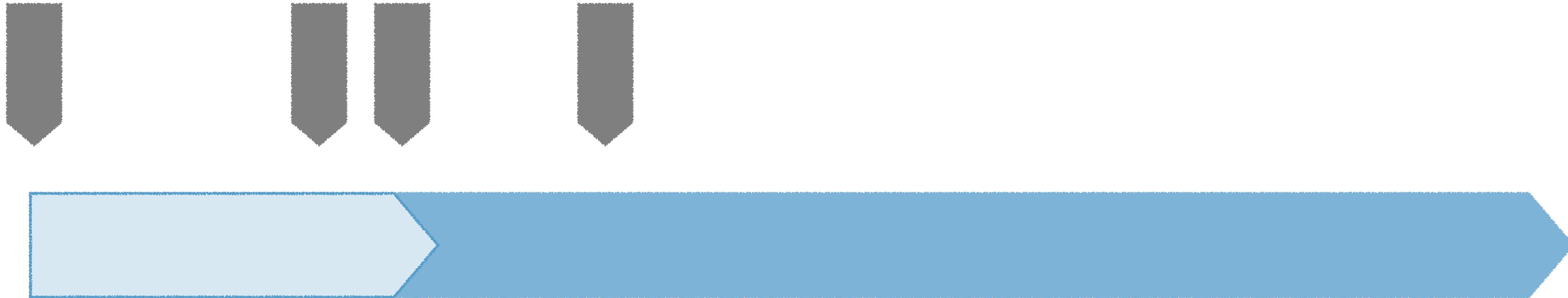
CI



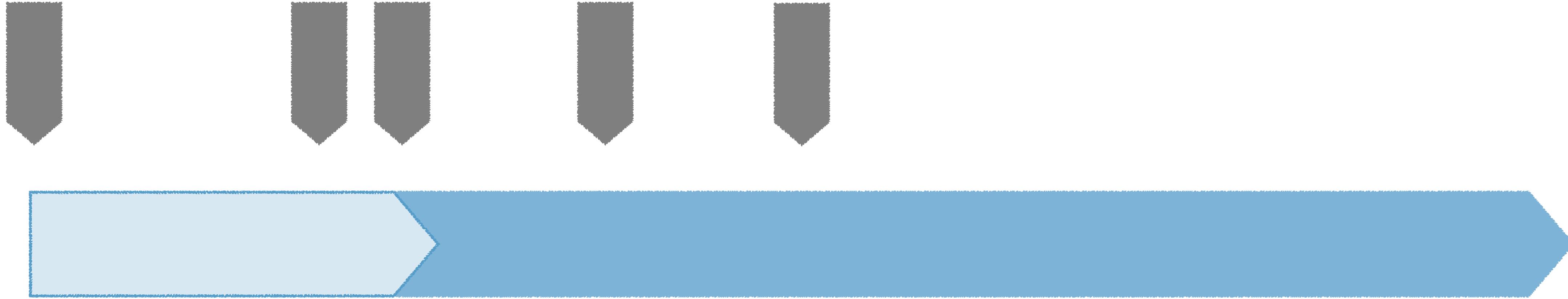
PUBLISH



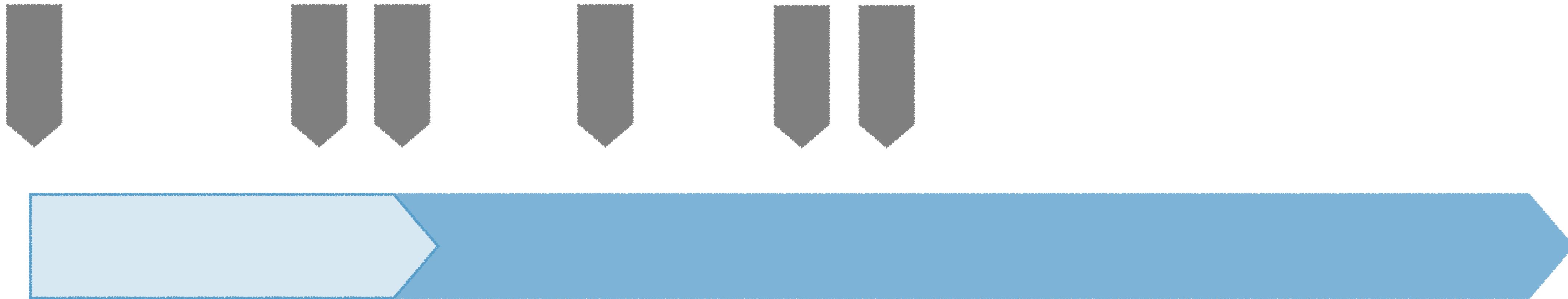
PLATFORM TEST



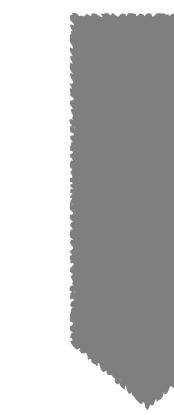
PRODUCTION



PERFORMANCE



CVE



CLOSED WORLD ASSUMPTIONS



**DEPENDENCIES
COST TOO MUCH**

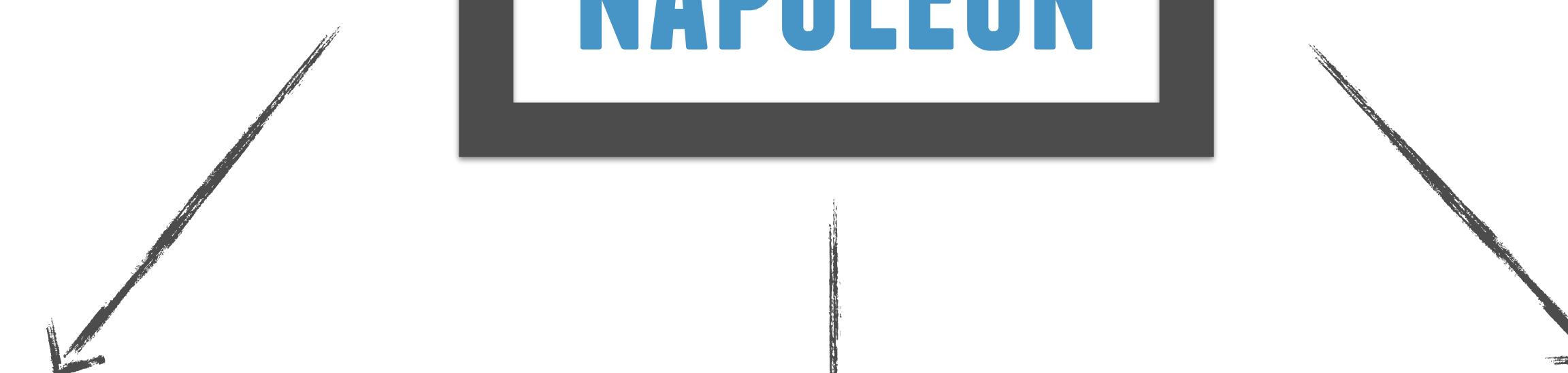
TWO — CONCEPTS

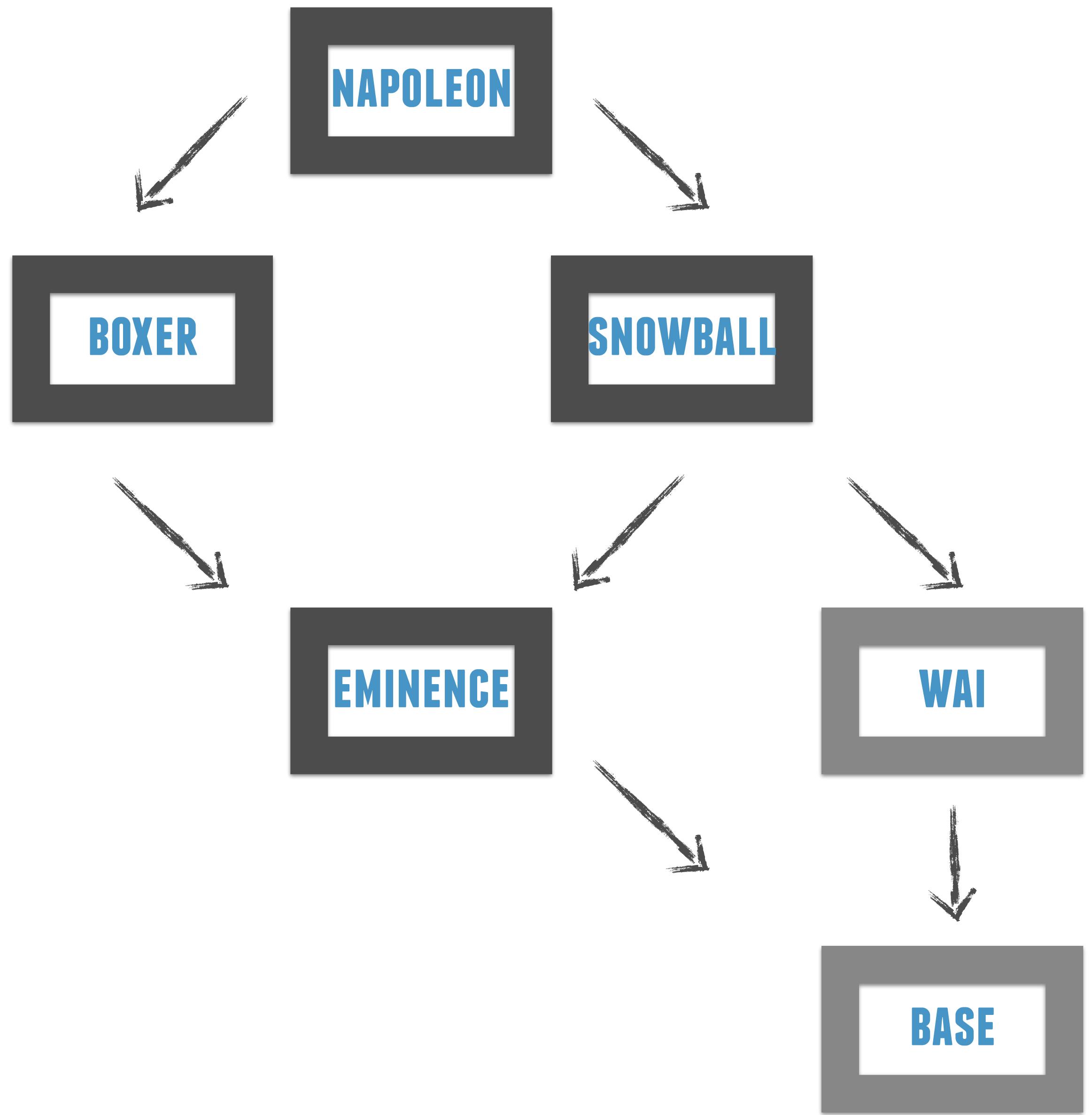
NAPOLEON

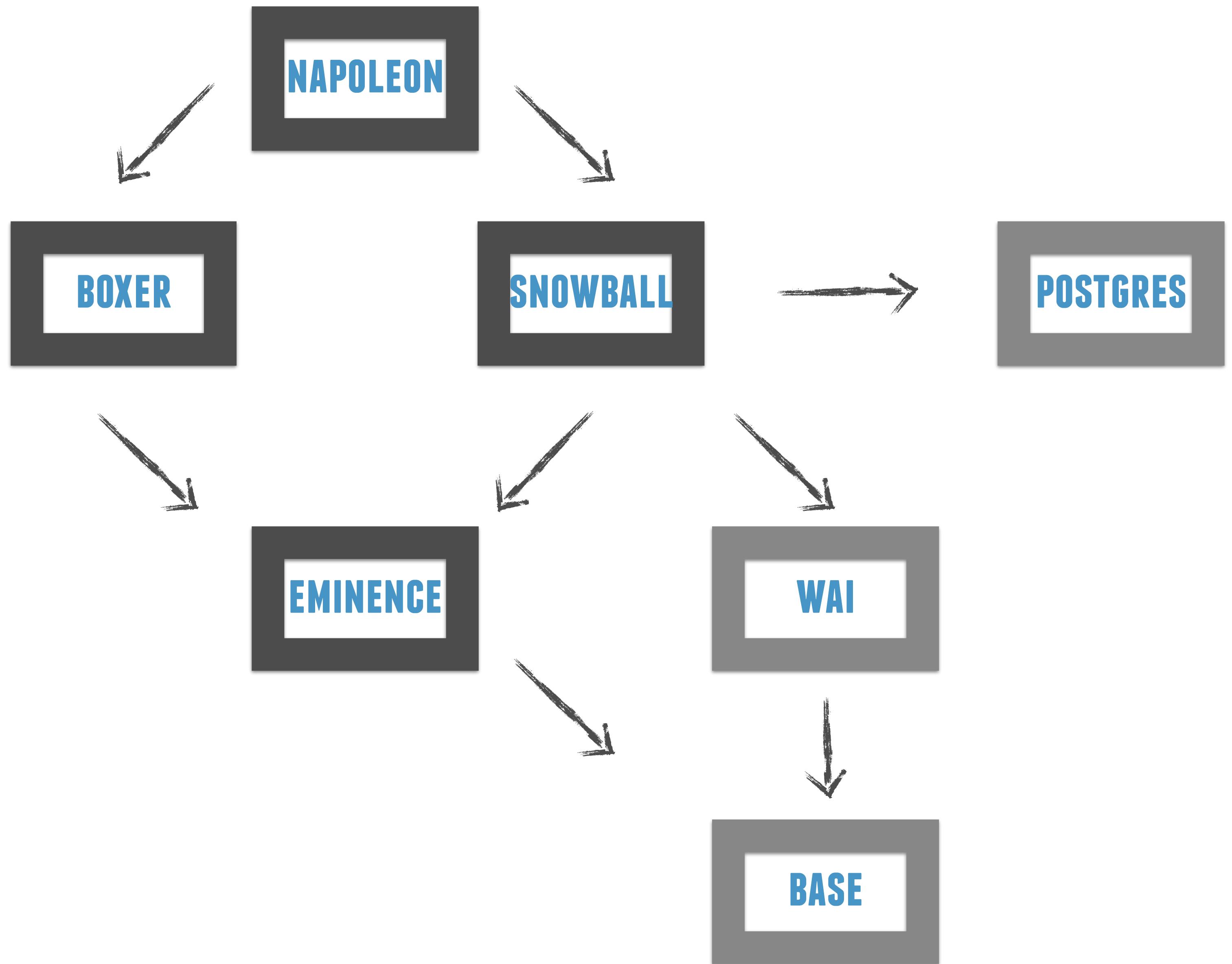
BOXER

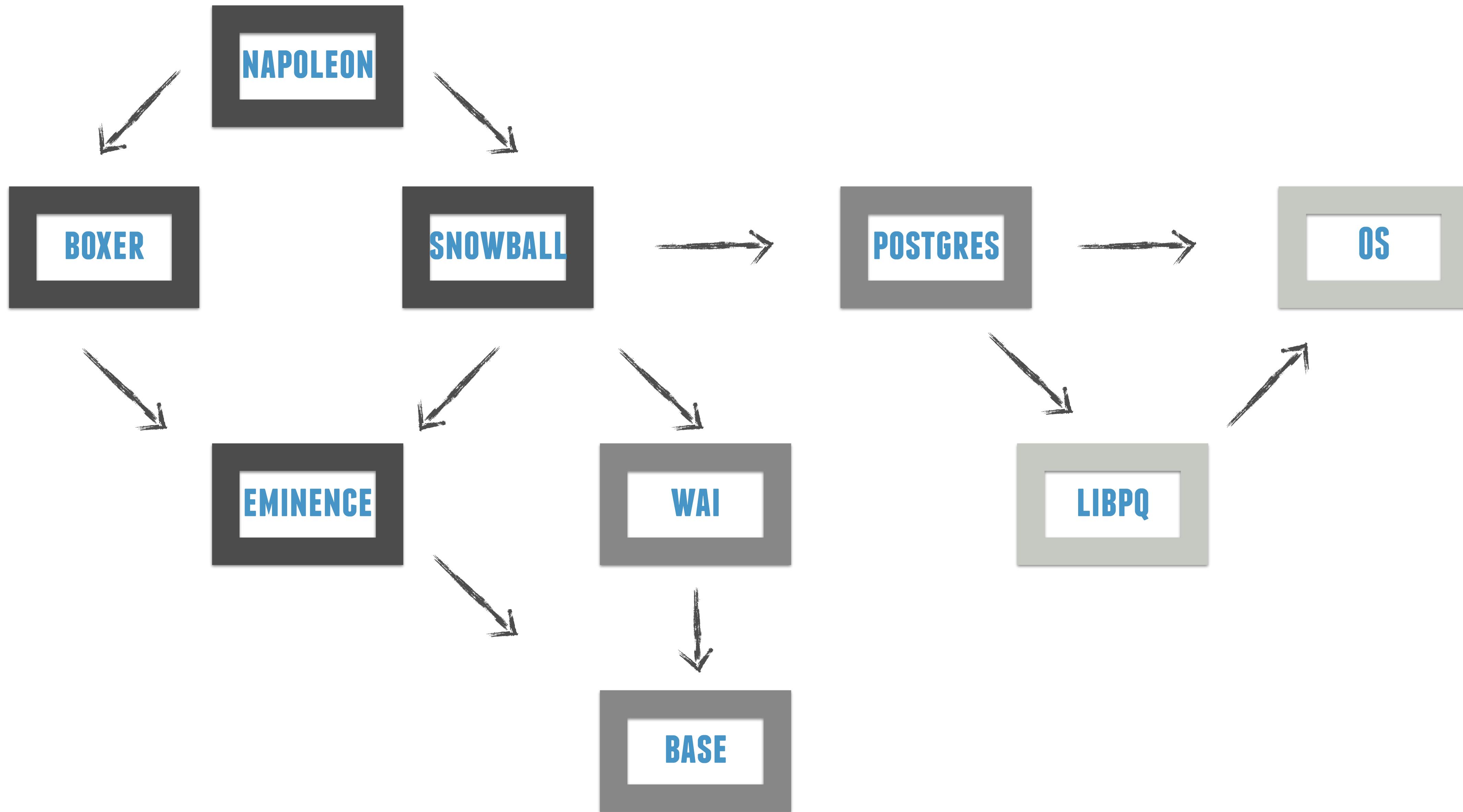
SNOWBALL

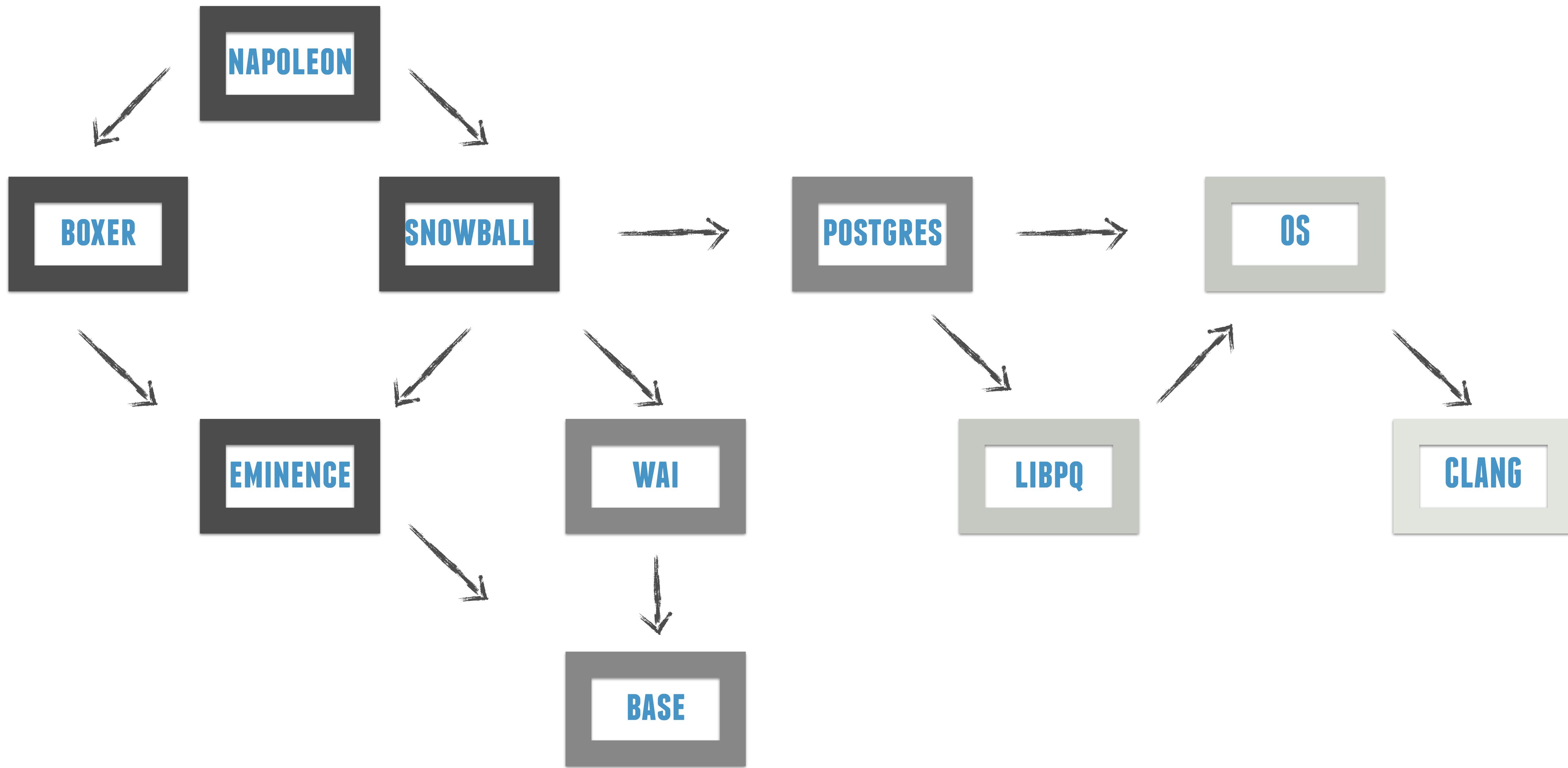
EMINENCE







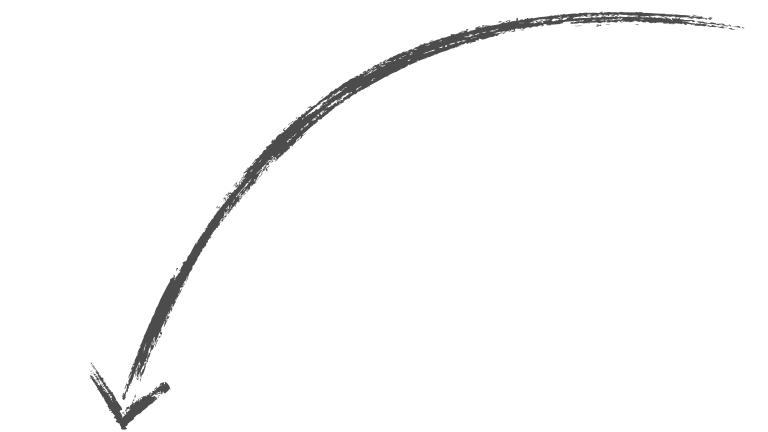




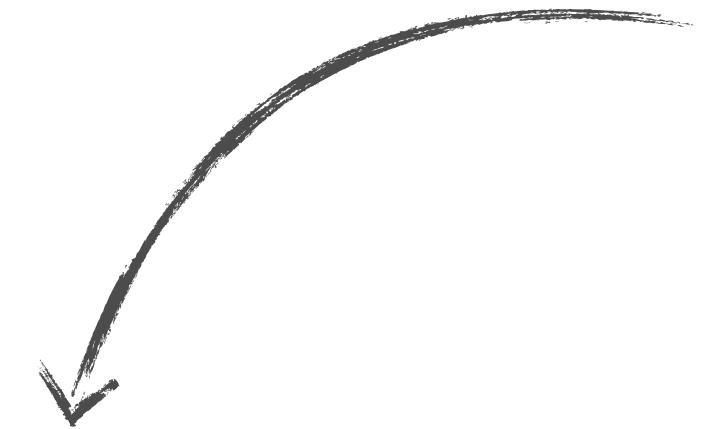
**ANNEX ISA
FACT STORE**

**START WITH SOMETHING WE
HAVE (OR CAN GET)**

A FAMILY



A FAMILY

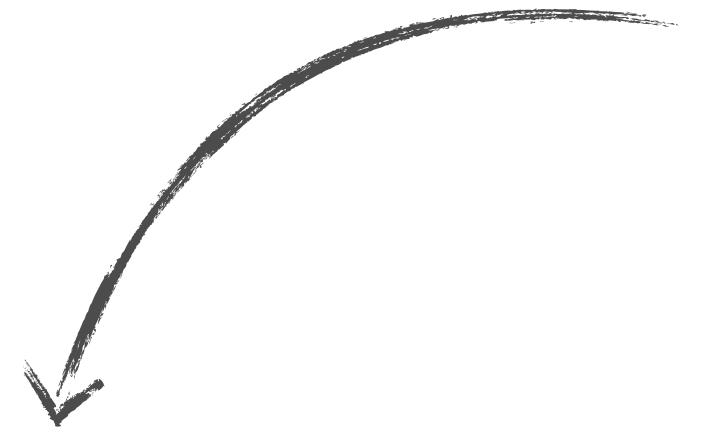


family/123-abc-456

AN ATOM

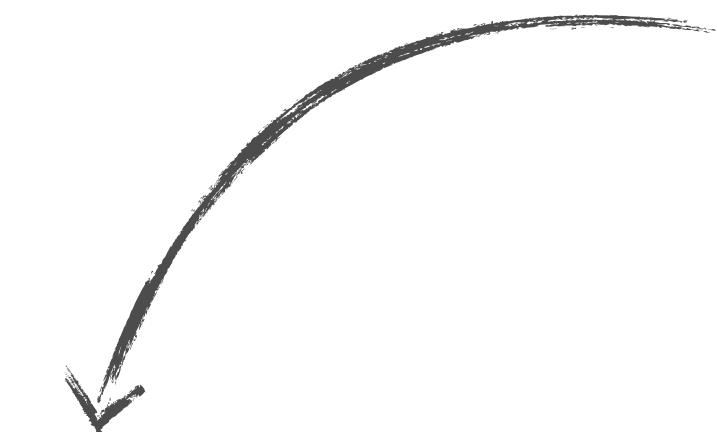


AN ATOM



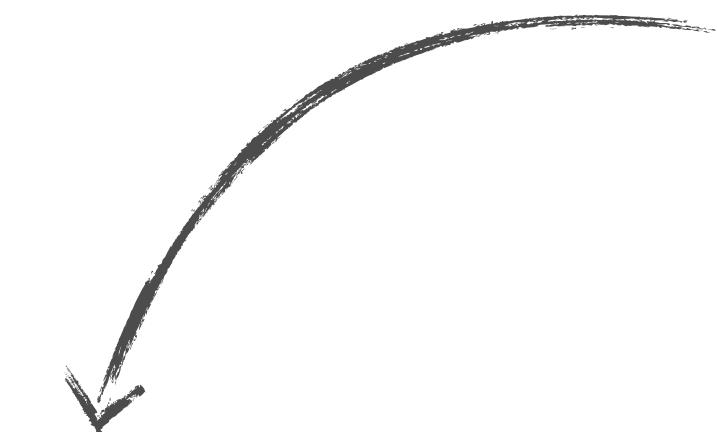
atom/123-abc-456

A FACT



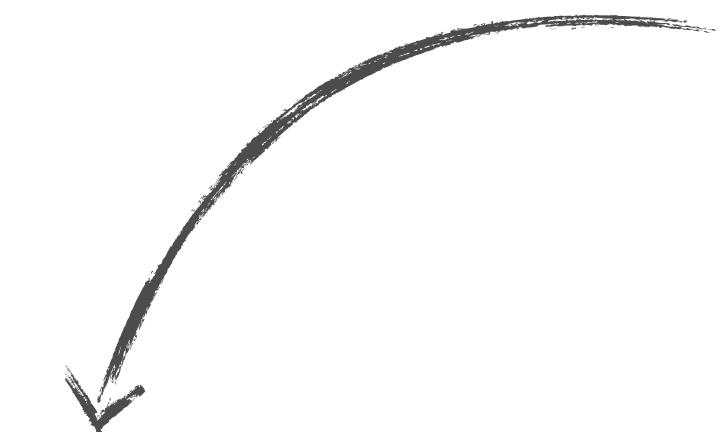
```
:fact/123-abc-457:  
  commit: bd2f074...02
```

A FACT



```
:fact/123-abc-458:  
  api-signature: [...]
```

A FACT



```
fact/123-abc-459:  
feature: it-works
```

WE ASCRIBE FACTS TO ATOMS

atom/123-abc-456

fact/123-abc-457

fact/123-abc-458

fact/123-abc-459

boxer 1.2.1

[commit: bd2f074...02

[api-signature: [...]

[feature: it-works

**THE VIEW OF FACTS AGAINST ATOMS
AT A POINT IN TIME IS A WORLD**

boxer

facts/...

snowball

facts/...

napoleon

facts/...

A SINGLE WORLD



WORLDS CHANGE OVER TIME

boxer 1.2.1

@v1

[commit: bd2f074...02

[api-signature: [...]

[feature: it-works

:fact/123-abc-460:
tested: FreeBSD-9.1

boxer 1.2.1

@v1

[commit: bd2f074...02

boxer 1.2.1

@v2

[commit: bd2f074...02

s

[api-signature: [...]

[feature: it-works

[tested: FreeBSD-9.1

USABILITY #1

DESIGN DECISIONS SHOULD BE
FRAMED IN TERMS OF
PREDICTABILITY AND REPEATABILITY

ANNEX ISA

DATA STORE

**BECAUSE WE BELIEVE IN
INTERACTING WITH AN OPEN WORLD
DOESN'T MEAN WE HAVE TO TRUST IT.**

atom/123-abc-456

fact/123-abc-457

fact/123-abc-458

fact/123-abc-459

artifact/123-abc-459

boxer 1.2.1

[commit: bd2f074...02]

[api-signature: [...]]

[feature: it-works]

[artifact:

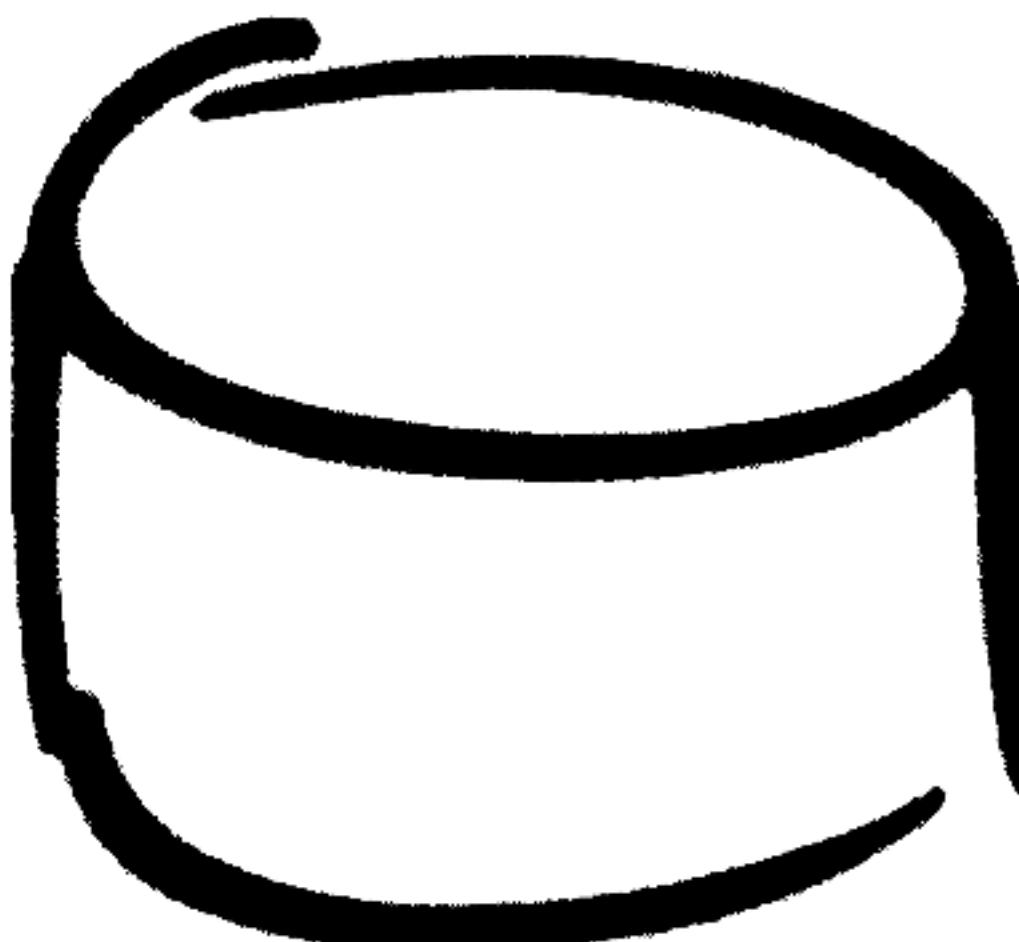
 tag: bin/boxer

 flags: [...]]

 address: e2f1...bc74]

boxer 1.2.1

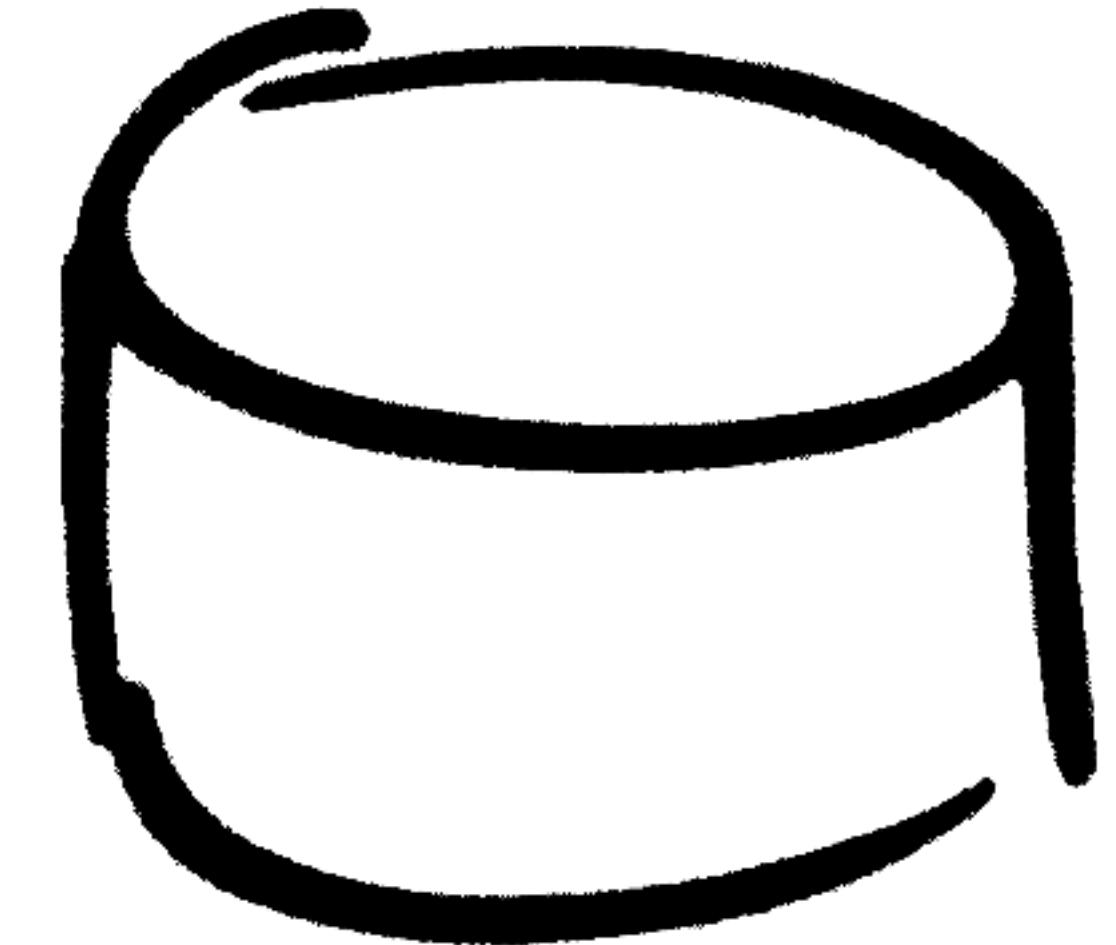
```
artifact:  
  tag: bin/boxer  
  flags: [...]  
  address: e2f1...bc74
```



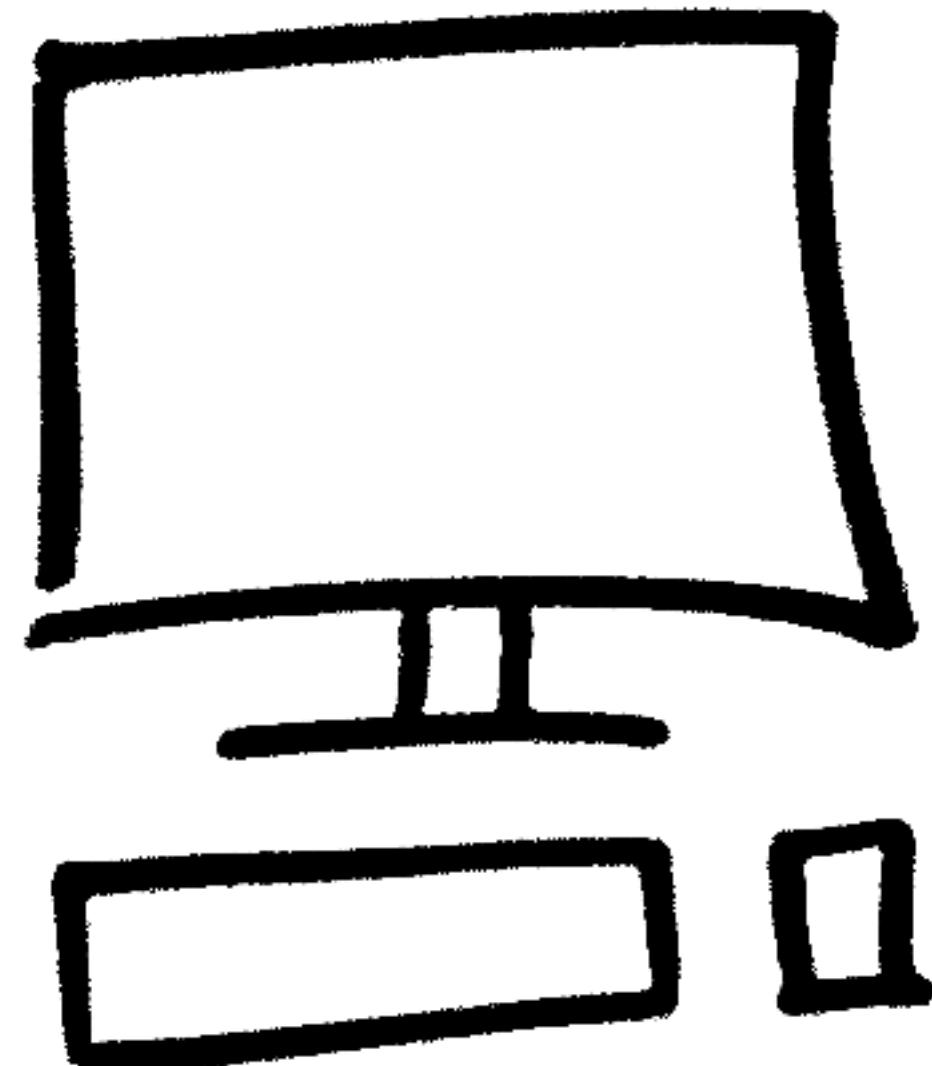
POINTS TO

```
annex/storage/e2f1...bc74/data  
/info
```

annex/storage/e2f1...bc74/data
/info



FREE PREDICTABLE CACHING



local/storage/e2f1...bc74/data
/info

USABILITY #2

NEVER DOWNLOAD SOMETHING
ALREADY ON A USERS MACHINE

ANNEX ISA

LANGUAGE

```
:boxer
:has :feature "multi-part-put"
:has :commit "abcd-1345"
:has :branch "master"
```

```
:snowball
:is :compatable-with atom/...
```

```
:napoleon
:semver >= 1.3 < 1.4
```

FIRST CLASS NOTION OF TIME

```
:boxer
:has :feature "multi-part-put"
:has :commit "abcd-1345"
:has :branch "master"
```

```
:snowball
:is :compatable-with atom/...
```

```
:napoleon
:semver >= 1.3 < 1.4
```

+annex.example.com@v12345

:boxer
:has :feature "multi-part-put"
:has :commit "abcd-1345"
:has :branch "master"

:snowball
:is :compatable-with atom/...

:napoleon
:semver >= 1.3 < 1.4
+annex.internal.com@v123

```
:boxer
  :has :feature "multi-part-put"
  :has :commit "abcd-1345"
  :has :branch "master"

:snowball
  :is :compatable-with atom/...

:napoleon
  :semver >= 1.3 < 1.4

:no-cve +annex.example.com@HEAD
```

ASSUMES IRREFUTABLE FACTS

```
: no-cve +annex.example.com@HEAD
```



USABILITY #3

PRECISION IS IMPORTANT, USERS
SHOULD ONLY HAVE TO SPECIFY
WHAT IS IMPORTANT TO THEM

USABILITY #4

FLEXIBILITY MUST NEVER COME
AT THE COST OF DETERMINISM

ANNEX ISA TOOL

annex fetch boxer.ax +server@v123

annex fetch +server@v123

```
annex fetch -u +server@v123
```

.stable.ax:

+server@v123

annex fetch

USABILITY #5

DON'T GENERATE FILES THAT A
USER WOULDN'T WRITE BY HAND

INSTANT BY DESIGN

```
annex fetch +repository@v123  
annex fetch +repository@v678  
annex fetch +repository@v123
```



annex atom --create family/1d...3b

annex fact atom/12...ef feature red

```
git checkout -b topic/feature
git add src/Boxer.hs
git commit -m 'Great change!
fixes #12
annex:
:feature winning'
git push origin topic/feature
```

```
annex fact atom/12...ef --git HEAD
```

```
git notes add --ref=annex \  
  -m ":feature again" HEAD  
git push origin refs/notes/*
```

```
annex fact atom/12...ef --git HEAD
```

USABILITY #6

LEVERAGE TOOLS ALREADY IN USE

USABILITY #7

DON'T BE AS BAD AS GIT

build.sbt:

```
scalaVersion := 2.11

annexDependencies := List(
    atom("ivory")
        .has("feature", "puts")
)
```

napoleon.cabal.annex:

name: napoleon
depends-on: eminence
 :feature fix-#12

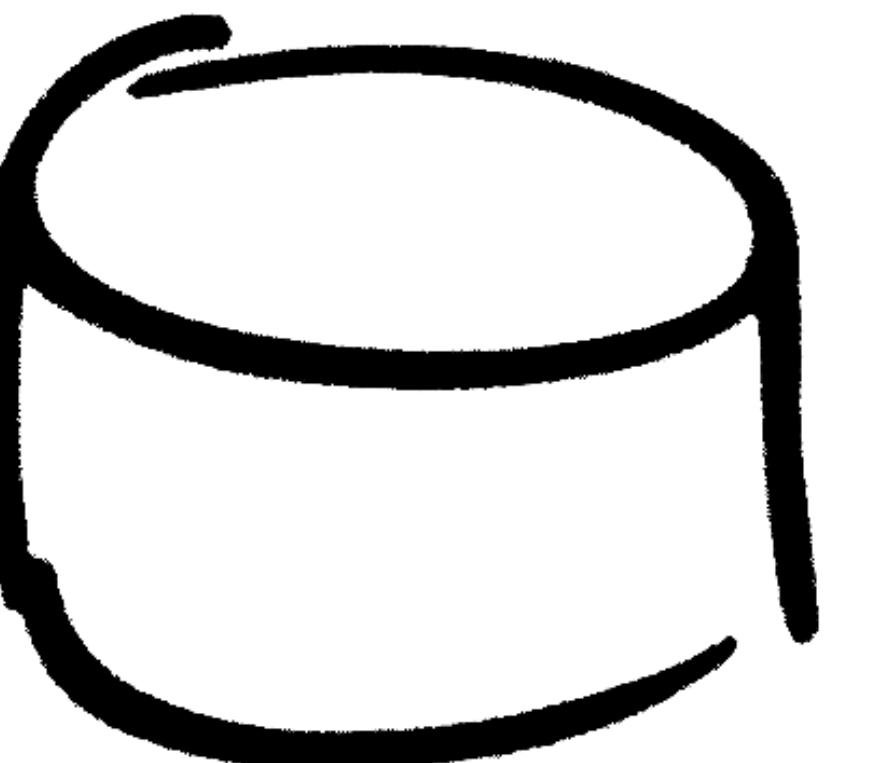
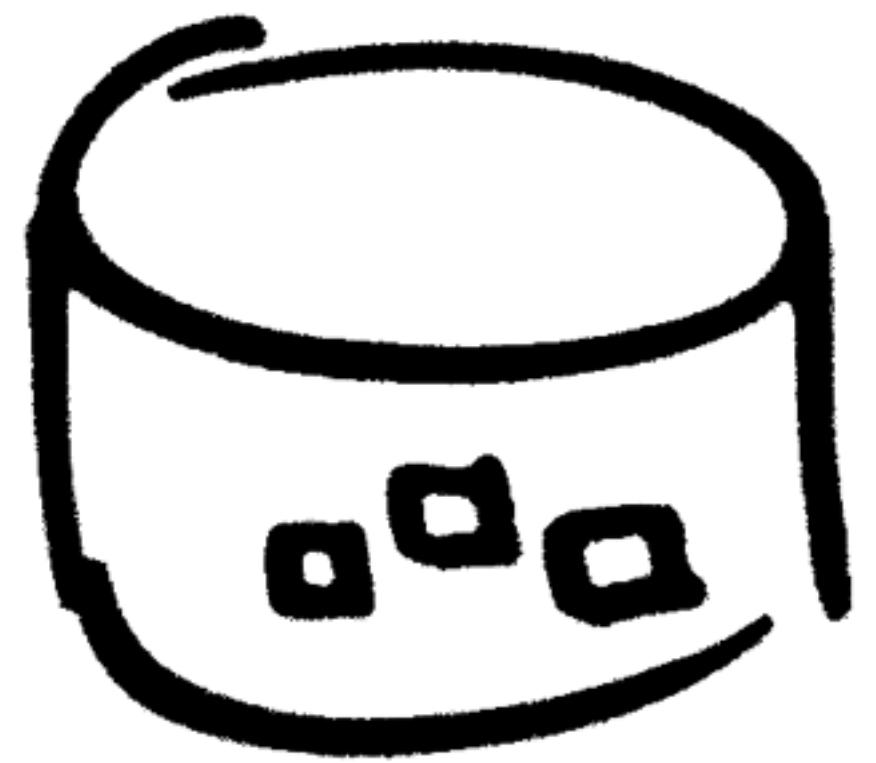
THREE

A DEEPER LOOK

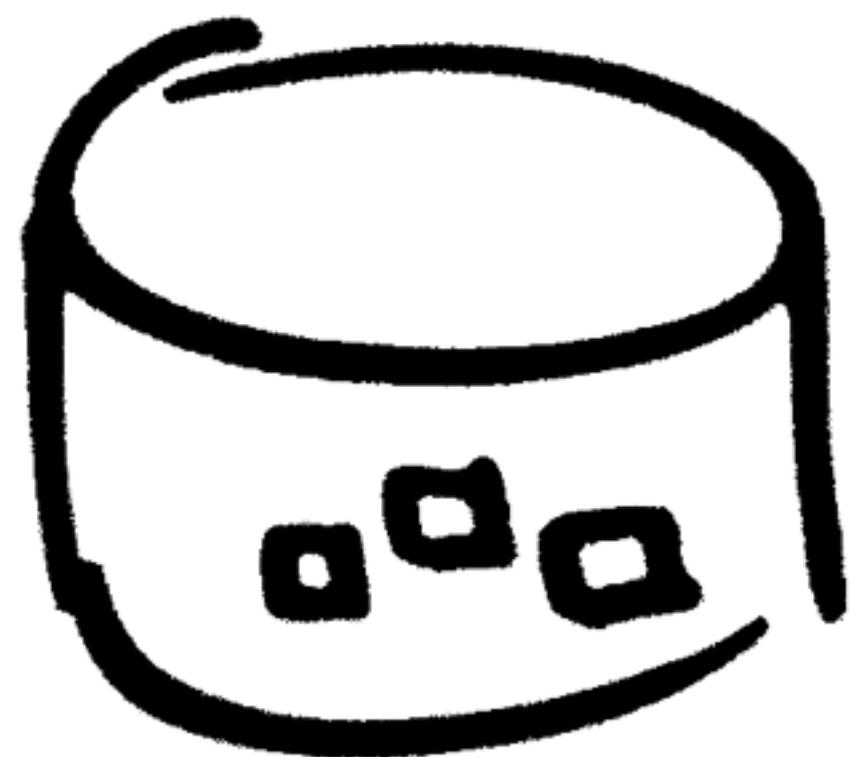
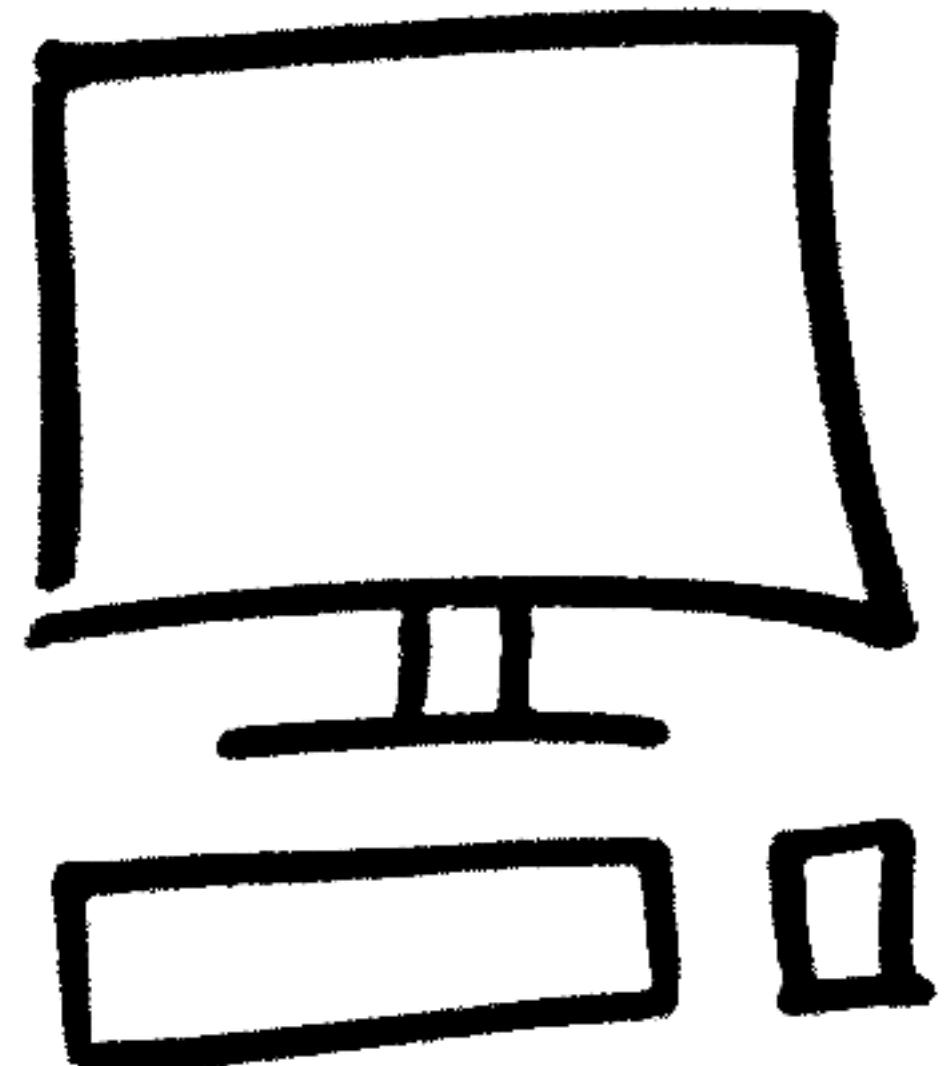
RESOLUTION

ANNEX.MTH.IO

RESOLUTION

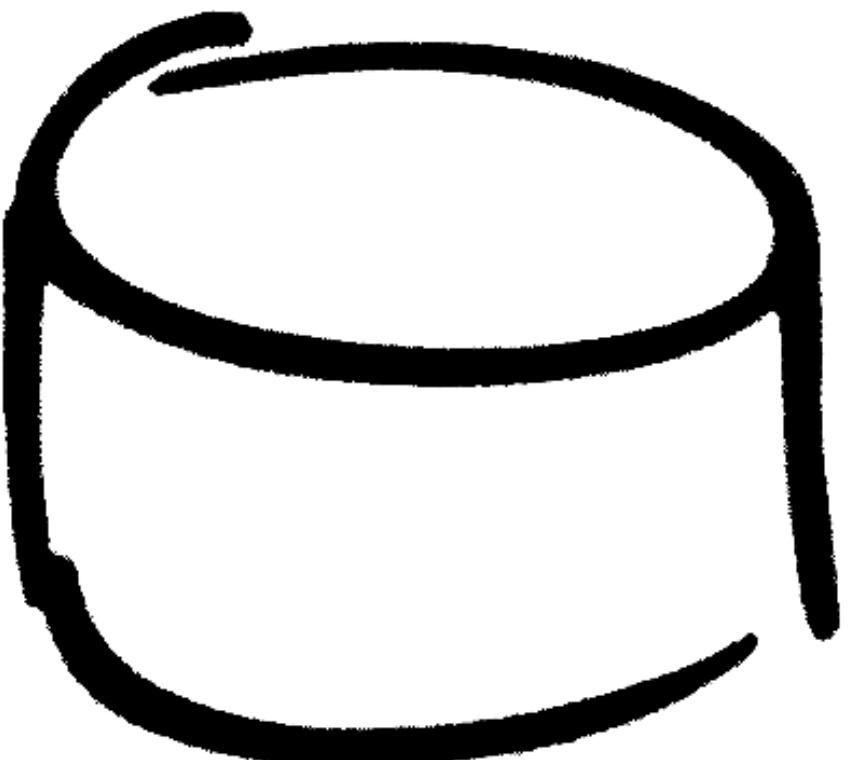
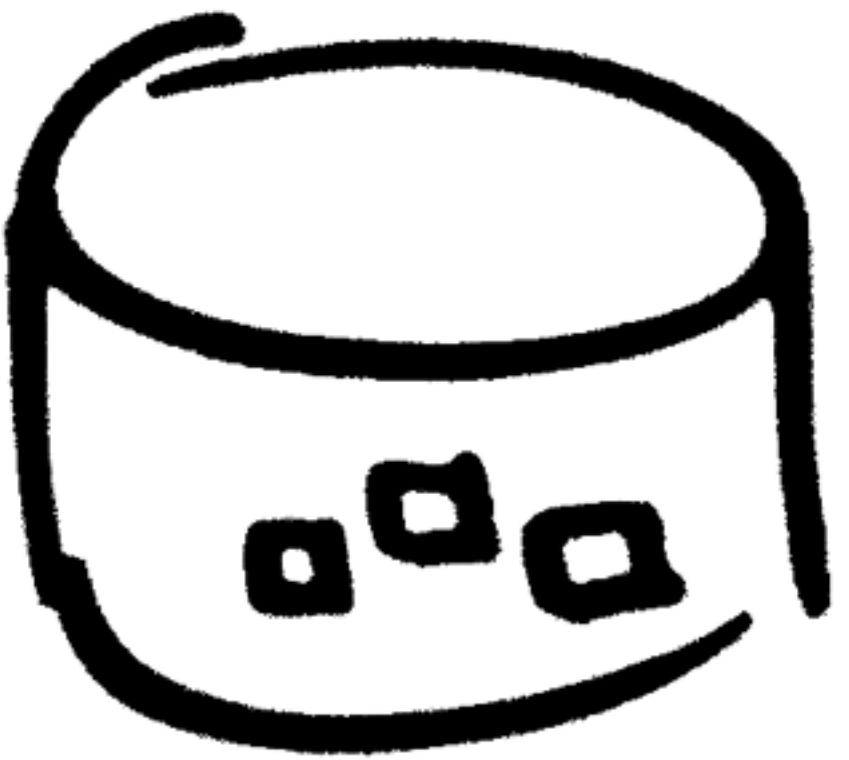


[GITHUB.COM/AMBIATA/BOXER](https://github.com/ambiata/boxer)



ANNEX.MTH.IO

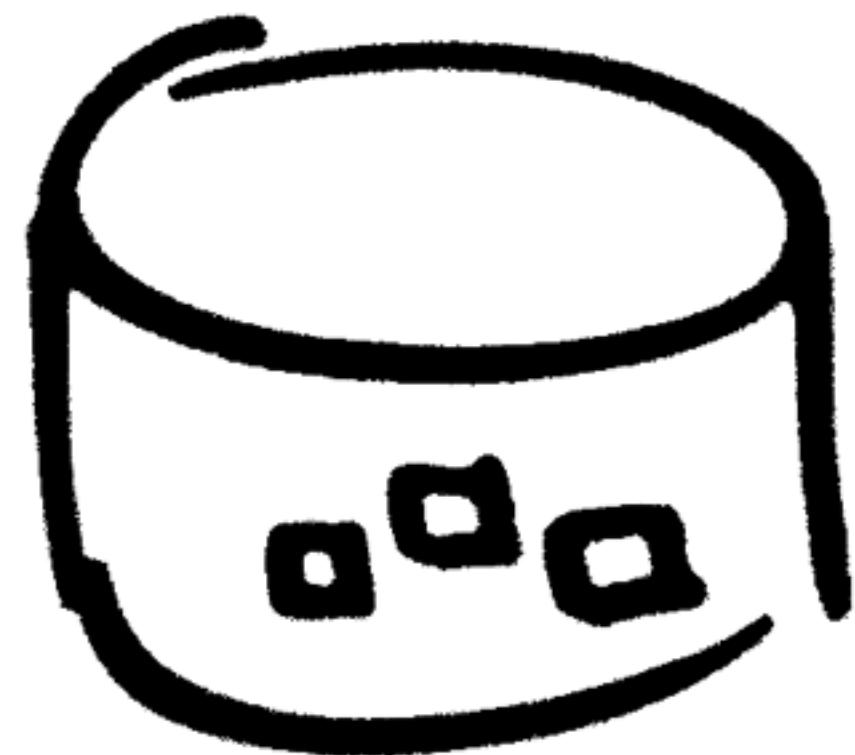
RESOLUTION



[GITHUB.COM/AMBIATA/BOXER](https://github.com/ambiata/boxer)

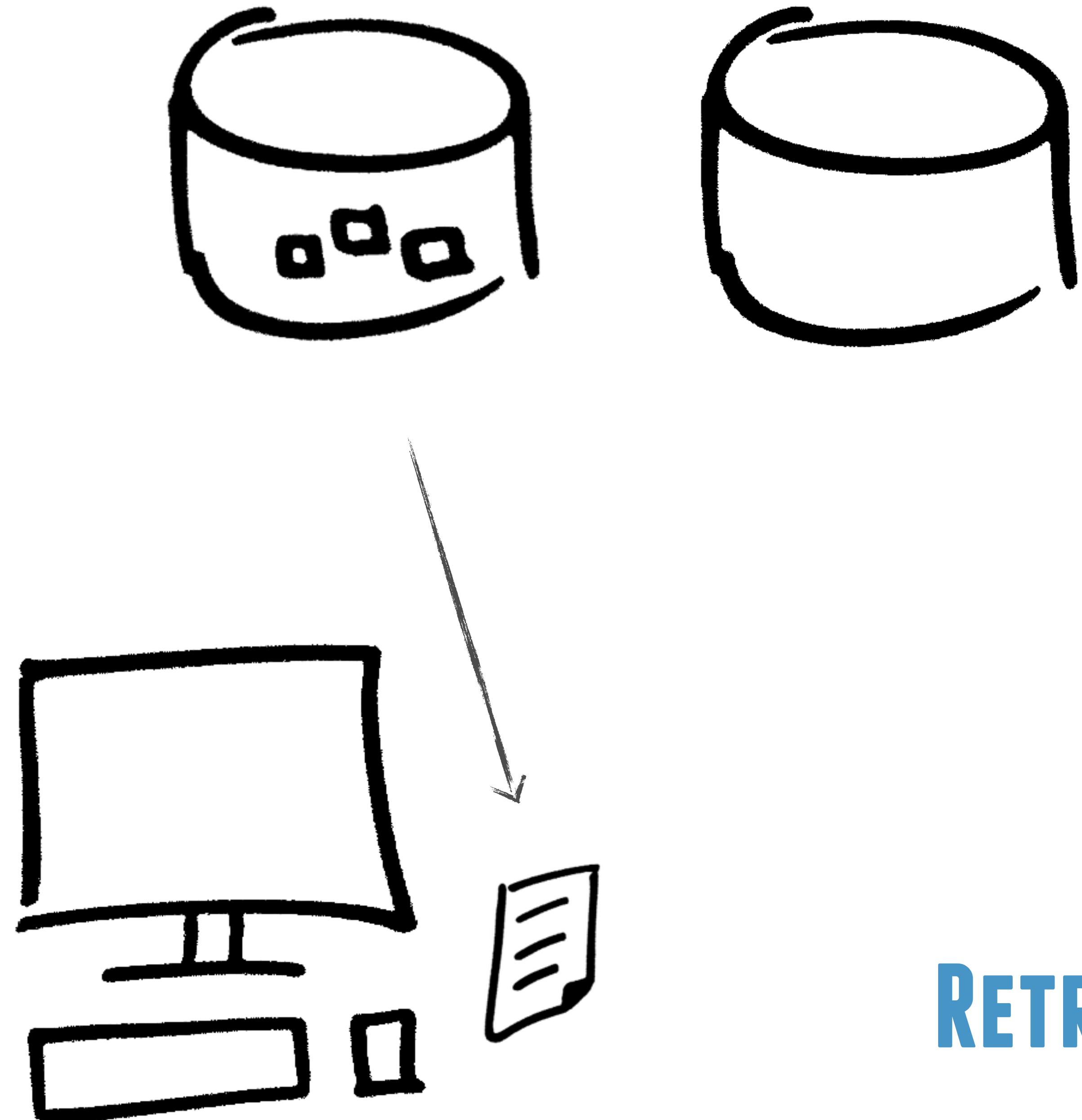


RETRIEVE FACTS



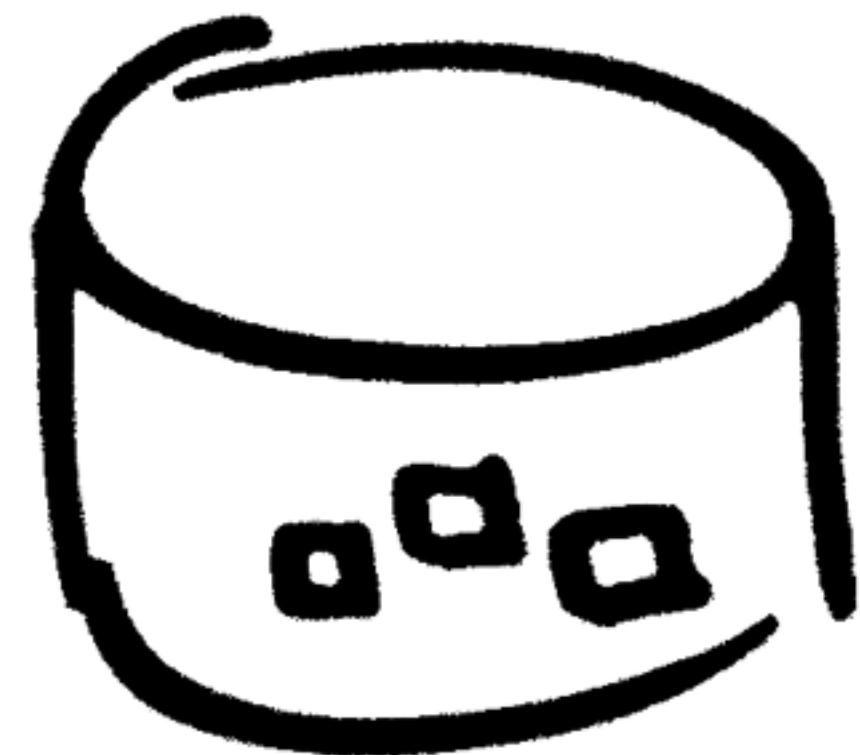
ANNEX.MTH.IO

RESOLUTION



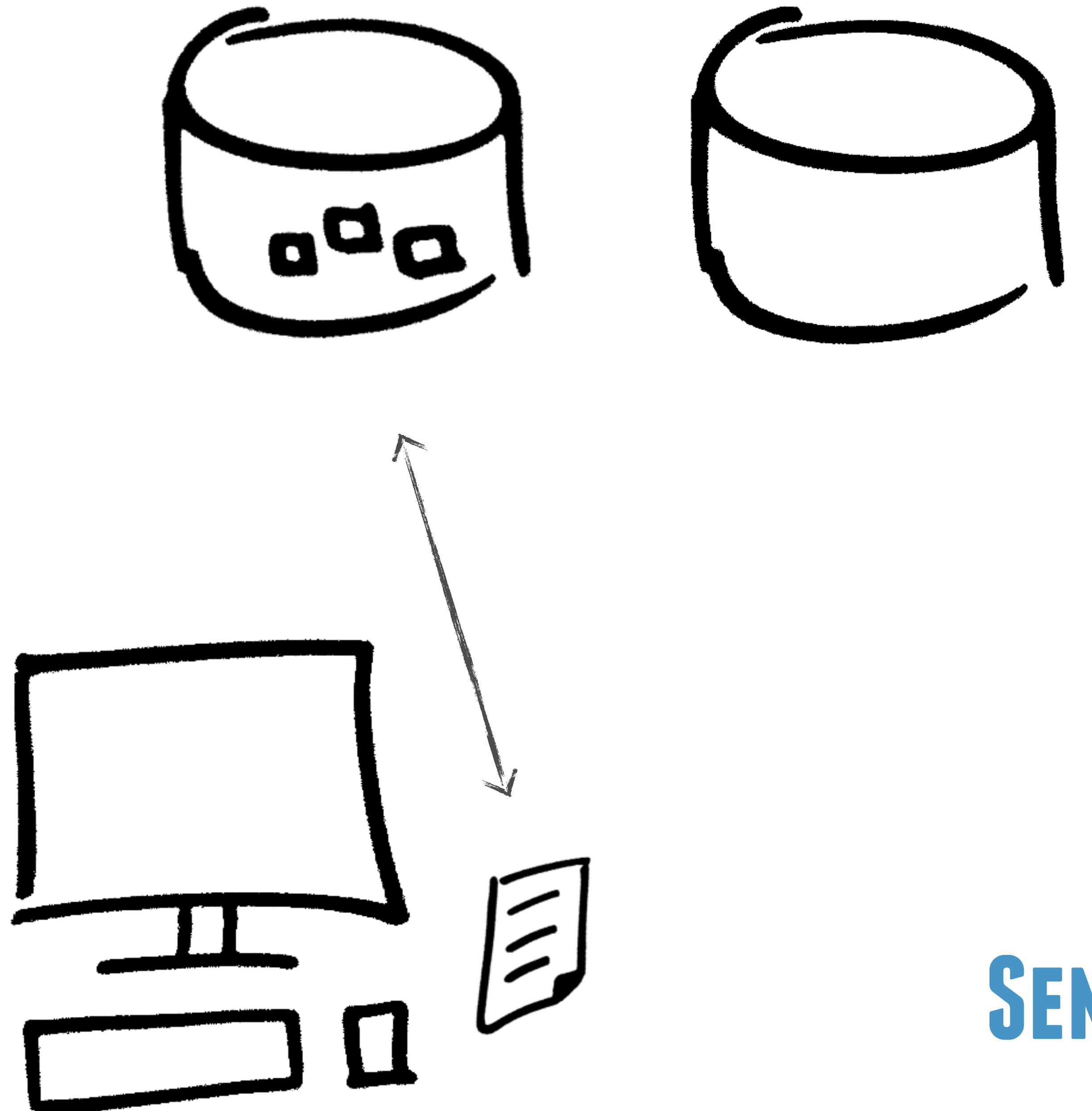
[GITHUB.COM/AMBIATA/BOXER](https://github.com/ambiata/boxer)

RETRIEVE FACTS



ANNEX.MTH.IO

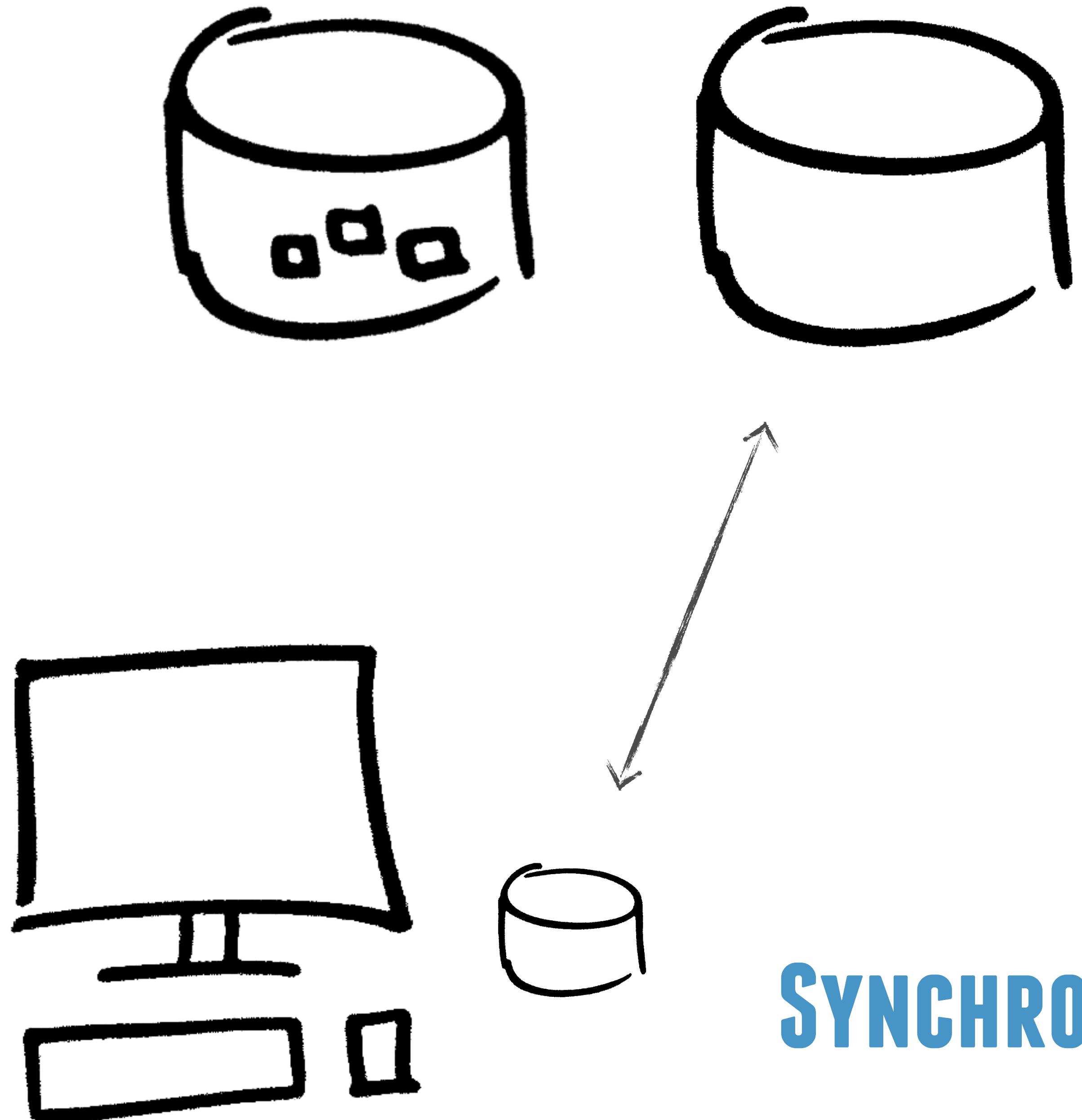
RESOLUTION



[GITHUB.COM/AMBIATA/BOXER](https://github.com/ambiata/boxer)

ANNEX.MTH.IO

RESOLUTION



[GITHUB.COM/AMBIATA/BOXER](https://github.com/ambiata/boxer)

SYNCHRONIZE ARTIFACTS

DEVELOPMENT

TIME-DEPENDENT RESOLUTION

NAPOLEON

BOXER

SNOWBALL

EMINENCE



napoleon.ax:

:boxer
:has :feature ingestion

:snowball
:has :feature timeline

.stable.ax:

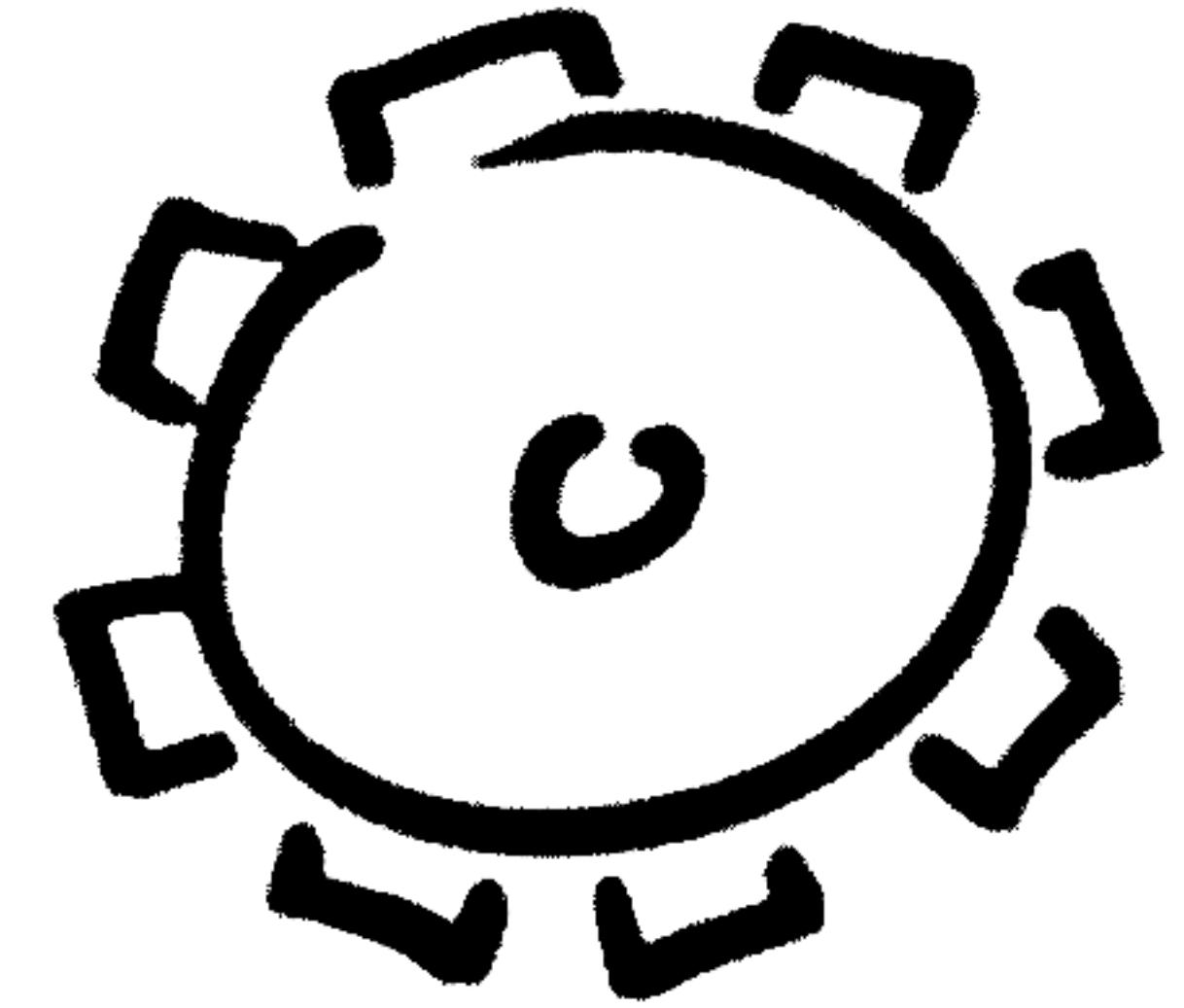
+annex.mth.io@v123

[ci] stable

annex fetch

[ci] edge

annex fetch @HEAD



napoleon

napoleon 1.2

@v123

@v124

@v125

napoleon 1.3

@v124

@v125

family/123-abc-4ef

atom/123-abc-4ef



USABILITY #8

DESIGN FOR SIMULATION,
NOTIFICATIONS AND METRICS

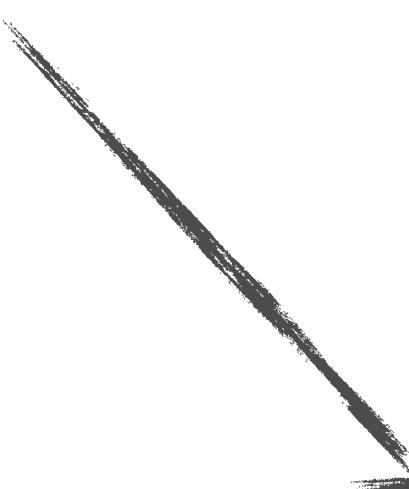
AN OPEN WORLD

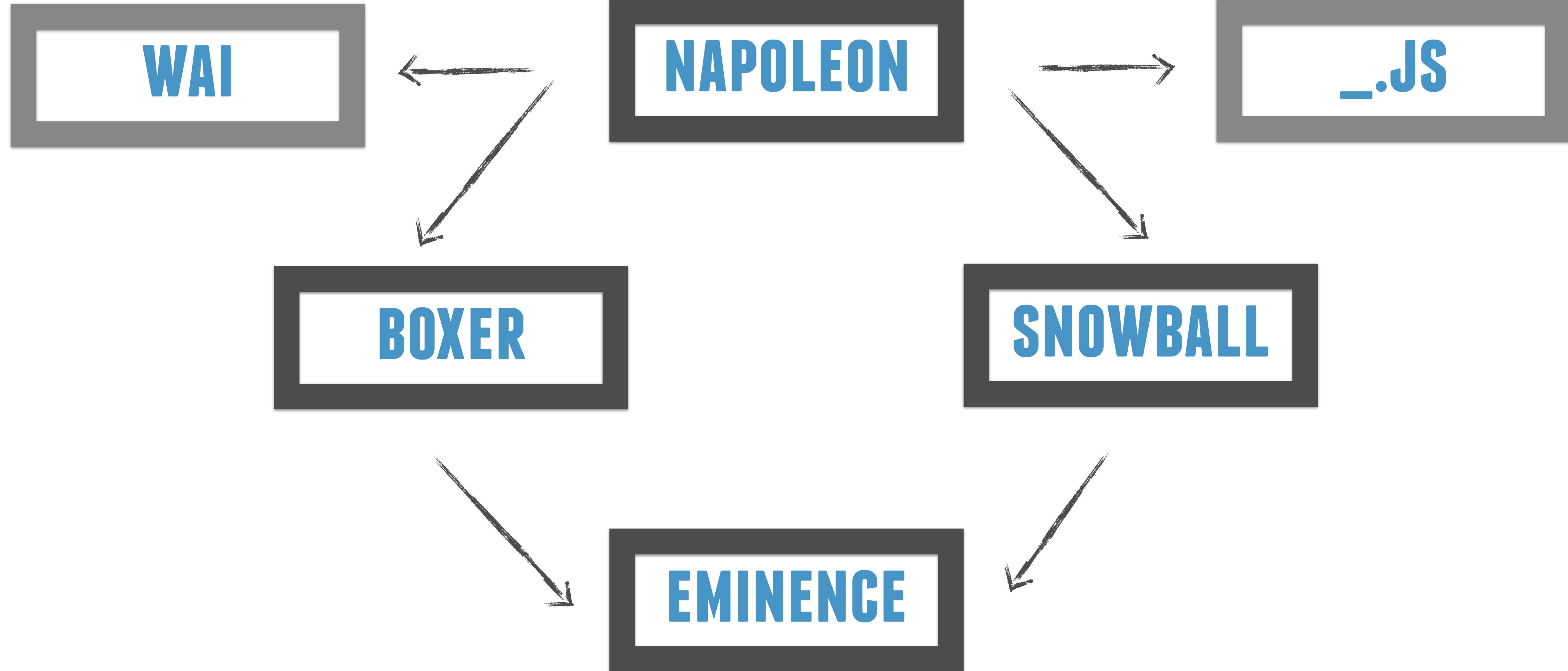
NAPOLEON

BOXER

SNOWBALL

EMINENCE





napoleon.ax:

```
:wai
:source hackage
:semver == 2.1.*
```

```
:underscore.js
:source cdnjs
:semver == 1.*
```

napoleon.ax:

```
:wai
:source hackage
:semver == 2.1.*
```

```
:underscore.js
:source cdnjs
:semver == 1.*
:tested-on ie4
```

USABILITY #9

START WITH THE PREMISE THAT
YOU NEED TO INTERACT WITH
LESS PRINCIPLED SYSTEMS

SOURCE SUBSTITUTION

NAPOLEON

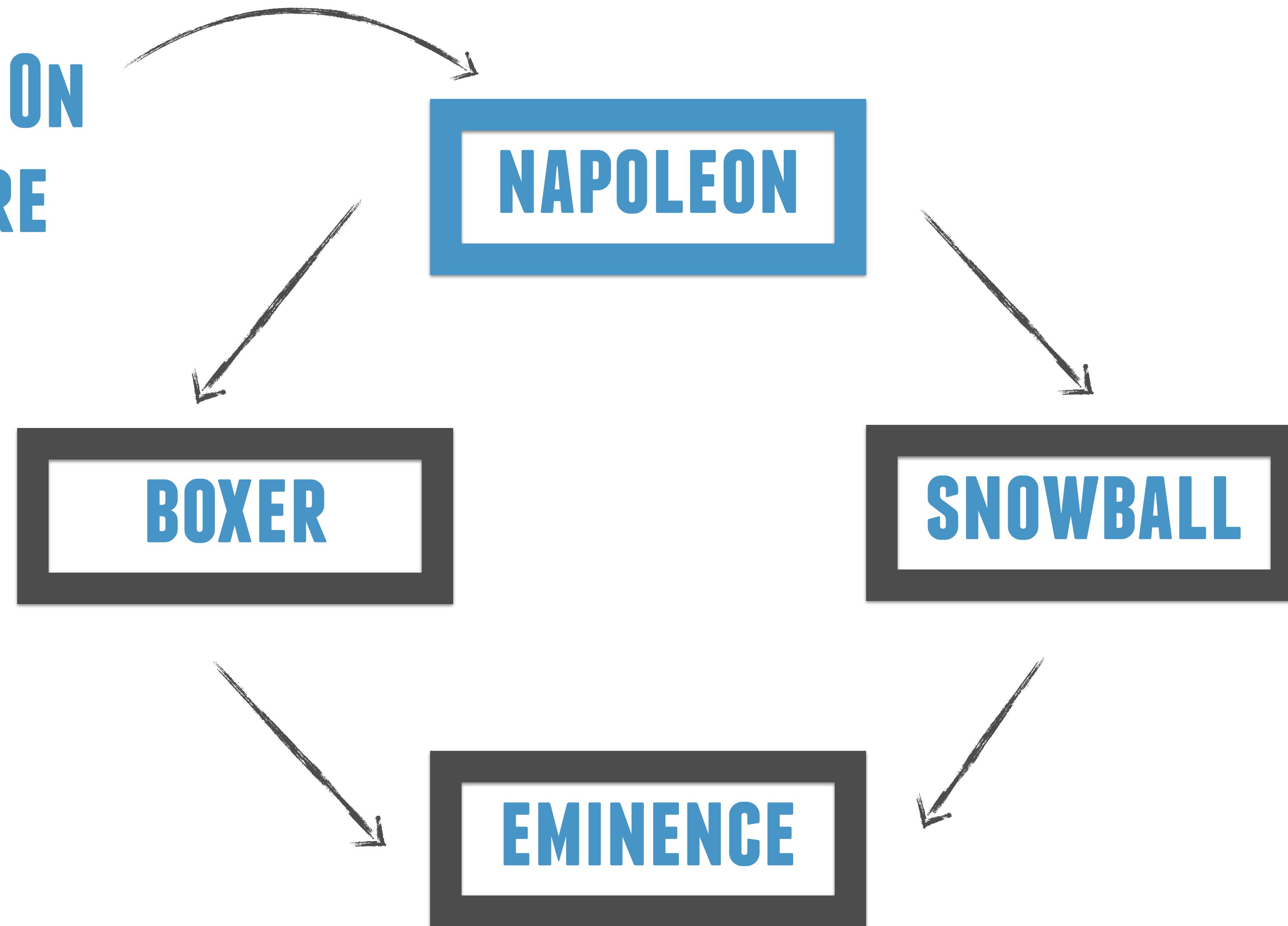
BOXER

SNOWBALL

EMINENCE



WORKING ON A FEATURE



napoleon.ax:

:boxer
:has :feature ingestion

:snowball
:has :feature timeline

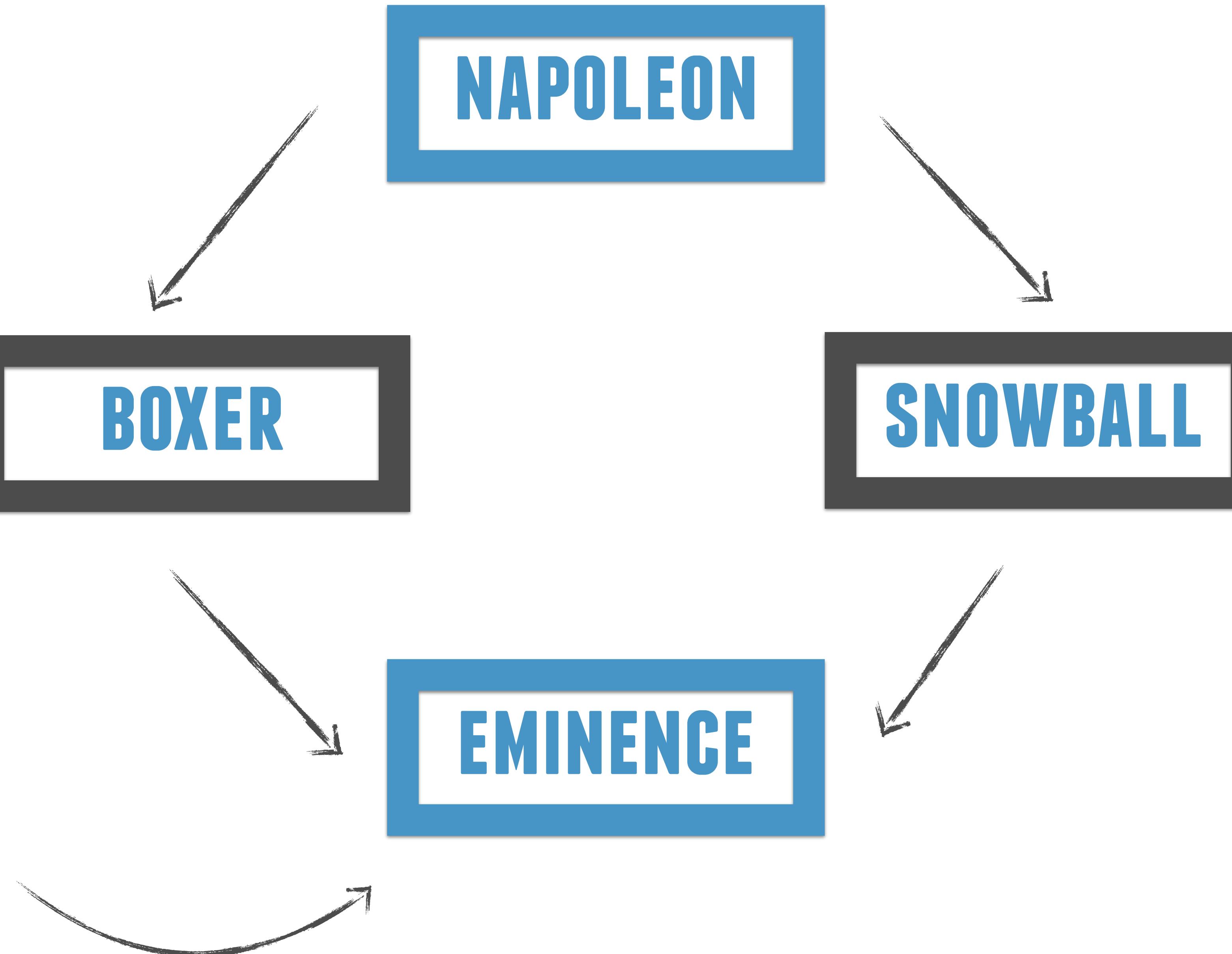
NAPOLEON

BOXER

SNOWBALL

NEED A
BUG FIX

EMINENCE



```
annex fetch --source-substitute \  
eminence ./eminence
```

```
annex fetch --source-substitute \
eminence ./eminence \
--ignore-constraints
```

napoleon.ax:

:boxer
:has :feature ingestion

:snowball
:has :feature timeline

:eminence
:has :commit ab34...f3e1
:transitive

annex fact git/HEAD fix '#112'

napoleon.ax:

:boxer
:has :feature ingestion

:snowball
:has :feature timeline

:eminence
:has :fix #112
:transitive

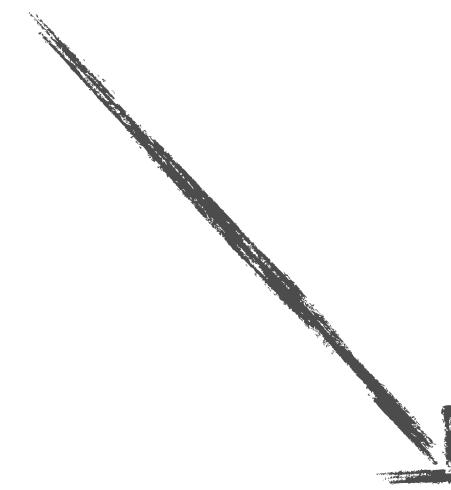
SHIP IT



NAPOLEON



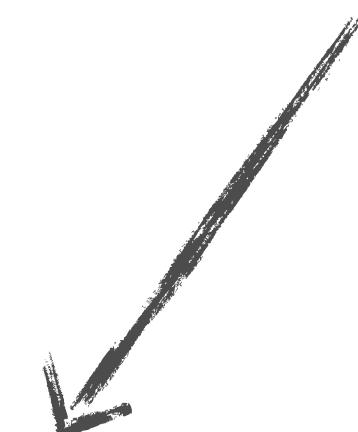
BOXER



SNOWBALL



EMINENCE



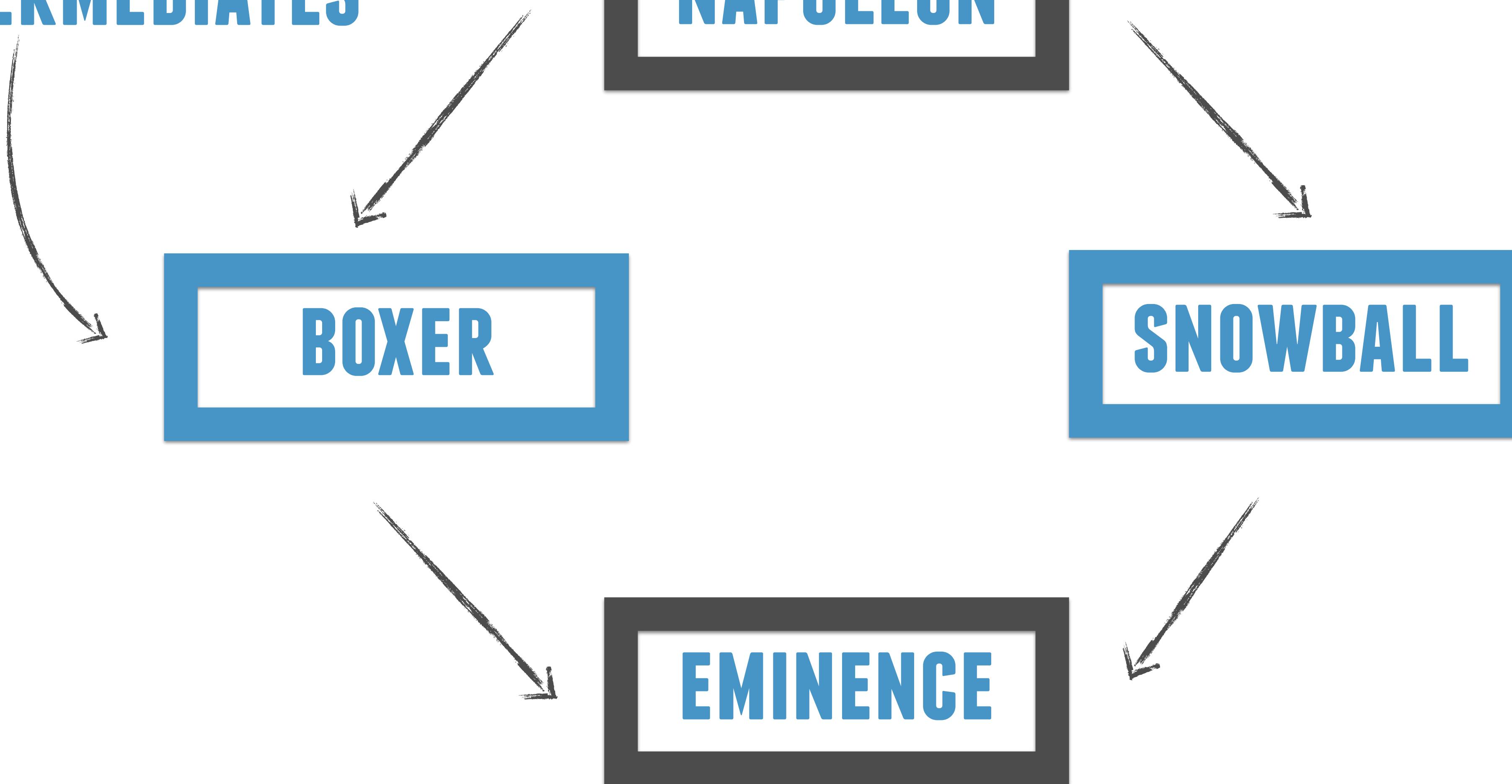
NEVER HAD TO TOUCH INTERMEDIATES

NAPOLEON

BOXER

SNOWBALL

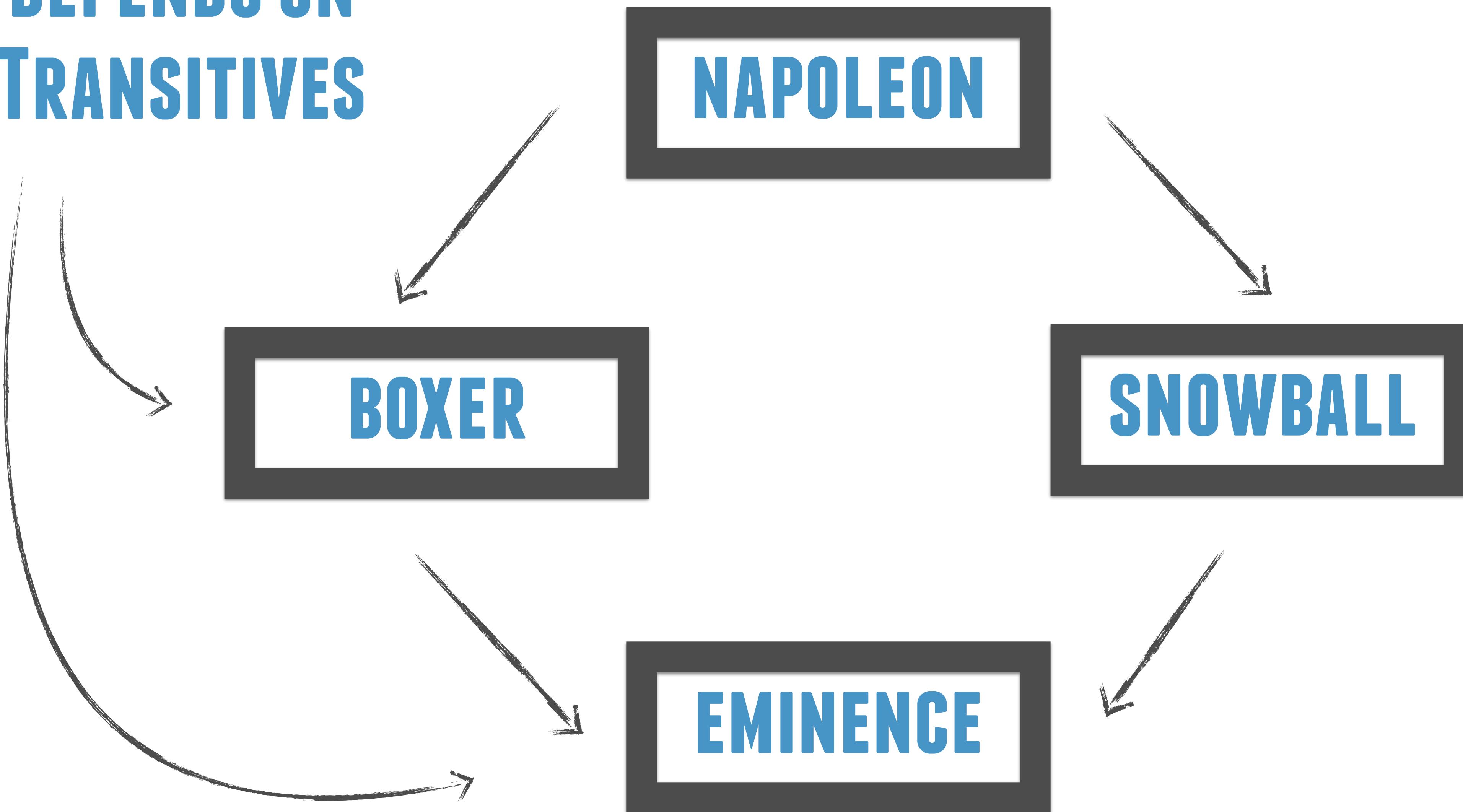
EMINENCE



BINARY SUBSTITUTION

**REQUIRES DEDUCTION OF OUTPUT
SIGNATURE BEFORE IT IS BUILT**

DEPENDS ON TRANSITIVES



**NIX STYLE BUILD THE WORLD +
BETTER LANGUAGE SUPPORT
ESSENTIAL**

DISTRIBUTION

**IF WE ASSUME OPEN WORLD,
MULTIPLE ANNEX FACT STORES
IS REALITY**

**HANDLING TIME IS NON-TRIVIAL
IN A DISTRIBUTED SYSTEM**

**ANNEX (CURRENTLY) CHOOSES
FEDERATION OVER BEING A TRULY
DISTRIBUTED SYSTEM**

+red@v123

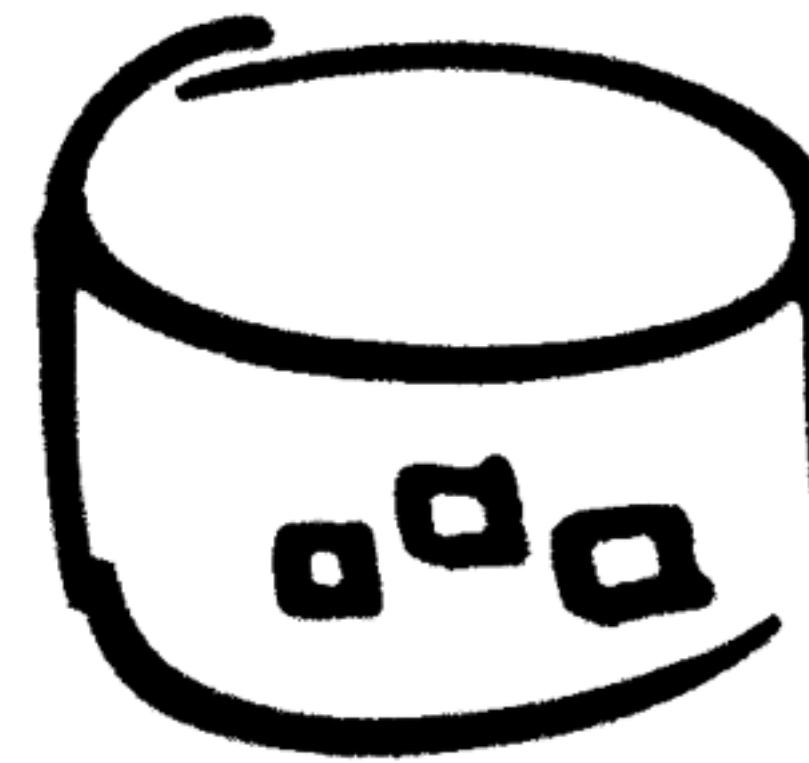


**TIME AXIS IS
LOCALIZED TO
A GIVEN STORE**

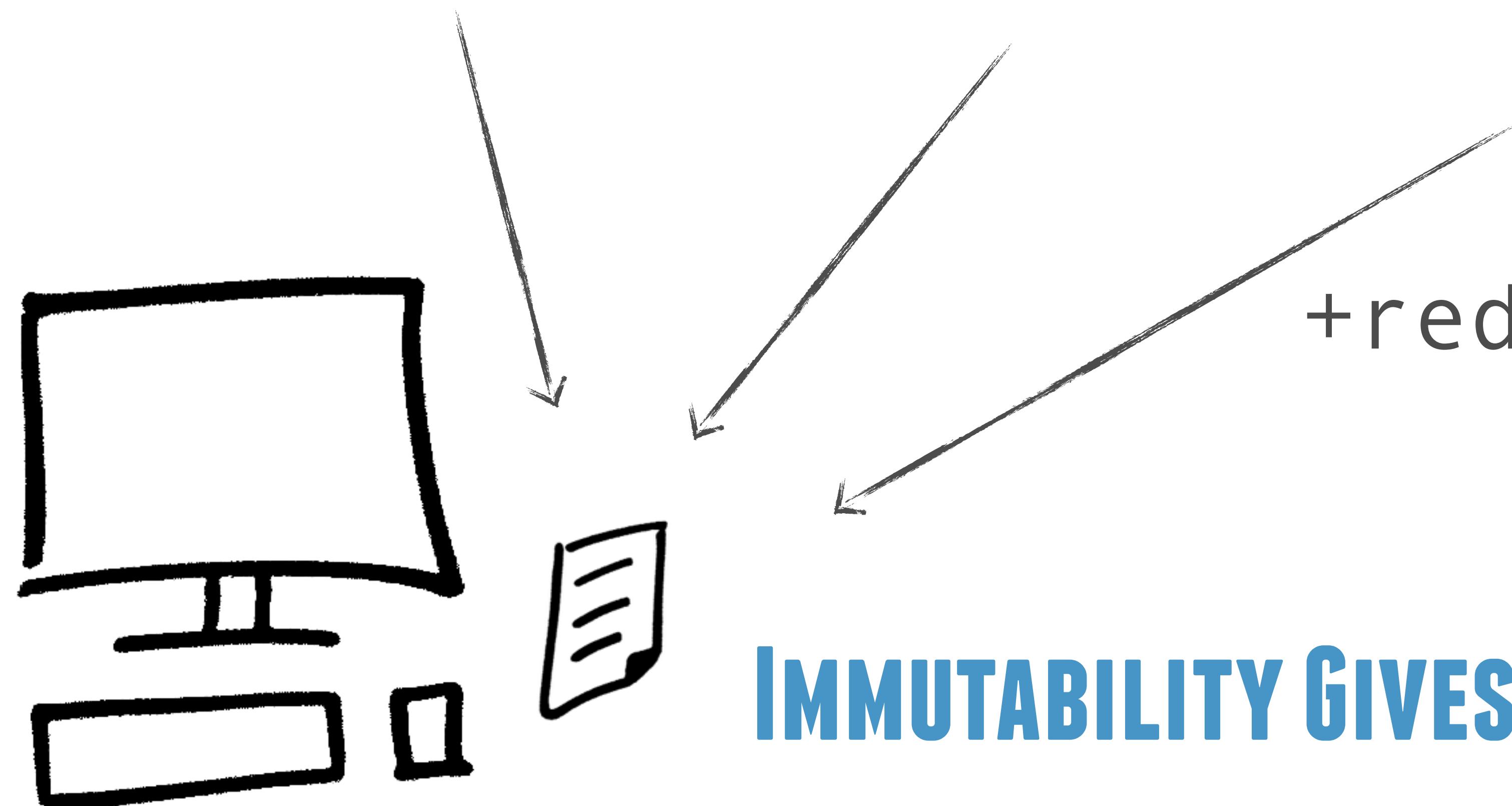
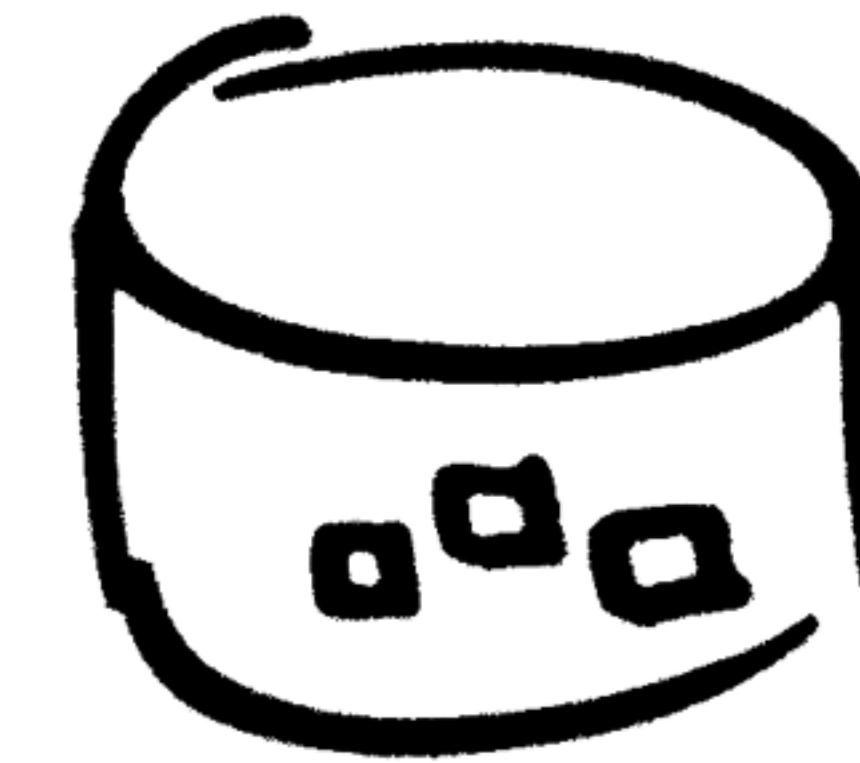
RED



GREEN

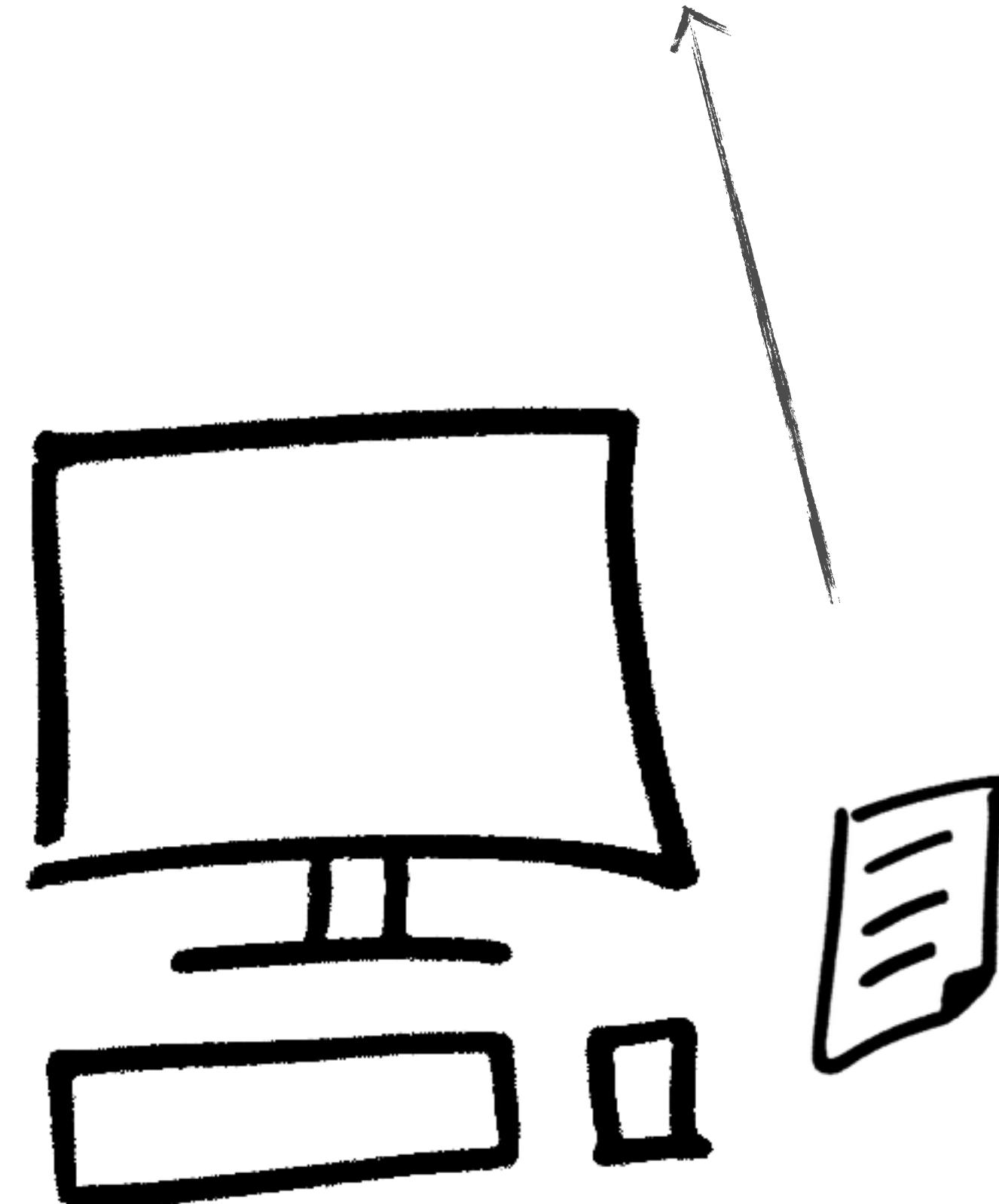
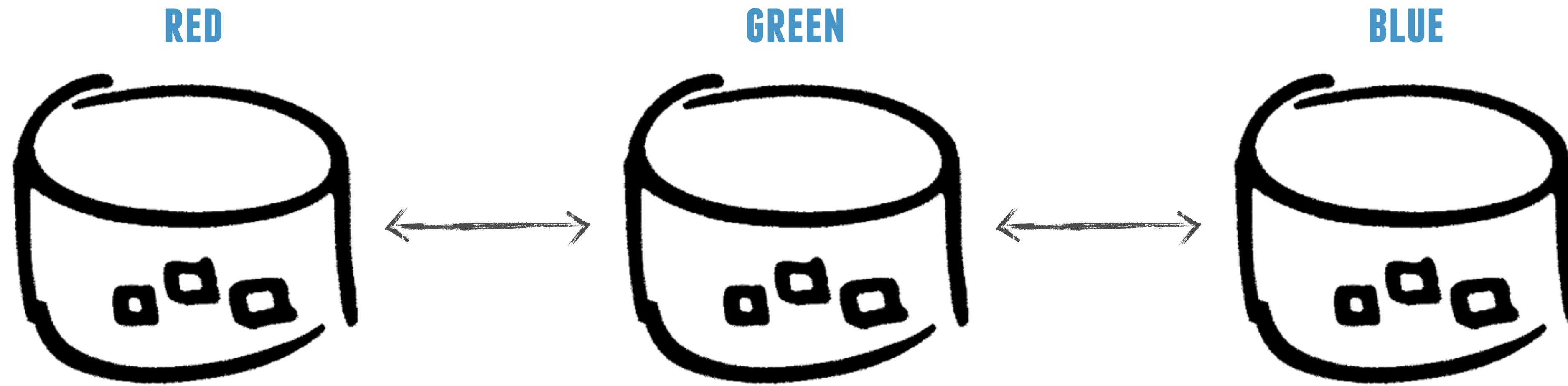


BLUE



+red@v123

IMMUTABILITY GIVES US ∞ READ REPLICAS



+red@v123 => +red@v124

QUERY CONTROLLED WRITES

**WORKING ON A MODEL OF FACTS THAT
ALWAYS COMMUTES**

TRUST

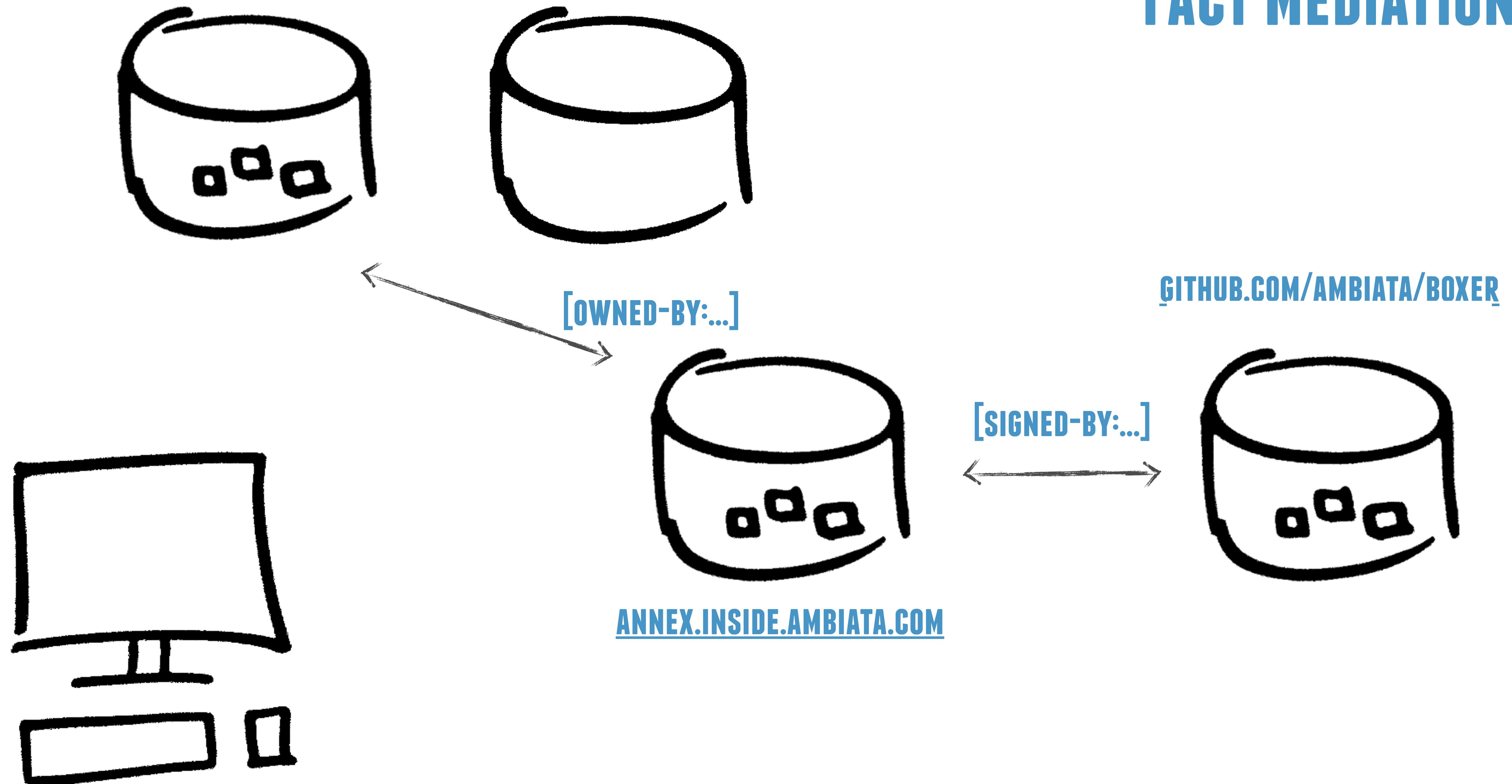
**AUTHENTICATED
FAMILY AND ATOM OWNERS**

SIGNED FACTS

MEDIATION AND FACT VIEWS

ANNEX.MTH.IO

FACT MEDIATION



SOLVING

**DPLL / SAT BASED SOLUTION W/
INSPIRATION FROM OPIUM PAPER**

**MAIN CHALLENGE IS MAPPING FACT
MODEL TO EQUATION**

**MAIN CHALLENGE IN MAPPING FACT
MODEL IS DEDUCING IDENTITY FROM
USER SPECIFIED QUERY**

**SECONDARY CHALLENGE IS CACHING
PARTIAL SOLUTIONS AND REDUCING
DUPLICATED WORK WHERE POSSIBLE**

REPRODUCIBILITY OF SOLVER

(A COVER UP)

napoleon.ax:

:boxer
:has :feature ingestion

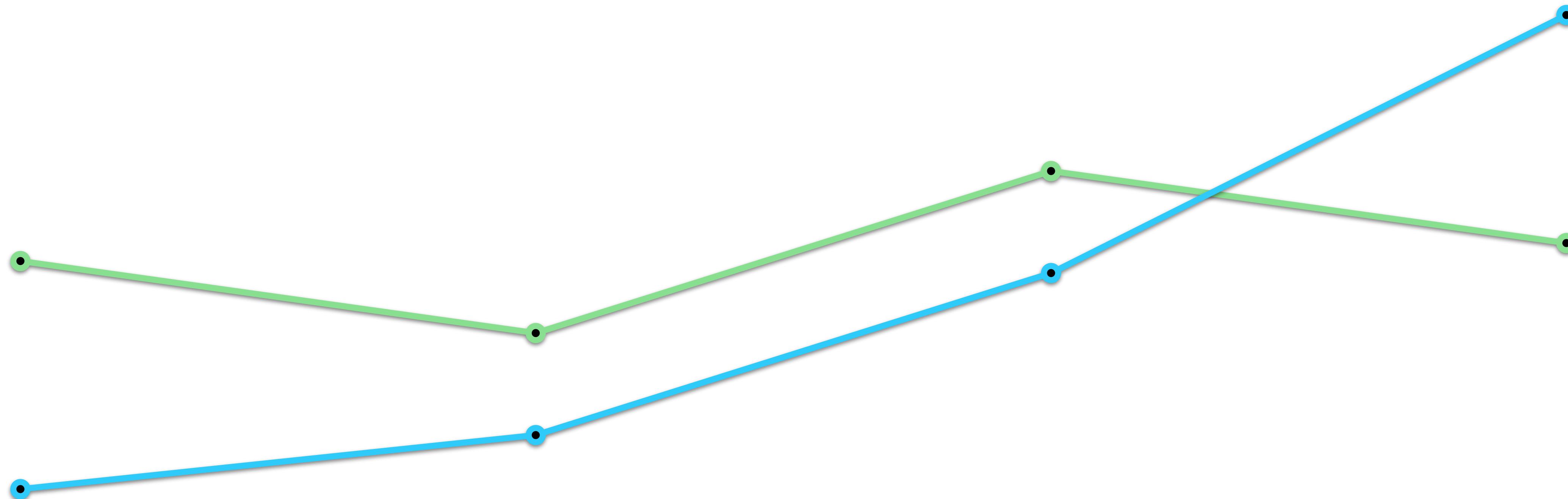
:snowball
:has :feature timeline

:annex-resolver
:has :version 1

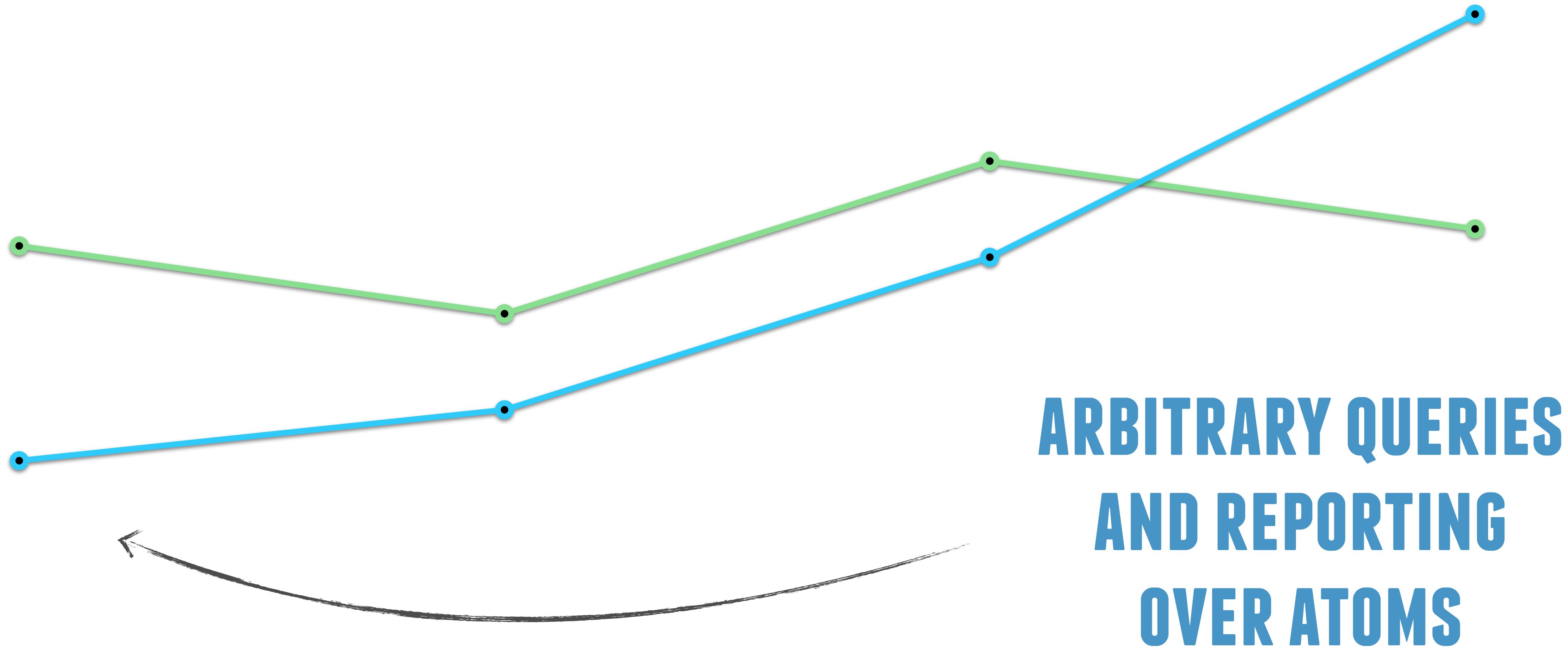
FOUR

A LOOK FORWARD

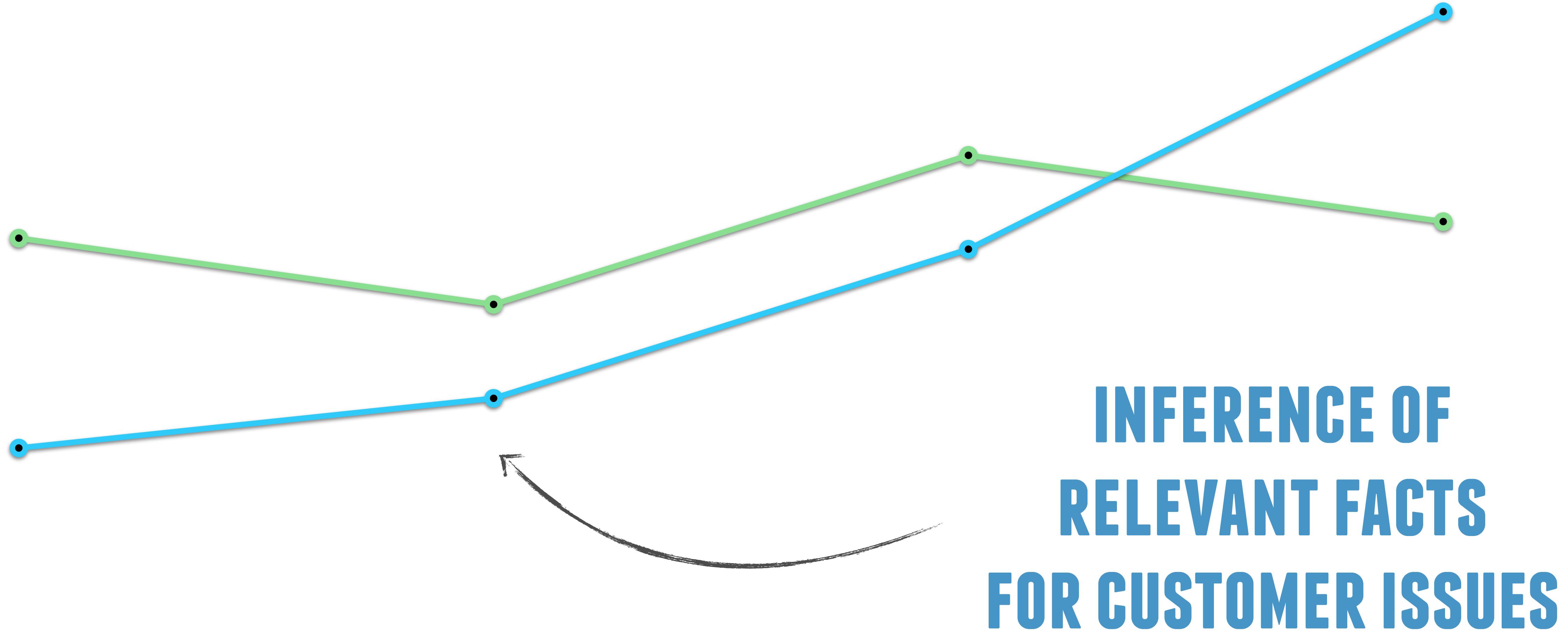
DEEPER ANALYTICS



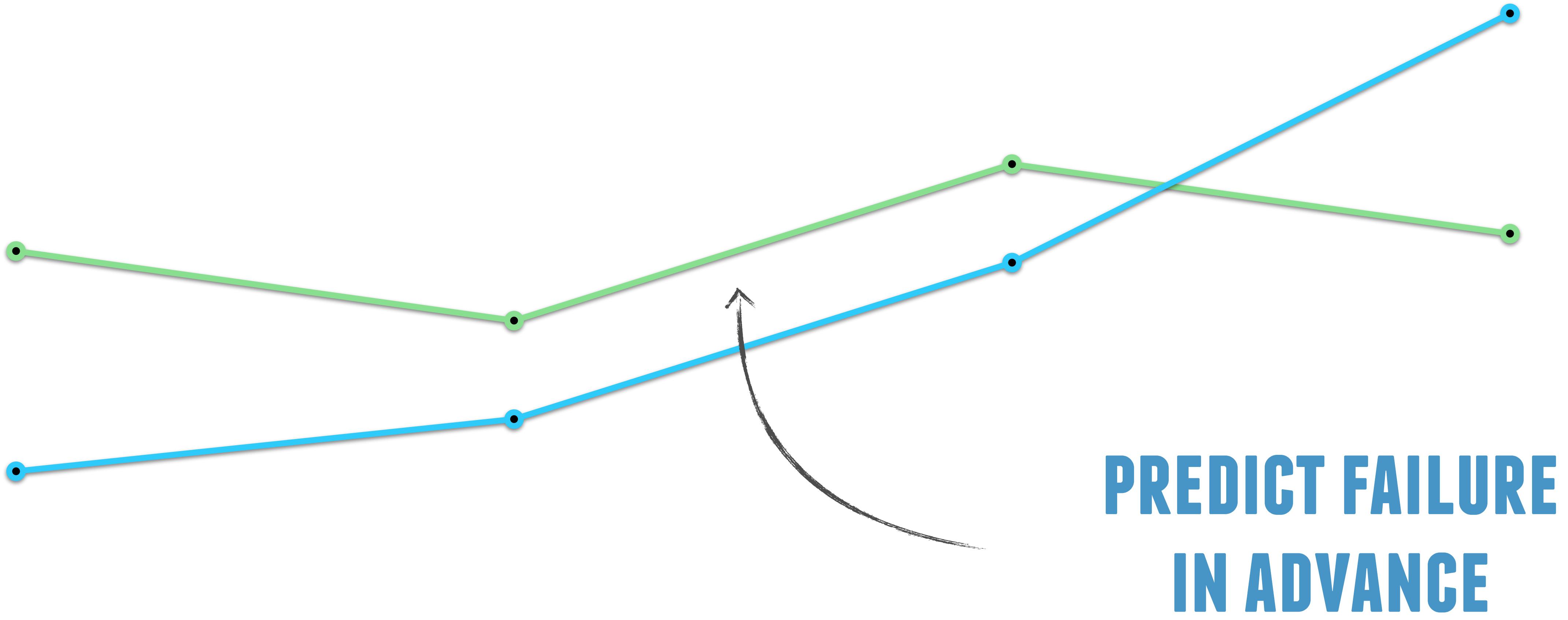
DEEPER ANALYTICS



DEEPER ANALYTICS



DEEPER ANALYTICS



FIXING ALL THE COMPILERS

**EASIER EXTENSION VIA
DEDUCTIVE RULES**

COMMUTATIVE FACT MODEL AND NON-LINEAR VERSIONING

**BETTER SUPPORT FOR
OPERATIONAL / RUNTIME
DEPENDENCIES**

**STEAL
THESE IDEAS**

END TRANSMISSION.

TOWARDS
annex

@markhibberd

IMAGES

Unmodified, Licences Specified at WikiMedia links

http://commons.wikimedia.org/wiki/File:Clock_Gare_de_Paris-Est.jpg

http://en.wikipedia.org/wiki/File:Bundesarchiv_Bild_101III-Merz-014-12A,_Russland,_Beginn_Unternehmen_Zitadelle,_Panzer.jpg

http://commons.wikimedia.org/wiki/File:French_-_Door_with_Cat_Hole_-_Walters_64164.jpg

Unmodified. CC BY 2.0 (<https://creativecommons.org/licenses/by/2.0/>)

<https://www.flickr.com/photos/timothymorgan/75288582/>

<https://www.flickr.com/photos/timothymorgan/75288583/>

<https://www.flickr.com/photos/timothymorgan/75294154/>

<https://www.flickr.com/photos/timothymorgan/75593155/>

<https://www.flickr.com/photos/timothymorgan/75593155/>