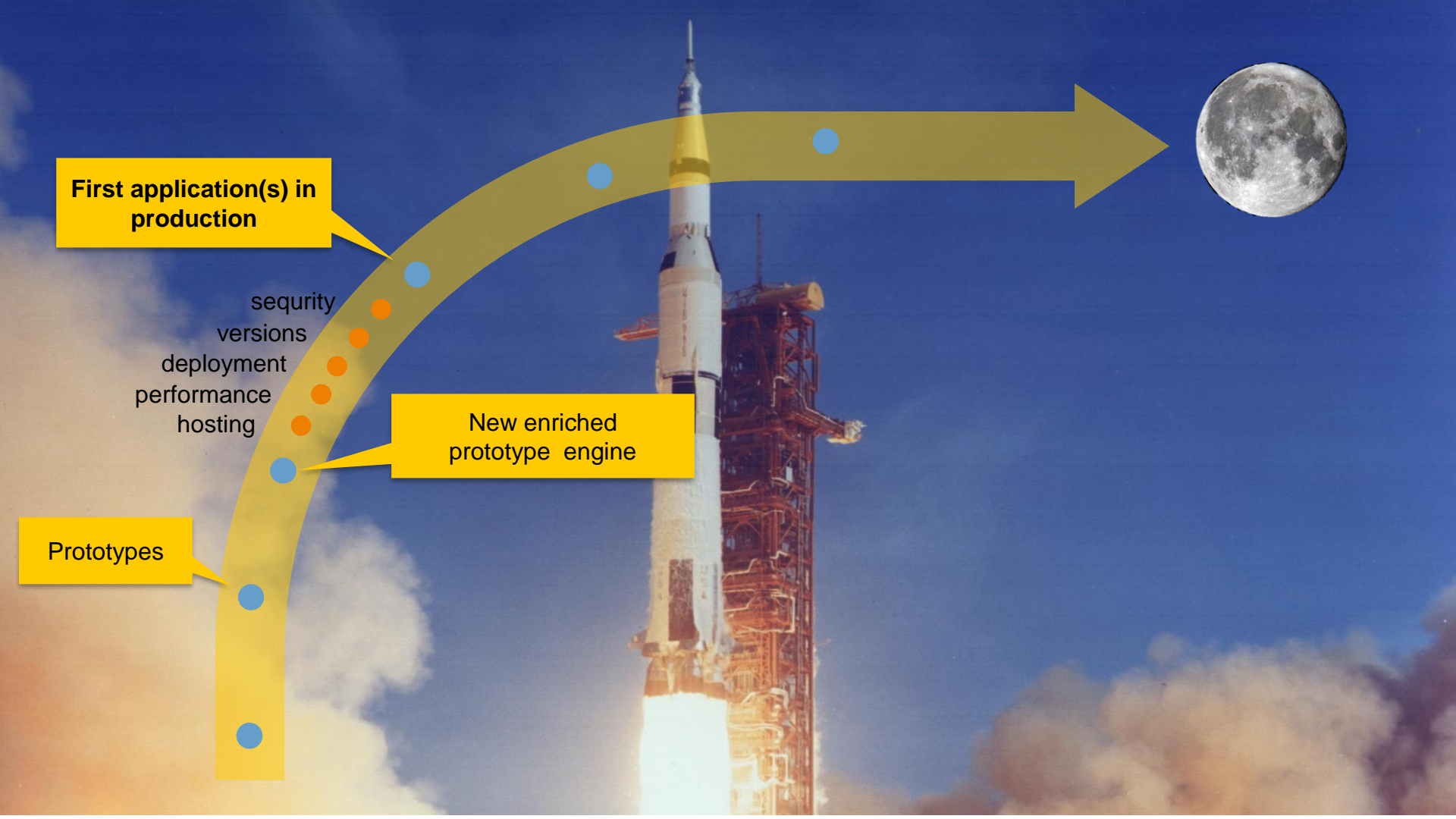


A REAL APPLICATION BUILT WITH AMPERSAND

Innovation in ICT

Michiel Stornebrink | Data science department

TNO innovation
for life



First application(s) in production

security

versions

deployment

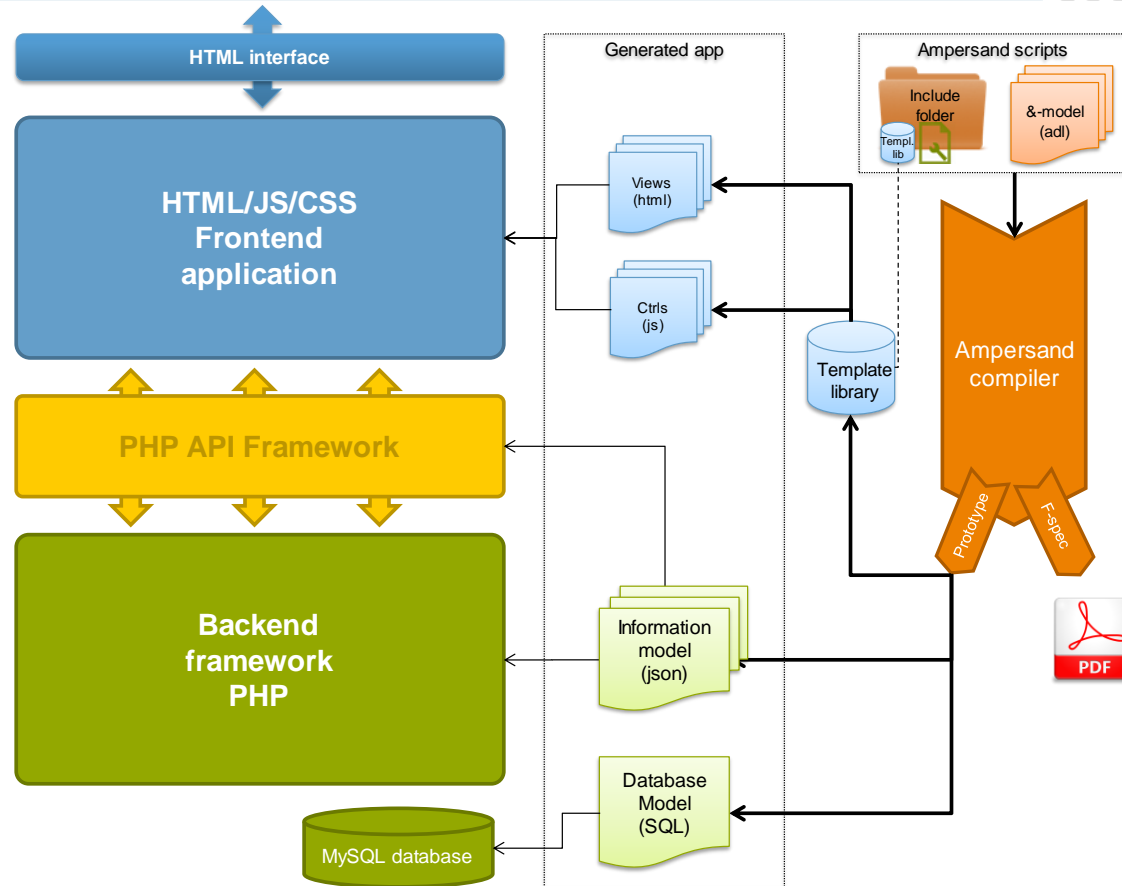
performance

hosting

New enriched prototype engine

Prototypes

HOSTING



PERFORMANCE

#486 DISTINCT STATEMENTS

id	select_type	table	type	possible_keys	key	key_len	ref	rows	Extra
1	PRIMARY	<derived2>	ALL	NULL	NULL	NULL	NULL	29284090	Using temporary
1	PRIMARY	<derived5>	ALL	NULL	NULL	NULL	NULL	10010	Using where; Distinct; Using join buffer (flat, BN...
5	DERIVED	<derived6>	ALL	NULL	NULL	NULL	NULL	910	Using temporary
5	DERIVED	<derived7>	ref	key0	key0	767	fence0.tgt	11	
7	DERIVED	subElement	index	PRIMARY,subElem	PRIMARY	1534	NULL	10046	Using where; Using index
6	DERIVED	subClassOf	ALL	subClassOf_TgtClas	NULL	NULL	NULL	910	Using where; Using temporary
2	DERIVED	<derived3>	ALL	NULL	NULL	NULL	NULL	10046	Using temporary
2	DERIVED	<derived4>	ALL	NULL	NULL	NULL	NULL	2915	Using where; Distinct; Using join buffer (flat, BN...
4	DERIVED	Property	range	PRIMARY,propertyC	propertyDomain	768	NULL	2915	Using where; Using index
3	DERIVED	subElement	index	PRIMARY,subElem	PRIMARY	1534	NULL	10046	Using where; Using index

id	select_type	table	type	possible_keys	key	key_len	ref	rows	Extra
1	SIMPLE	subElement	index	PRIMARY,subElement_Property,C	PRIMARY	1534	NULL	10046	Using where; Using index; Using temporary
1	SIMPLE	Property	eq_ref	PRIMARY,propertyDomain	PRIMARY	767	ampers	1	Using where; Distinct
1	SIMPLE	subClassOf	ref	subClassOf_TgtClass,subClassO	subClassOf_SrcClass	767	ampers	1	Using where; Distinct
1	SIMPLE	subElement	eq_ref	PRIMARY,subElement_Property,C	PRIMARY	1534	ampers	1	Using where; Using index; Distinct

29.284.090
10.046

```

select distinct t1.src as src, t1.tgt as tgt
from
(
  select distinct t1.src as src, t1.tgt as tgt
  from
    (
      select distinct "Class" as src, "Property" as tgt
      from "subElement"
      where ("Class" is not null)
      and ("Property" is not null)
    ) as t1
  left join
    (
      /* Flipped: EDCD propertyDomain[Property*Class] */
      select distinct "propertyDomain" as src, "Property" as tgt
      from "Property"
      where ("Property" is not null)
      and ("propertyDomain" is not null)
    ) as t2
  on (t1.src = t2.src) and (t1.tgt = t2.tgt)
  where (t2.src is null) or (t2.tgt is null)
) as t1
left join
(
  select distinct fence0.src as src, fence1.tgt as tgt
  from
    (
      select distinct "SrcClass" as src, "TgtClass" as tgt
      from "subClassOf"
      where ("SrcClass" is not null) and ("TgtClass" is not null)
    ) as fence0,
    (
      select distinct "Class" as src, "Property" as tgt
      from "subElement"
      where ("Class" is not null) and ("Property" is not null)
    ) as fence1
  where (fence0.tgt = fence1.src)
) as t2
on (t1.src = t2.src) and (t1.tgt = t2.tgt)
where (t2.src is null) or (t2.tgt is null)

```

PERFORMANCE

#217 NUMBER OF SUBQUERIES

🏠 [Active projects](#) [Inactive projects](#) [People](#) [My projects](#)

Home / Active projects

1 + 4x7 = 29 queries!

Projects	Name	Description	Projectleider	@	Start	Active
Apollo 13	Apollo 13	Joosten, get us back to earth please!	J. Lovell	@	17-04-1970	<input checked="" type="checkbox"/>
Alfa board	Alfa board	Create an Alpha board for the customer	P. Leider	@	31-12-2013	<input checked="" type="checkbox"/>
Beta board	Beta board	further development of the board to Beta	P. Leider	@	15-02-2014	<input checked="" type="checkbox"/>
Argos	Argos	get the Golden Fleece	J. Ason	@	dd-mm-yyyy	<input checked="" type="checkbox"/>

1 query

PERFORMANCE

#488 INDEXING BY DEFAULT

```
253 CREATE TABLE "Project"
254     ( "Project" VARCHAR(255) UNIQUE NOT NULL /* OBJECT */
255     , "projectName" VARCHAR(255) DEFAULT NULL /* ALPHANUMERIC */
256     , "projectStatus" VARCHAR(255) DEFAULT NULL /* ALPHANUMERIC */
257     , "projectDescription" TEXT DEFAULT NULL /* BIGALPHANUMERIC */
258     , "projectStartDate" DATE DEFAULT NULL /* DATE */
259     , "projectActive" VARCHAR(255) DEFAULT NULL /* OBJECT */
260     , "pl" VARCHAR(255) DEFAULT NULL /* OBJECT */
261     , PRIMARY KEY ("Project")
262     , "ts_insertupdate" TIMESTAMP ON UPDATE CURRENT_TIMESTAMP NULL DEFAULT CURRENT_TIMESTAMP
263     ) ENGINE = InnoDB DEFAULT CHARACTER SET UTF8 COLLATE UTF8_BIN
264     , ROW_FORMAT = DYNAMIC
265 ;
266 CREATE INDEX "Project_projectName" ON "Project" ("projectName");
267 CREATE INDEX "Project_projectStatus" ON "Project" ("projectStatus");
268 CREATE INDEX "Project_projectStartDate" ON "Project" ("projectStartDate");
269 CREATE INDEX "Project_projectActive" ON "Project" ("projectActive");
270 CREATE INDEX "Project_pl" ON "Project" ("pl");
```

PERFORMANCE

OTHER

- › PHP7 instead of 5.x
- › #535 Improve performance of checking affected conjuncts
- › #454 SQL queries: improve performance of LEFT JOIN
- › #426 SQL query performance improvement
- › Skip query for I[cpt] interface expressions
- › Cache conjunct violations in database
- › Cache atoms in Concept class

DEPLOYMENT

#438 YAML FILE TO CONFIG

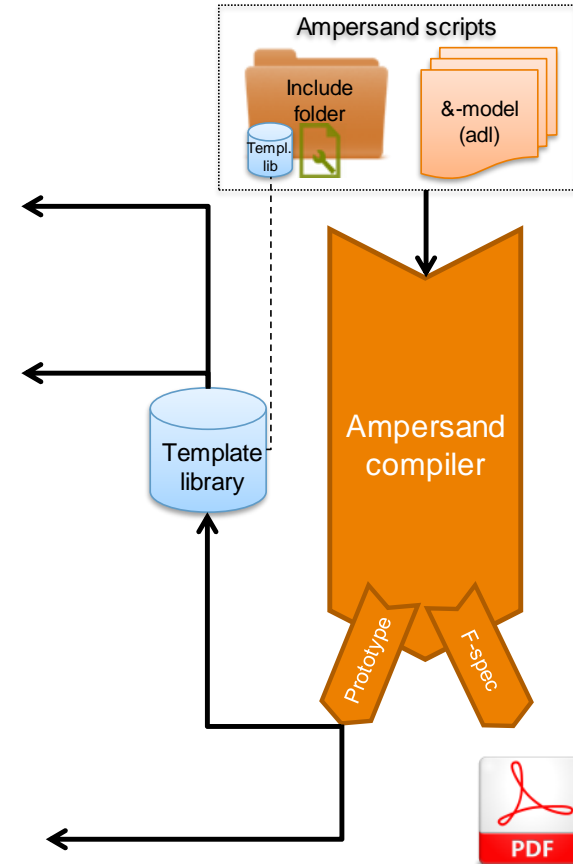
```
ampersand script.adl -p"/var/www" --verbose
--include=project.inc --crud-defaults=cRud
--meta-tables --gen-as-rap-model
```

```
ampersand script.adl --config=script.yaml
```

```
ampersand script.adl
```

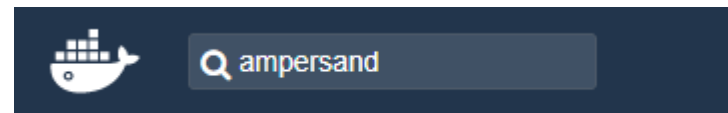
Tip!

```
> ampersand script.adl -sampleConfigFile
```



DEPLOYMENT

DOCKERIZE



VERSION MNGMT AND MIGRATION STEPS

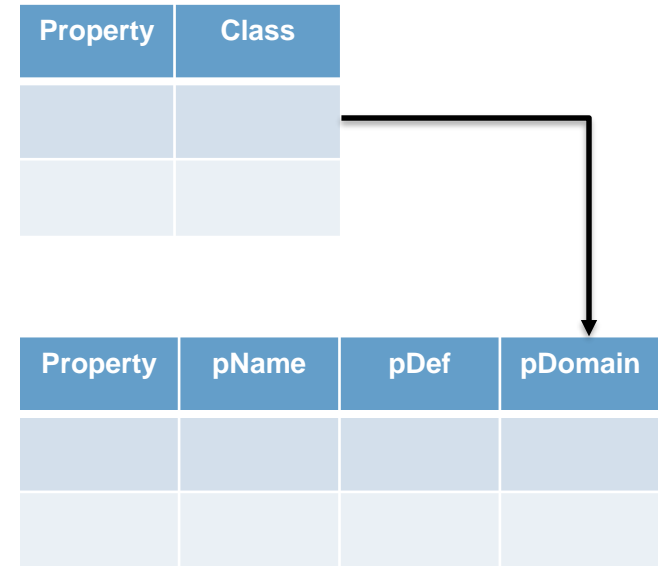
RELATION **propertyDomain**[Property*Class]

↓↓

RELATION **propertyDomain**[Property*Class] [UNI]

Solution 2: the quick 'n dirty approach

- Add column with custom sql query
- Migrate data with custom query
- Remove old table with custom query



VERSION MNGMT

Tip!

Put project files (i.e. ampersand scripts) in separate git repository

Tip!

Keep your scripts up-to-date with latest Ampersand Y releases
Current:3.9.2.

Tip!

Keep track of the version of the Ampersand compiler you used.

OWASP Top 10 – 2013 (Previous)	OWASP Top 10 – 2017 (New)
A1 – Injection	A1 – Injection
A2 – Broken Authentication and Session Management	A2 – Broken Authentication and Session Management
A3 – Cross-Site Scripting (XSS)	A3 – Cross-Site Scripting (XSS)
A4 – Insecure Direct Object References - Merged with A7	A4 – Broken Access Control (Original category in 2003/2004)
A5 – Security Misconfiguration	A5 – Security Misconfiguration
A6 – Sensitive Data Exposure	A6 – Sensitive Data Exposure
A7 – Missing Function Level Access Control - Merged with A4	A7 – Insufficient Attack Protection (NEW)
A8 – Cross-Site Request Forgery (CSRF)	A8 – Cross-Site Request Forgery (CSRF)
A9 – Using Components with Known Vulnerabilities	A9 – Using Components with Known Vulnerabilities
A10 – Unvalidated Redirects and Forwards - Dropped	A10 – Underprotected APIs (NEW)



First application(s) in production

security
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**New enriched
prototype engine**

Prototypes

Next steps for Ampersand prototypes

- Agree on destination (Moon?)
- Performance
- Config/install UI
- Add integration tests for prototype code
- CI/CD chain for prototypes
- Embrace existing modeling languages

A full-page advertisement featuring an astronaut in a white spacesuit sitting on the moon. The astronaut is holding a green Carlsberg beer bottle in their gloved hand. The moon's surface is dark and rocky, with a lunar lander and its ladder visible in the background. The Earth is seen in the distance against the starry black sky of space. The text 'THANK YOU' is overlaid in white on the left side of the image.

THANK YOU

TNO innovation
for life