CDS UWS Library

Thomas Boch, on behalf of

- *Grégory Mantelet*
- *Brice Gassmann*

UWS

Universal Worker Service pattern

- **What is it ?**

A pattern for a Web-Service which has to manage asynchronous jobs.

- **How does it work ?**

1 URL => 1 Action

- **What are the possible actions ?**

Create a job, Set job parameters, Execute a job, Get job results, Get list of jobs, etc...

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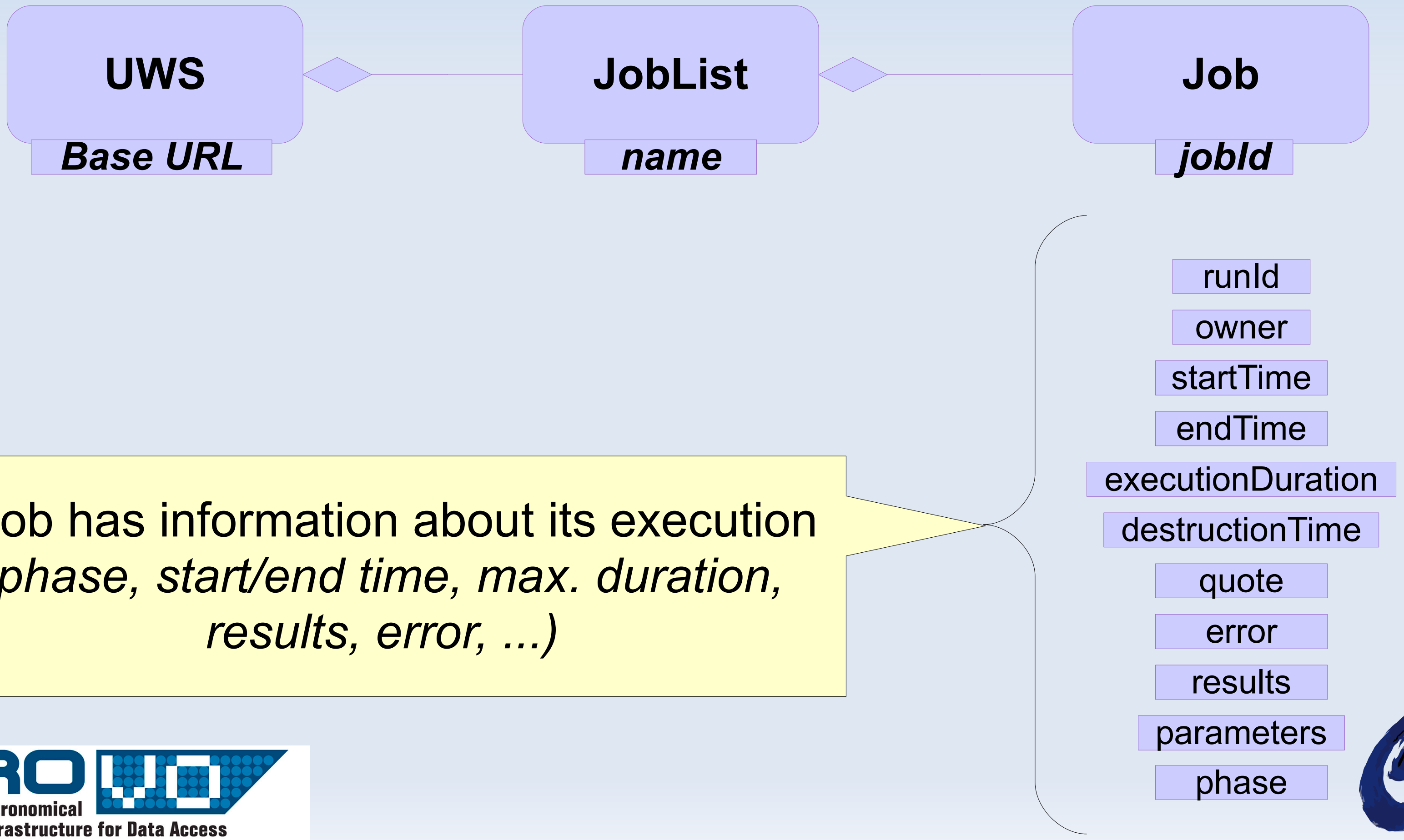
Quick description

UWS as a Tree

- A UWS is structured as a tree, in which a job is a leaf.
- Each node is considered as a web resource...

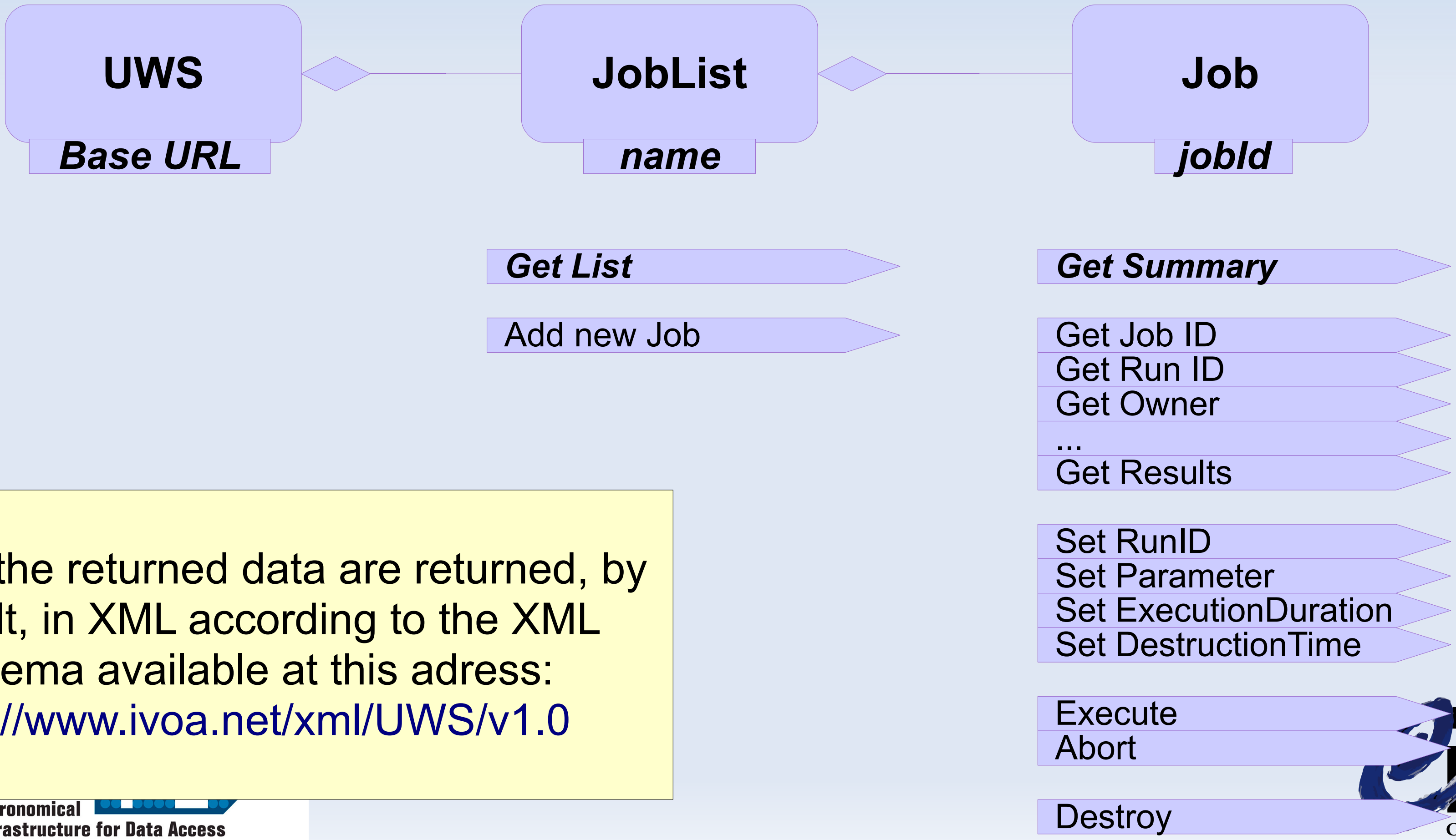


A job has information about its execution *(phase, start/end time, max. duration, results, error, ...)*

Quick description

UWS commands

- ...which can be manipulated thanks to some commands...



Most of the returned data are returned, by default, in XML according to the XML schema available at this adress: http://www.ivoa.net/xml/UWS/v1.0

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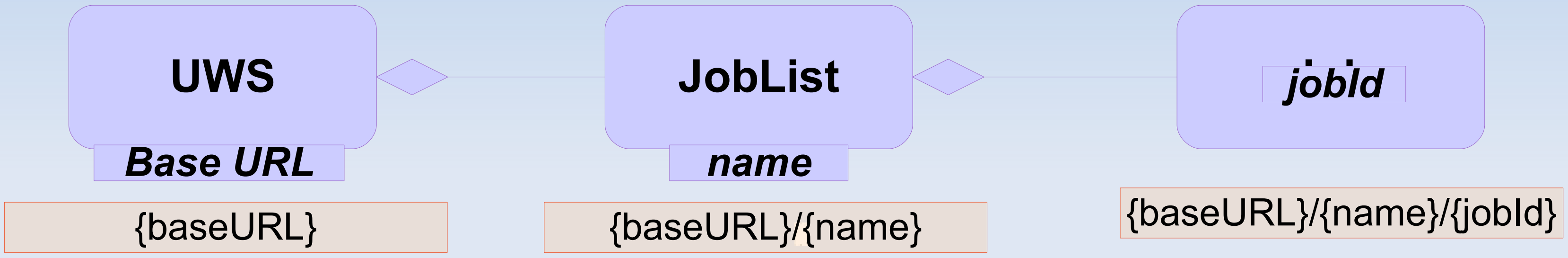
Quick description

UWS URLs

- ...which correspond to REST based URLs.



For instance: (*if baseURL = http://foo.org, name = myJobList, jobId = 123Job*)

- **Get Job List** http://foo.org/myJobList in HTTP-GET
- **Add Job** http://foo.org/myJobList in HTTP-POST with/without some job parameters
- **Get Job Summary** http://foo.org/myJobList/123Job in HTTP-GET
- **Execute the job** http://foo.org/myJobList/123Job/phase in HTTP-POST with PHASE=RUN
- **Get Job Results** http://foo.org/myJobList/123Job/results in HTTP-GET
- ....

The UWS Library

Goal

- **Main Goal:**

  Providing a generic way to implement as quickly and as simply as possible the default behaviours of UWS.

- ***Notes:***
  - *Developed in Java*
  - *Designed to be used in Servlets*

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Functionalities

- **Implemented UWS functionalities described in standard:**
  - Interpreting each HTTP requests sent as UWS commands *(managed HTTP methods: GET, POST, PUT and DELETE)*
  - Stopping the job when its execution is longer than its imposed duration
  - Destroying the job at its imposed destruction time
  - Returning a UWS content in other formats than XML *(in version 3)*
  - Managing a job execution queue *(in version 3)*
- **Additionnal functionalities are also available:**
  - Customizing the UWS home page *(accessible via {baseURL})*
  - Linking each returned XML with a XSLT style-sheet
  - Adding custom commands to a UWS *(in version 3)*

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Quick HOW TO 1/2

To create your own job, you must:

1. Extend AbstractJob
2. Implement:

➔ **JobWork():**	*what the job must do*
➔ IsQueuedRequired():	*whether this job can be managed in a queue*

<u>Example:</u> JobChrono (a job which stops after a given number of seconds):

http://saada.u-strasbg.fr/uwstuto/gettingStarted.html#jobChrono

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Quick HOW TO 2/2

To create a UWS, you must:

1. Create a HttpServlet
2. Override the *doGet* and *doPost* functions
3. In *doGet*:
   i. Call the *doPost* function
4. In *doPost*:
   i. At the first call, initialize your UWS
   ii. Otherwise, call the function *executeRequest* of your UWS instance

<u>Example:</u>* *UWSTimers (a UWS which manages instances of JobChrono):

http://saada.u-strasbg.fr/uwstuto/gettingStarted.html#servletTimers

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Download/Tutorial

- Download:

  http://saada.u-strasbg.fr/saada/spip.php?article219
- Released under LGPL3 licence

- Documentation/Tutorial at:

  http://saada.u-strasbg.fr/uwstuto/

- Some answers or suggestions ?

  gregory.mantelet@astro.unistra.fr

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Suggestions for the UWS pattern

- Add an attribute *progression* to a Job
  - Readable at any time
  - Writable by the job only during its execution
- Allows for multiple jobLists
- Add a new resource: *uws*
  - it has, optionnaly, a name and a description
  - it gives a list of job lists
- Propose a structure for a JSON format

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Example of the XML content of *uws*

```
<uws name="uwsName">
   <description>...</description>
   <jobLists>
      <jobListRef name="jlName"
       href= ".../uwsName/jlName" />
      ...
   </jobLists>
</uws>
```

Services using the library

- Used in SAADA (ObsTAP implementation)
- Used in CDS cross-match service

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Developer's feedback

Using the UWS library for the CDS X-match service

Thomas Boch

On behalf of: ***Brice Gassmann***

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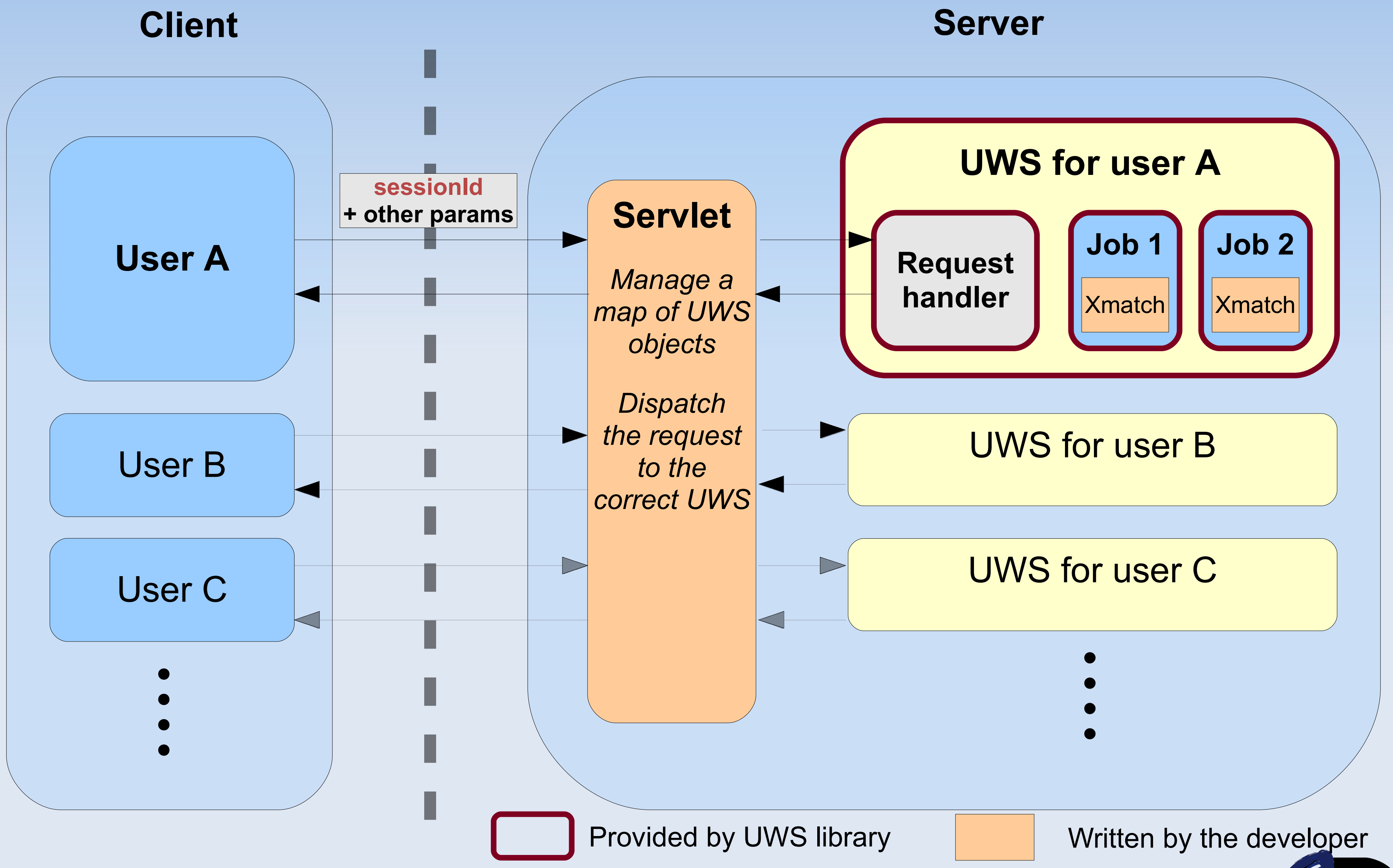
UWS library for X-match service



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UWS library for X-match service

Thanks to the library, enabling UWS on the X-match service was seamless

Only 2 classes to extend

- *AbstractUWS* to associate a user id to a UWS
- *AbstractJob* to manage the additional parameters and perform the X-match itself

...and a servlet to write

- Manage a <userId, uws> map
- Dispatch the requests to the correct UWS objects (one UWS instance per user)

UWS library for X-match service

Easy interaction between user Web interface and the service

- UWS is REST based => perfect for AJAX requests
- But: JSON is not handled yet

Possibility to plug specific ”actions” to extend inner commands of UWS

- *deleteJobs* to delete a selection of jobs
- *getJobs* to get the list of jobs in JSON format
  (should we use HTTP Accept header to manage this ?)

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Dealing with multiple users

- Current implementation creates one UWS instance per user
  - Not optimal
  - Would be prettier if a *userId* or *sessionId* could be passed as a parameter of **/jobList**

Open questions

How do we isolate different users ?

- User A should not be able to see jobs from user B
- UWS document has a section about Security considerations (authentication/authorization)
  - Does it also apply to privacy ?
- Our implementation use session IDs to isolate users' jobs
  - Good pratice for privacy ?
  - Is there a proper (standardized) way to do that ?

JSON representation of objects

Suggested JSON format

```
*** UWS ***
{
	"name": "uwsName",
	"description": "uwsDescription",
	"jobLists": [
		{ "name": "jlName", "href": "jlUrl" },
		...
	]
}

*** JobList ***
{
	"name": "jlName",
	"jobs": [
		{ "id": "jobId", "href": "jobUrl", "phase": "jobPhase" },
		...
	]
}
```

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```
*** Job ***
{
"jobId": "",
"runId": "",
"owner": "",
"phase": "",
"quote": "",
"executionDuration": "",
"destruction": "",
"startTime": "",
"endTime": "",
"error": { "type": "", "hasDetail": "", "message": ""},
"parameters": [
{ "paramName": "", "paramValue": "" },
...
],
"results": [
{ "id": "", "type": "", "href": "" }
...
]
}
```