



**adaptTo()**

**EUROPE'S LEADING AEM DEVELOPER CONFERENCE**

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**Playing headlessly with GraphQL capabilities in AEM!**

**Evgeny Tugarev, Adobe.**

# Headless, a new trend?

- Headless, what is it?
- AEM provide different APIs to headlessly deliver content:
  - Core Components/Sling Exporter, Assets, ...
  - Content Fragments

# Content Fragments & GraphQL

- Content Fragment
  - Rely on a model definition
  - One model - multiple content fragments (1:many)
  - Presentation-agnostic, intended for multi channel use
  - Strongly typed, well suited for GraphQL

# Recap on GraphQL

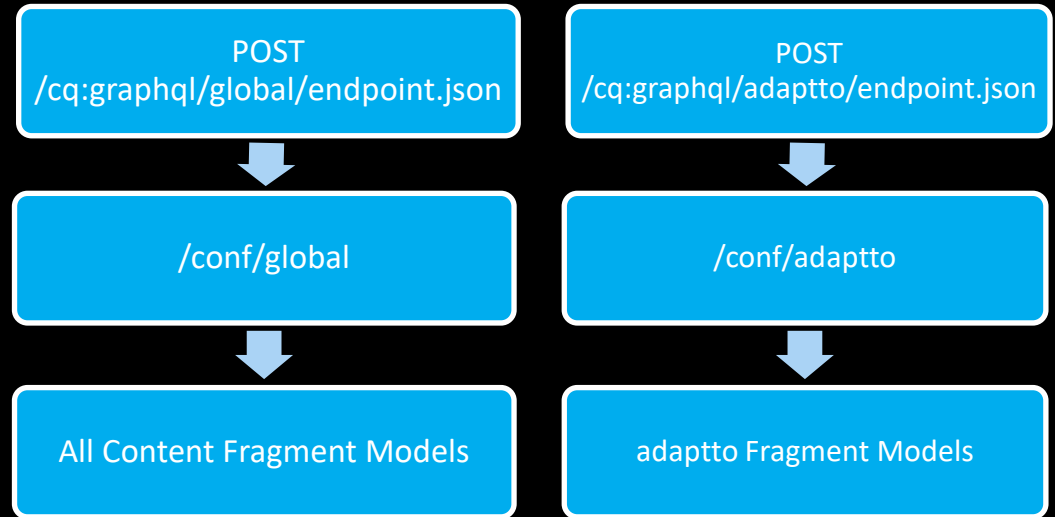
- Strongly typed, schema based
- Solves over/under fetch problem, you get what you asked for
- Not a rival to REST

# Sling GraphQL support in AEM

- Per Sling GraphQL API contract we have to provide implementation for
  - SlingSchemaServlet, SlingTypeResolver, SlingDataFetcher
- Supported features
  - Aliases, Arguments, Fragments, Input types, Introspection, Meta fields, Nested fragments, Union types, Variables
- Mutations
  - Assets HTTP API

# GraphQL Endpoints & configurations

- Configurations
  - Content Fragment managed as assets
- Endpoints
  - Divide, conquer

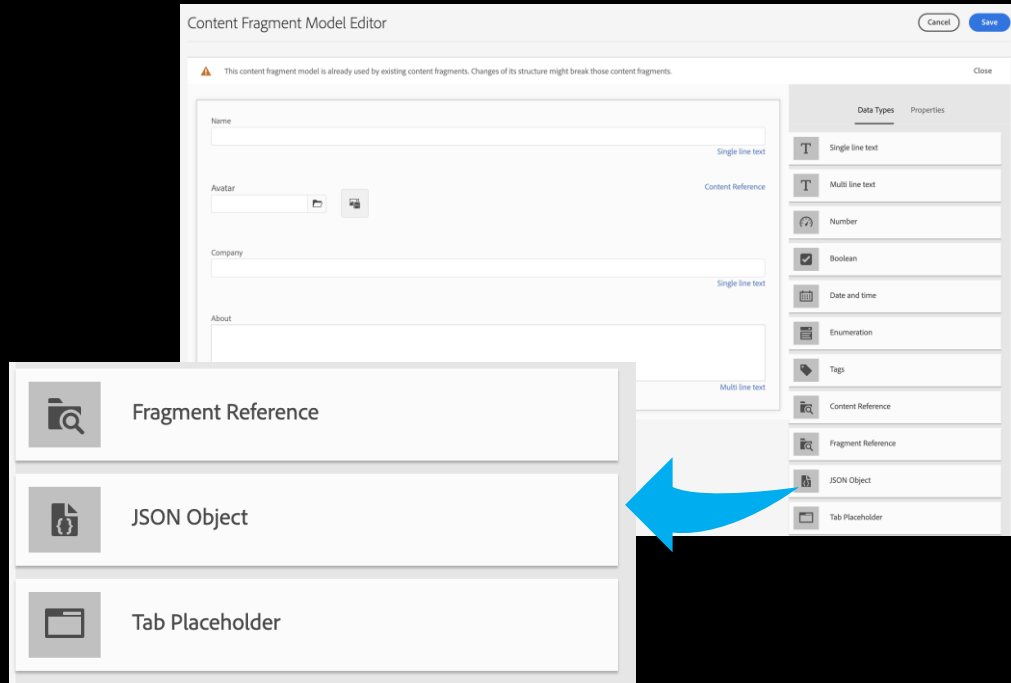




# Designing and testing the API

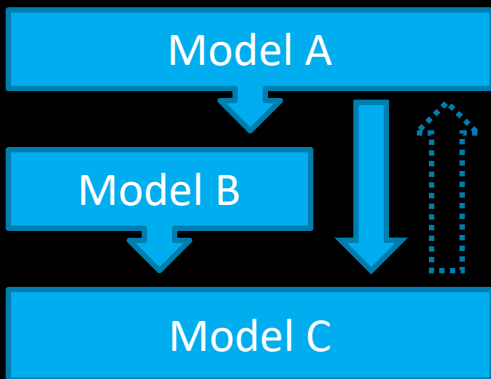
# Content Fragment Model Editor, what's new?

- **Types**
  - Fragment Reference,
  - JSON
  - Child Fragment Reference
- **Attributes**
  - Unique, translatable



# Fragment Reference

- Create graph structure
- Loop detection (link C-A)



```
a: {  
  b: {  
    c: {  
      a: null  
    }  
  }  
  c: {  
  }  
}
```

- A scalar type
  - No filtering
  - Included in query output as is
  - Validated

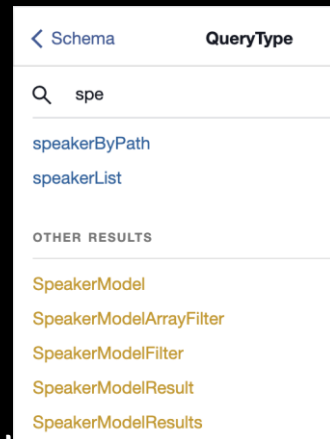
Model A

info : Json

```
a: {  
  info : {  
    "prop1" : "value1"  
    "prop2" : ["a", "b", "c"]  
  }  
}
```

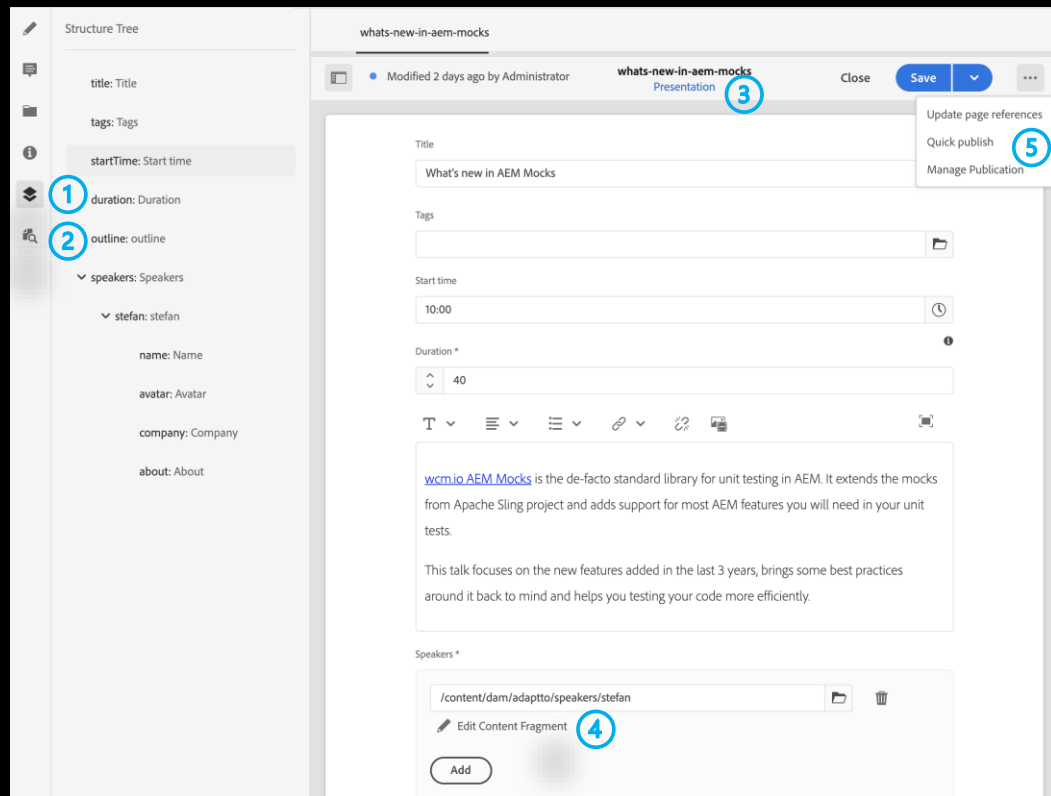
# From models to GraphQL schema

- Generated queries
  - ByPath(...), List(...)
- Generated types
  - ModelResult, ModelResults, ModelFilter
- Considering a “Speaker” model
  - `speakerByPath(_path : String!, _variation: String): SpeakerModelResult!`
  - `speakerList(filter: SpeakerModelFilter , _variation: String, _locale: String): SpeakerModelResults!`
- Duplicated name resolution



# Content Fragment Editor, what's new?

- Improved UI
  - Structure tree ①
  - JSON preview ②
  - Access to model ③
  - Nested fragments editing ④
  - Direct publishing ⑤



The screenshot displays the Content Fragment Editor interface for a presentation titled "whats-new-in-aem-mocks".

- Structure Tree (Left Panel):** Shows a hierarchical view of the content model. Callout ① points to the "duration: Duration" field, callout ② to the "outline: outline" field, and callout ③ to the "speakers: Speakers" section, which is expanded to show a speaker named "stefan" with fields for name, avatar, company, and about.
- Main Editing Area (Right Panel):** Shows the content fragment being edited. Callout ③ points to the "whats-new-in-aem-mocks" title bar. Callout ④ points to the "Edit Content Fragment" button at the bottom of the main text area. Callout ⑤ points to the "Quick publish" button in the top right corner, which is part of a dropdown menu that also includes "Update page references" and "Manage Publication".
- Form Fields:** The main area contains form fields for Title (filled with "What's new in AEM Mocks"), Tags, Start time (10:00), and Duration (40). Below these is a rich text editor with a toolbar and a text area containing a link to "wcmio AEM Mocks" and a paragraph of text.

# Developer workflow

- Craft your queries with GraphQL (software distribution)
- Fragment Publishing
  - Underlying Model published
  - All linked Fragments / Models / Assets also published
- Postman
  - Dev token (dev console)

# Persisted Queries & Performance

- Persisted queries overview
  - Why do we need them?
- Performance optimization
  - Structure your API
- Monitoring – Sling Metrics
  - `aem.graphql`

<code>sling:aem.graphql:CfsFetchResource</code>	3	0.013642	0.009343
<code>sling:aem.graphql:SchemaGenerating</code>	1	0.003977	0.003370
<code>sling:aem.graphql:SchemaGenerating_Builder</code>	1	0.003977	0.003370
<code>sling:aem.graphql:SchemaGenerating_Builder_BasicTypes</code>	2	0.007955	0.006740
<code>sling:aem.graphql:SchemaGenerating_Builder_Callbacks</code>	2	0.007955	0.006740
<code>sling:aem.graphql:SchemaGenerating_Builder_FullTypes</code>	2	0.007955	0.006740
<code>sling:aem.graphql:SchemaGenerating_Builder_UniqueTypeName</code>	2	0.007955	0.006740
<code>sling:aem.graphql:SchemaGenerating_Builder_Validators</code>	2	0.007955	0.006740
<code>sling:aem.graphql:SchemaGenerating_CalendarPlugin</code>	1	0.003977	0.003370
<code>sling:aem.graphql:SchemaGenerating_ContentFragmentPlugin</code>	1	0.003977	0.003370
<code>sling:aem.graphql:SchemaGenerating_DateTimePlugin</code>	1	0.003977	0.003370
<code>sling:aem.graphql:SchemaGenerating_FilterPlugin</code>	1	0.003977	0.003370
<code>sling:aem.graphql:SchemaGenerating_JsonPlugin</code>	1	0.003977	0.003370
<code>sling:aem.graphql:SchemaGenerating_MetadataPlugin</code>	1	0.003977	0.003370
<code>sling:aem.graphql:contentFragmentFetcher</code>	3	0.013664	0.009343
<code>sling:aem.graphql:createFragmentRep</code>	72	0.327868	0.224238
<code>sling:aem.graphql:createFragmentRepDeep</code>	72	0.327867	0.224238
<code>sling:aem.graphql:createNestedFragmentReps</code>	72	0.327867	0.224238
<code>sling:aem.graphql:createSingleMultiFormatText</code>	63	0.286869	0.196208



- Managing access to Content Fragments
  - Secure what needs to be secured
- Do not install dev tools on production!
- CORS, CSRF, Referrer Filters

# Consuming output data

# Headless API & WKND Project

- AEM Headless Client for Javascript
  - <https://github.com/adobe/aem-headless-client-js>
- AEM Headless Client for Java
  - <https://github.com/adobe/aem-headless-client-java>
- External application, WKND
  - <https://github.com/adobe/aem-guides-wknd-graphql>

# A conference schedule application

- **Development Plan**
  - Use react command line tools to generate application skeleton
  - Add dependencies, create a Schedule component
  - Add styling and Presentation component (pre-built)
- **Improvement Ideas**
  - Add authors list
  - Use persisted queries! 😊
- **Application Link**
  - <https://github.com/etugarev/adapt-to-schedule>

# What's next?

- Headless UI for Content Fragments
  - Completely new UI
  - React / GraphQL based
- Schema resilience
  - Content Model Locking

- <https://graphql.org/>
- <https://one-inside.com/aem-headless-cms/>
- <https://www.veriday.com/blog/headless-cms-pros-cons-decoupling/>
- <https://adapt.to/2020/en/schedule/graphql-in-apache-sling-but-isnt-it-the-opposite-of-rest.html>
- <https://sling.apache.org/documentation/bundles/metrics.html>
- <https://www.udemy.com/course/react-the-complete-guide-incl-redux/>
- <https://www.youtube.com/watch?v=zepOmSsZUjE>
- <https://experienceleague.adobe.com/docs/experience-manager-cloud-service/headless-journey/developer/overview.html>



Thank you! Q/A