

FOLIO meets Share-VDE

Collaborative Entity Management Workflows

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I, Andrea Gazzarini

- Software Engineer (1999-)
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- **Q** Information Retrieval Passionate
 - Author of "Apache Solr Essentials"
 - Apache Qpid (past) Committer
- Founder of <u>SpazioCodice</u>



- **Share-VDE** Lead Architect
- Husband & Father

Bass Player

🛰 Chapman Stick (aspiring) Player





VDE



- ➤ The Share-VDE Initiative
- Sapientia: The Share-VDE Knowledge Base
- ≻ The Domain Model
- ➤ The Entity as a "Prism"
- Knowledge Base Management API: JCricket
- Outbound Connector Framework
- > FOLIO Integration: Challenges
- > FOLIO Integration: Use Cases
- > FOLIO Integration: Available Options
- > FOLIO Integration: Roadmap



The Share-VDE Initiative



Serving libraries & publishers since 1958





➤ The Share-VDE Initiative

- What is Share-VDE?
- History
- The Share Family Linked Data Ecosystem
- Sapientia: The Share-VDE Knowledge Base
- ≻ The Domain Model
- ➤ The Entity as a "Prism"
- Knowledge Base Management API: JCricket
- Outbound Connector Framework
- > FOLIO Integration: Challenges



Share-VDE: Share Virtual Discovery Environment



In a Nutshell

Share-Virtual Discovery Environment is a library-driven initiative which brings together, in a shared discovery environment, the bibliographic catalogues and authority files of a growing number of leading academic and national libraries from across North America and Europe.



Stepping stones



The Share Family Linked Data Ecosystem



The Share Family is a global community built on collaboration that brings together libraries, archives, museums, consortia and Library Service Platforms (LSP) and joins their knowledge in an ever-widening network of interconnected bibliographic data.

For further details please refer to <u>https://www.share-family.org</u> and <u>the dedicated Share-VDE wiki</u> <u>section</u>.



Sapientia: The Share-VDE Knowledge Base



- > The Share-VDE Initiative
- Sapientia: The Share-VDE Knowledge Base
 - Tenants and Provenances
 - Sapientia: Genesis
 - Record-Level Provenance
- ≻ The Domain Model
- ➤ The Entity as a "Prism"
- Knowledge Base Management API: JCricket
- Outbound Connector Framework
- > FOLIO Integration: Challenges



Tenants and Provenances

Share-VDE manages a Knowledge Base which consists of clustered, integrated and enriched entities



An institution within a tenant is called provenance.

We use that term because we want to **retain** the relationship between **Share-VDE entities** and data that originally **contributed** to them.



Sapientia: Genesis



Record-Level Provenance



Each record coming from a **provenance contributes** in **building/enriching** one or more **Share-VDE entities**.

A Share-VDE entity can be seen as a **prism** where each **face** represents **data** coming from a given **provenance**

Each Share-VDE cluster maintains a **link** to the **records** it **originated from**



The Domain Model



- > The Share-VDE Initiative
- Sapientia: The Share-VDE Knowledge Base
- ➤ The Domain Model
 - Core Entities
 - Agents, Contributions
 - Subjects
 - Non-core Entities
- ➤ The Entity as a "Prism"
- Knowledge Base Management API: JCricket
- Outbound Connector Framework



Core entities



Share VDE

Agents, Contributions









Non-core Entities



The Entity as a "Prism"



- ➤ The Share-VDE Initiative
- Sapientia: The Share-VDE Knowledge Base
- ≻ The Domain Model
- ➤ The Entity as a "Prism"
 - From Library Data to Sapientia
 - Prism, faces: the Share-VDE Entity
 - Faces (aka Contributions)
 - Properties: Attributes, Relationships, Links
- Knowledge Base Management API: JCricket
- Outbound Connector Framework



From Library Data to Sapientia

VDE

A Share-VDE member (Stanford, in the example) uses FOLIO for managing its data.

Stanford LIBRARIES

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FOLIO instance data is split across the entities that form the Share-VDE domain model. In this example we focus on the properties that are assigned to a Share-VDE instance (red triangle above)



FOLIO instance (or instances in case of massive export) is sent to Share-VDE

Prism, faces: the Share-VDE Entity



Faces (aka Contributions)



Properties: Attributes, Relationships, Links





sameAs http://dbpedia.org/resource/Alice's_Adventures_in_Wonderland Dbpedia sameAs https://www.wikidata.org/wiki/Q189875 Wikidata sameAs https://data.bnf.fr/ark:/12148/cb358500385#about bnf

 Name
 Provenance

 author
 IBRARY STEELess (I) Stanford

A link is a connection between a Share-VDE Prism and an external reference





A relationship is a connection between two Share-VDE Prisms

Knowledge Base Management API: JCricket





- ➤ The Share-VDE Initiative
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- ➤ The Entity as a "Prism"
- Knowledge Base Management API: JCricket
 - The Big Picture: Genesis, Search, Edit
 - JCricket: Available Operations
 - JCricket UI
- Outbound Connector Framework



The Big Picture: Genesis, Search, Edit



JCricket: Available Operations



JCricket UI

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Outbound Connectors Framework



- ➤ The Share-VDE Initiative
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- Knowledge Base Management API: JCricket
- > Outbound Connector Framework
 - The Architecture
- FOLIO Integration: Challenges
- > FOLIO Integration: Use Cases
- > FOLIO Integration: Available Options
- > FOLIO Integration in Share-VDE: Roadmap



The Architecture



FOLIO Integration: Challenges



- > The Share-VDE Initiative
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- ≻ The Domain Model
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- Knowledge Base Management API: JCricket
- Outbound Connector Framework
- > FOLIO Integration: Challenges
 - #1: Different Domain Model, Entities, Properties
 - **#2: Use Cases**
 - #3: Data Consistency
- > FOLIO Integration: Use Cases



Challenge #1: Different Domain Model



Micro-services based, FOLIO has a flexible, modular and extensible domain model

More than one domain model, it's like a set of **interconnected micro-domain-models**, therefore able to capture a **vast** domain space.

The Domain Model includes both **bibliographic** (e.g. Instances, Items) and **management** entities (e.g. Loan, Orders, Invoices)



Share-VDE inherits from, and extends the **BIBFRAME** Domain Model.

Everything is an **entity** (e.g., Works, Agents, Places, Formats, even **properties**).

Entities are called **Prisms** composed by multiple faces, each one representing the data contributed by a given library/institution.

Entities are mainly created through a clustering process where deduplication, integration, enrichment play a crucial role.

The core domain model doesn't not contains anything outside the **bibliographic sphere**.


Challenge #1: Different Entities



Challenge #1: Different Entities



Challenge #1: Different Properties



Challenge #1: How can we address that?

Share-VDE configuration allows to associate a **provenance** (i.e., a member) to one or more (external) data provider **systems** (e.g. ILS). In the simplest scenario there's just one system; however, a member could be in a context where data is managed by multiple systems.



Other than the association, the configuration stores the coordinates of each target system (e.g., protocol, endpoints, credential access)



Challenge #1: Reverse Mapping



Challenge #2: "Unusual" Use Cases





Challenge #3: Data Consistency

The **async nature** of the communication **between** the two systems makes **very hard** to avoid at all the consistency issue. Things get even worse if multiple users/apps insist on the same entities, on both sides.



Challenge #3: How can we address?



Use Cases



Agenda

•••

- > The Domain Model
- ➤ The Entity as a "Prism"
- Knowledge Base Management API: JCricket
- Outbound Connector Framework
- > FOLIO Integration: Challenges
- > FOLIO Integration: Use Cases
 - Edit
 - Invalidate
 - Merge
 - Split



"Edit" Property (Value)

A property value is added/updated/deleted according to its formal definition in the Share-VDE dictionary (e.g, type, datatype, cardinality, mandatory or not)

A property can be an attribute (a literal value), a relationship (a connection between two prisms) or a link (a connection to an external URL/URI)





Edit: How does it work in Share-VDE?

Share-VDE is able to **detect** and **signal** a change that occurs at **property-value level**.

When such an event occurs, a notification is sent to **Chronos**, an internal **service bus** component that implements a **publish-subscribe** messaging model.



Edit: Challenge on (multi-valued) properties?

The integration with a system that does not have a **public "identity**" for each property value can be <u>challenging</u> because a given **property value instance** in Share-VDE **cannot be** easily **correlated** with the **corresponding value instance** in the target system.

Share-VDE provides one way to <u>mitigate</u> the issue by means of a **Memento** pattern: **change signals** include the **old** and the **new value** for the affected property; it helps in correlating the value instances between the two systems.



Even using the above, the consistency issue is **mitigated**, not **completely solved** (e.g., parallel editing on both sides)

Actually, the **async nature** of the **communication** between the two systems makes **very hard** to **avoid at all** the **consistency issue**.



Edit Demo: API Requests



Postman Collection

https://tinyurl.com/folio-requests

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Postman Collection

https://tinyurl.com/sharevde-requests

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#### Edit Demo: FOLIO Instances





#### **Edit Demo:** From FOLIO To Share-VDE

52



#### **Edit Demo:** Share-VDE Entities

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**VDE** 

• Aventures d'Alice au pays des

merveilles.

French

1869

Volume

#### Edit Demo: Enter in JCricket

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#### Edit Demo: Enter in JCricket

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VDE

### Invalidate a Prism

The Knowledge Base **does not perform deletes** by removing data. Instead, prisms are **invalidated**, meaning they are marked with **tombstones**. **Invalidated Prisms** are no longer **searchable** in the public portal; however, they can be still managed through **JCricket API**.

A prism can be invalidated **explicitly**, or **implicitly/indirectly**, when it's part of a **merge** context.

#### **Explicit Invalidation**



https://svde.org/agents/11234



#### https://svde.org/agents/11234

#### Implicit Invalidation (Merge)





#### Merge n Prisms into One

**Multiple Prisms** are merged into **one**. The "merge" result is called "**destination**" prism. The editor can choose which **properties** move between **sources** and **destination**. **After merging**, source prisms are **implicitly invalidated**.

**Merge** operates at **Prism level**, meaning that it affects **all prism "faces**" (i.e. data belonging to **all provenances** that contributed to that prism). For that reason the **user** must have **special** grants (**advanced** editing); in addition, the whole operation must be **reviewed/approved** by another advanced editor.



## Split One Prism into n Prisms

**One prism** is split into **multiple entities** (**new** or **existing**). In the Split context, the source is called **giver**, the splits are called **receivers**.

Split operates at Prism level, meaning that it affects all prism "faces" (i.e. data belonging to all provenances that contributed to that prism).

For that reason the **user** must have **special** grants (**advanced** editing); in addition, the whole operation must be **reviewed/approved** by another advanced editor.



Receivers can be existing or new prisms.



#### Challenge: What Should We Send Back?



#### Share-VDE<->FOLIO Integration: Scenarios



Agenda

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- Knowledge Base Management API: JCricket
- Outbound Connector Framework
- > Third Parties Integration Challenges
- > FOLIO Integration: Use Cases
- > FOLIO Integration: Options/Scenarios
  - JCricket UI + FOLIO Connector
  - JCricket UI in FOLIO
  - Another JCricket UI in FOLIO
  - Online Stream Clustering
  - Offline Batch Clustering







The **Share-VDE editor** accesses the **JCricket UI** and starts changing Prisms. As far as changes are related to a **provenance** connected to **FOLIO**, the **outbound connector** asynchronously **propagates** the change.

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### JCricket UI in FOLIO

A **JCricket native FOLIO App** that communicates with **Share-VDE GraphQL API** and propagates (back) the changes to FOLIO through the Share-VDE outbound connector.





Sapientia (Share-VDE Knowledge Base)



### ~JCricket UI in FOLIO

A JCricket native FOLIO App that synchronously updates the FOLIO Inventory and then uses the Share-VDE GraphQL API to propagate the changes into the Share-VDE Knowledge Base.







# **Online Stream Clustering**

FOLIO (Inventory) feeds Share-VDE through a GraphQL (or a REST) channel which triggers an online Stream Clustering that updates the Share-VDE Knowledge Base.





# Offline Batch Clustering

**FOLIO** feeds Share-VDE periodically with data pertaining to a given period. That could be the whole system dataset (e.g., very beginning, disaster recovery) or the delta that captures the changes occurred in a given period (e.g., a week, a day, a month).





### FOLIO Integration: Roadmap



# Agenda

- ➤ The Share-VDE Initiative
- Sapientia: The Share-VDE Knowledge Base
- ≻ The Domain Model
- ➤ The Entity as a "Prism"
- Knowledge Base Management API: JCricket
- Outbound Connector Framework
- > FOLIO Integration: Challenges
- > FOLIO Integration: Use Cases
- > FOLIO Integration: Options/Scenarios
- > FOLIO Integration: Roadmap



# JIRA Timeline (in progress)



## JIRA Timeline (in progress)

Projects / Share-VDE / Share-VDE Board (By Stories)

Timeline



### Get involved!

Becoming part of the global Share Family means sharing data and cooperating with the greater international library community

The family continues to expand as more and more libraries worldwide embrace the opportunity to be involved in an international network of information, creating dialogue, participation and partnership Share

Get in touch with us to find out more about how the Share family can help your library: info@svde.org https://wiki.svde.org/ https://www.svde.org/about/about-share-vde





# FOLIO meets Share-VDE

#### **Collaborative Entity Management Workflows**

WOLFCon 2023 - David Rubenstein Forum, The University of Chicago, August 24th 2023

Andrea Gazzarini, Share-VDE Lead Architect

www.svde.org info@svde.org