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Service oriented archive based on Fedora Commons

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Preview

1. Background
2. Project drivers and design goals
3. Fedora and other building blocks
4. Development (and a few words on the ideology)
5. Future
6. Review and conclusion

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Background

Digital preservation and archiving in MAMK

- Fifteen years of research and development
  - Digital archive and repository software
  - Methods and tools development
  - Digitization, 3D scanning and modeling
  - Audiovisual materials
- Commercial digital archive services since 2004
  - Private archives and companies, city archives, non-profit organizations
  - Digital archive and repository as a service
  - Digitization, media productions
- Disec
  - Spin-off company for medical sector image archives and digital services
  - Provides MAMK an enterprise level infrastructure and data security

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Background

OSA - Open Source Archive

- Find and develop open source tools for digital preservation, repositories and archives
- Focus on developing a service platform for archives
- Pilot test a dark archive solution (DAITSS)
- Implementation during 2012 - 2014
- Funded by European Regional Development Fund, South Savo Regional Council, MAMK and partners
- Results will be released as much as possible open source
- Project blog: http://osarchive.wordpress.com/

We know how to do it.
This has been there for the last 5000 years.

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Motivation

- Upgrade current digital archive software
- Support changing requirements and agile development model
- Get rid of closed and proprietary software
  - Cut costs and understand the licensing better
  - Reduce risks and be in control
  - Political reasons (public sector, EU)
- A new architecture design
  - Modularity and loose coupling
  - Open source components
  - Flexible data models
- Provide top notch end-user experience

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Service model

- MAMK is a digital archive (and repository) service provider
  - SaaS (Software as a Service) with multi-tenant applications
  - Agile and user focused development
  - Focus on software and infrastructure, not in the content
  - Current production software is in-house developed YKSA
- Research and development projects integration
  - Continuum and funding outside of the projects
- Partnerships
  - such as ELKA (Central Archives for Finnish Business Records)
- Content agnostic services
  - Audiovisual materials
  - Documents
  - Maps, posters …
  - OAIS packages etc.

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Digital archive data lifecycle

Lots of processes in different phases of data lifecycle

- Ingest, migration, fixity, disposal etc.
- Some are organization dependant, some are not
- Configurability without added complexity – is it possible? Oh yes.

Lifecycle phases can be managed with workflows and plans

- Automation eliminates human errors and enforces processes
- Can be compared and shared with the community
- Micro-services based implementation

Digital archive or a repository is not a data tomb.

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Data modeling

- Very pragmatic approach
  - Archive first, enrich and enforce later
  - Do not limit the content or formats
- Umbrella metadata model
  - Covers multiple national and international standards
  - Roughly 300 metadata fields to cover various content types
  - Provide compatibility with mappings (which can be archived too)
  - Can be extended
- Machine readability
- Linked data
  - Internal and external (ontologies, classifications, vocabularies etc.)
  - Contextual entities

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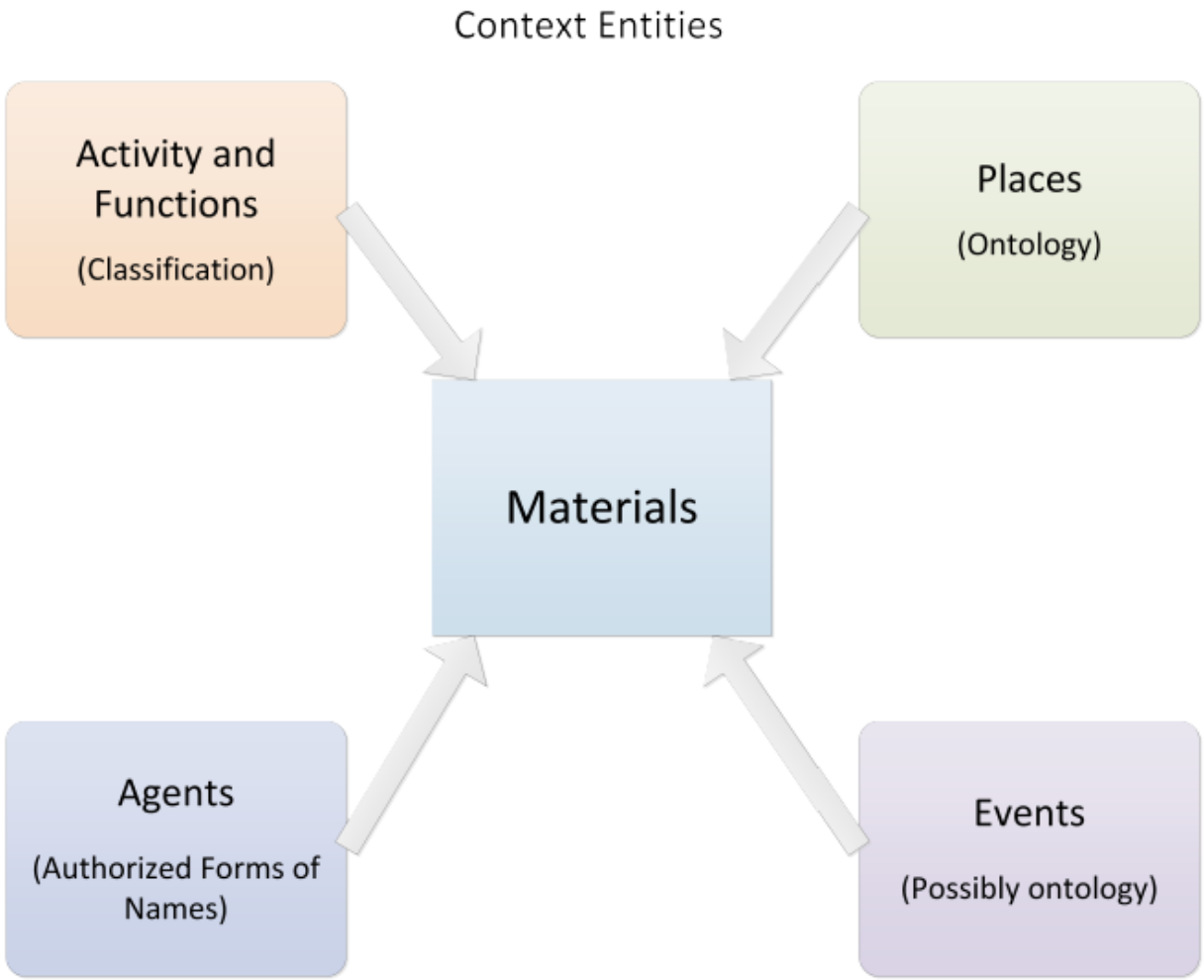

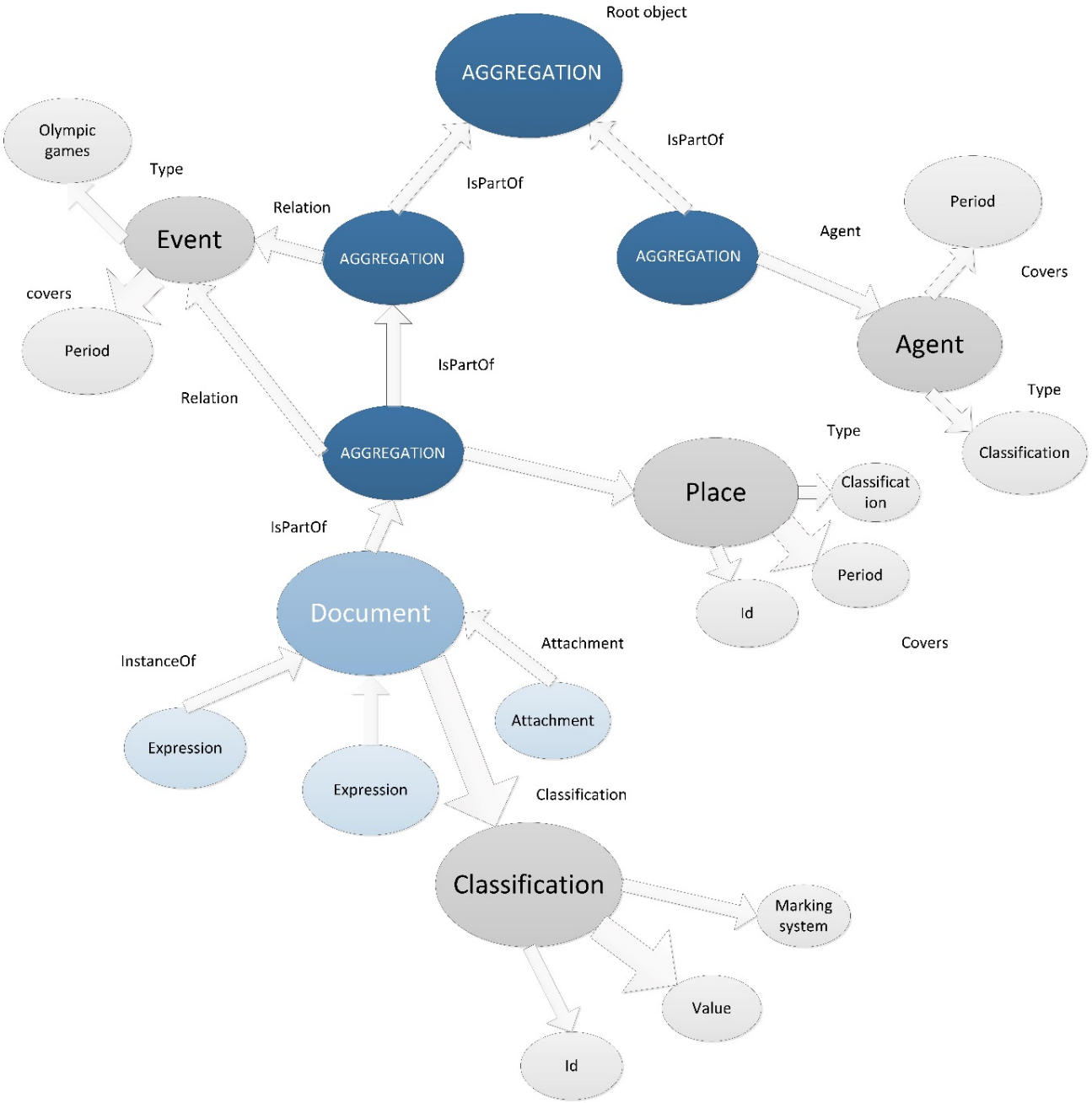
Root object
AGGREGATION
Olympic games
Type
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Attachment
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Attachment
Expression
Expression
Classification
Classification
Marking system
Value
Id

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Discoverability and access

All data should be accessible and discoverable

- Without any knowledge of archive hierarchy etc.
- Natural language understanding
- Multilanguage support
- Google (like) searching
  - Downside is every results page after the first
- Faceted search and browsing based on metadata
- Linked data and open data
- Access control and privileges

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Research and evaluation

Done to avoid unnecessary re-inventing in 2012.

- Key requirements
  - Previous drivers
  - Open source
  - Active community and healthy ecosystem
  - Stable and reliable product
  - Good architecture and technical design
  - Flexible and customizable
- We ended up with Fedora and a few others (Hydra, Islandora, Archivematica).
- In the end techies decided. Fedora it was.

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Solution overview

- Fedora Commons as central repository
- Solr for search and indexing
- Custom developed front-end and business logic layer
- Java as core technology
  - Easy to find developers
  - Plenty of tools available
- MVC and service oriented architecture
  - Extendable and modular design
  - Loose coupling
- Disk and tape storage
- Runs on Linux

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Fedora Commons

- Currently Fedora 3.6.x
- Looking to start F4 testing during summer

- Why Fedora?
  - Technology base (such as Java, APIs)
  - Community and use cases
  - Object modeling
  - Content and data model agnostism
- Role of Fedora in our solution
  - Master data storage
  - Low-level storage management
  - Manages audit logs, versions, relations, compound objects
  - Basically keeps it all together

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Experiences with Fedora

What we did

- Created Custom content models
  - Looked for Islandora and other examples
  - Based on content types
  - Defined minimun requirements (metadata, relations, data streams)
  - Designed schemas for metadata models
- Interfaces (APIs or GUI) provide mappings per customer
- UI elements (forms, views) are completely configurable and decoupled from the content models

What we didn’t like, use or understand

- SOAP API
- Service definitions and deployments
- Hard coded policies e.g. access rights

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Open source compontents

- Apache Solr 4.x
  - Gsearch (moving away with F4 adoption)
  - Voikko for Finnish language understanding
- MariaDB, MongoDB, (Apache Cassandra)
- LDAP based user management
  - OpenLDAP reference implementation
- SOSWE
  - Custom developed distributed micro-service workflow engine
  - Open source
  - Looking for and building micro-services
- Jasper Reports
- Piwik
- (however, need for some additional proprietary tools)

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Current status (and issues)

- Currently in Beta
- Implemeneting pilot tests with project partners
- Looking positive but …
- Fedora 3 issues
  - Performance and scalability (with batches and massive operations)
  - Complexity (configurations, content models)
  - Lack of transactions and multi-tenancy
  - Lack of knowledge (and docs, examples, up-to-date references)
- Middleware issues
  - Gsearch
  - Message queue persistence and keeping Solr in sync

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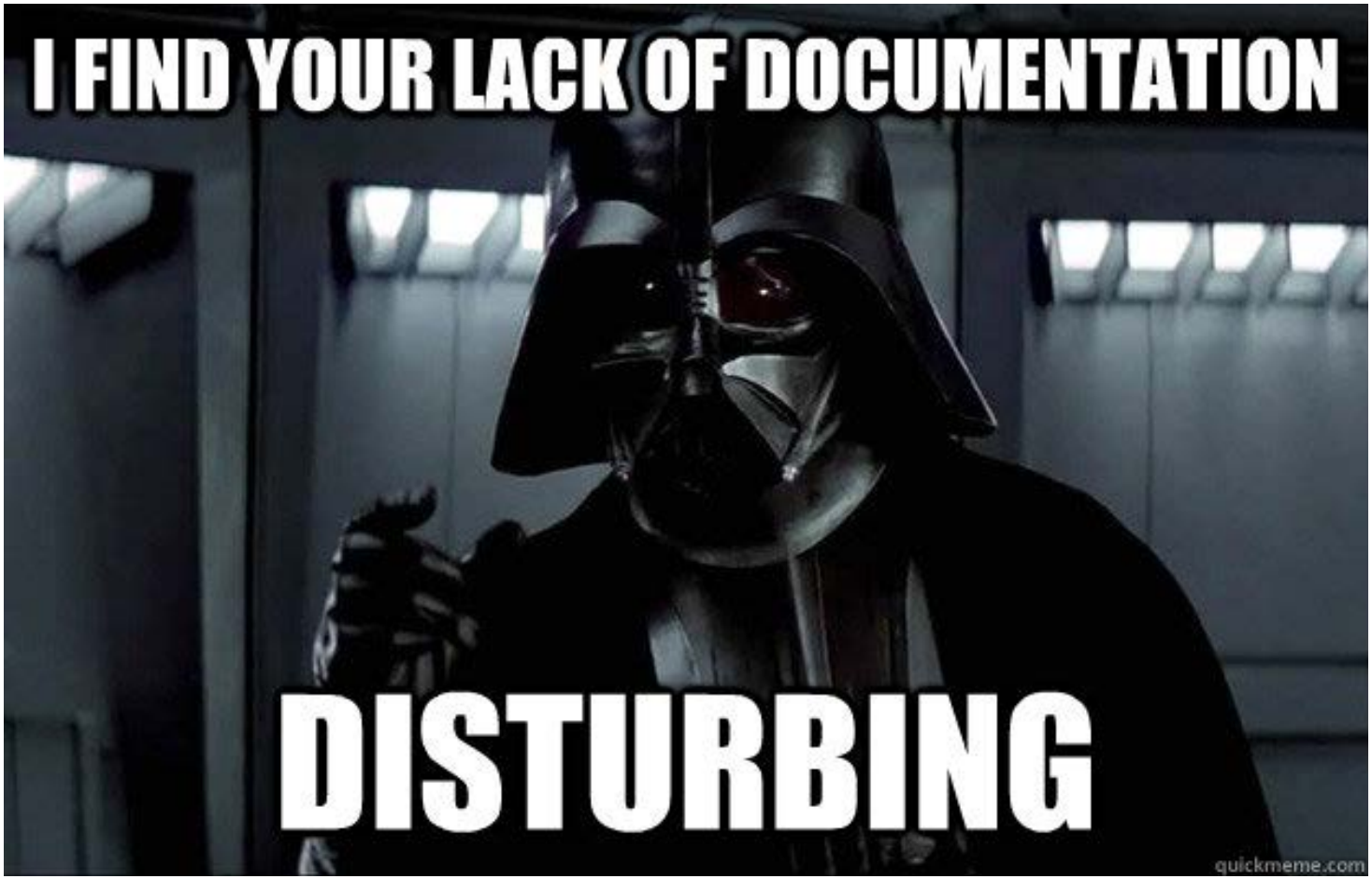

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Fedora 4

Key requirements

- Good design and simplicity (from developer point of view)
- REST API
- Performance upgrades
- Batch operations
- Transactions
- RDF and linked data support
- Powerful but simplified content modeling
- Multi-tenancy

What we can contribute

- Use cases and testing
- Java client development
- Promotion
- Project deliverables (once completed and decided licensing)

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Future development

Project scope

- Workflow engine and micro-services
- User experience upgrades
- F4 Java client
- API
- NoSQL storage for access
- Reporting and analytics

Future future development

- Personal archiving
- Productization and migration with commercial services
- Utilization with new industries

Open source tape management -- contact us

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Review

What we did in a nutshell

1. Design drivers and requirements identification
2. Data model design
3. Software review and analysis
4. Hand-crafted software to exploit Fedora and the best tools
5. Share and profit

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Links and deliverables

- Follow OSA - Open Source Archive blog and twitter
  - http://osarchive.wordpress.com/
  - @OSArchive

- OSA project final report in English will be available by end of 2014.
- Capture project summary is available in English.
  - Complete documentation in Finnish

- www.mamk.fi/osa (Finnish only)
- Ask anything: mikko.lampi@mamk.fi or @jotudin in Twitter