The Power of the Apache Sling Resource API

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About

- Member of the ASF
  - Current PMC Chair of Apache Sling
  - Apache Sling, Felix, Portals, Incubator
- RnD Team at Adobe Research Switzerland
- Article/Book Author, Conference Speaker
- Technical Reviewer
- JSR 286 Spec Group (Portlet API 2.0)

CRUD with Apache Sling

- Resource API for reading
- Workaround resource API for updating
- No resource API for create, delete (update)
  - Fallback to storage API (JCR)
- High demand for full CRUD support

1 ROA and REST

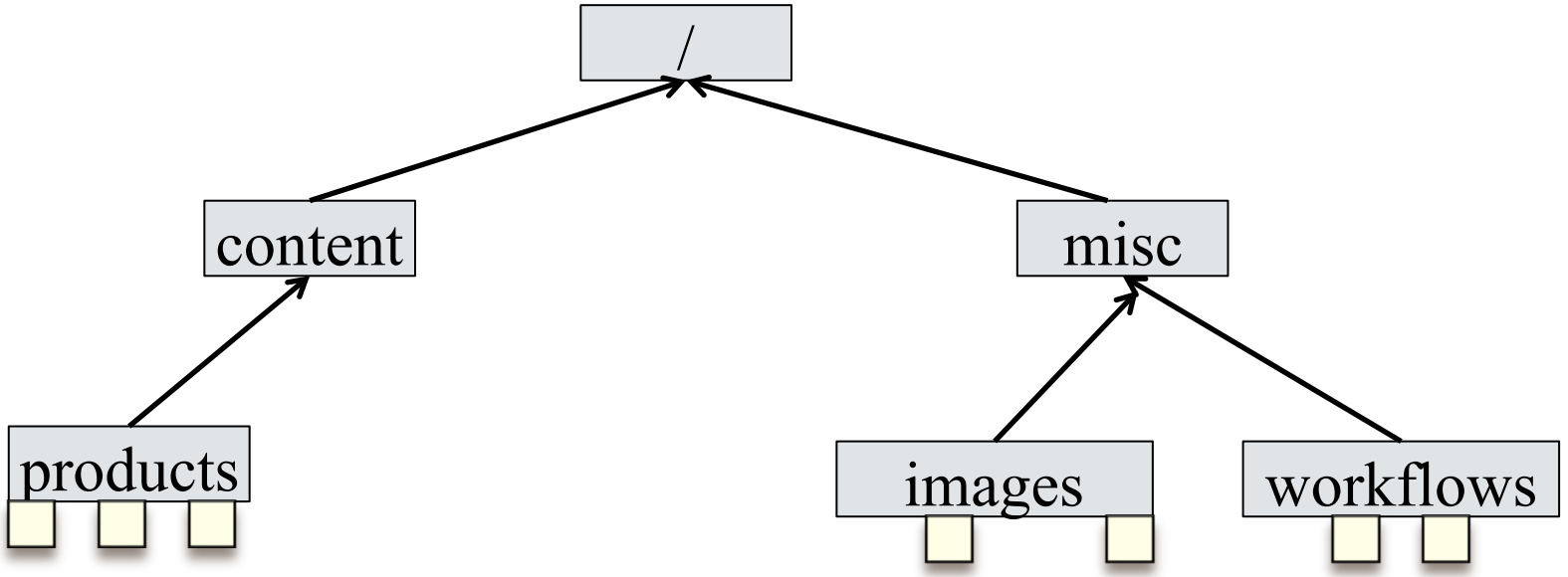
Resource Oriented Architecture

- Every piece of information is a resource
  - News entry, product, image
  - Addressable by a (descriptive) URI
- Leverages HTTP
  - Stateless
    - Request contains all relevant information
  - Methods (GET, POST, …) for operations
- Different Representations
  - Request contains representation wish

REST with Apache Sling

- Default behaviour for GET
- Creating/Updating content through POST
  - Default behaviour
- Additional operations/methods
- Resource-first request processing!

Resource Tree



http://localhost/content/products

Resource: /content/products

Resource

- Apache Sling's abstraction of the *thing* addressed by the request URI
  - Usually mapped to a JCR node
  - File system, bundle resource, database..
- Attributes of resources
  - Path in the resource tree
  - Resource type
  - Metadata, e.g. last modification date

2 Resource Resolver

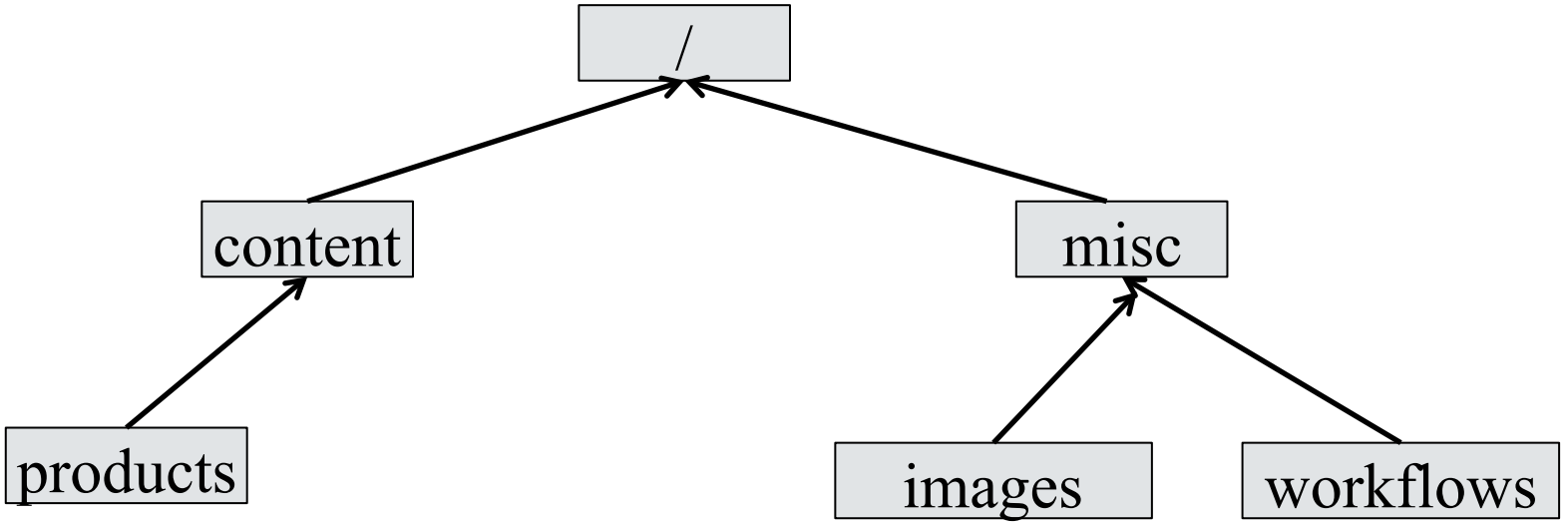
Resource Resolver I

- Tasks:
  - Finding resources
  - Getting resources
  - Querying resources
- Not Thread Safe!
  - Includes all objects fetched via resolver

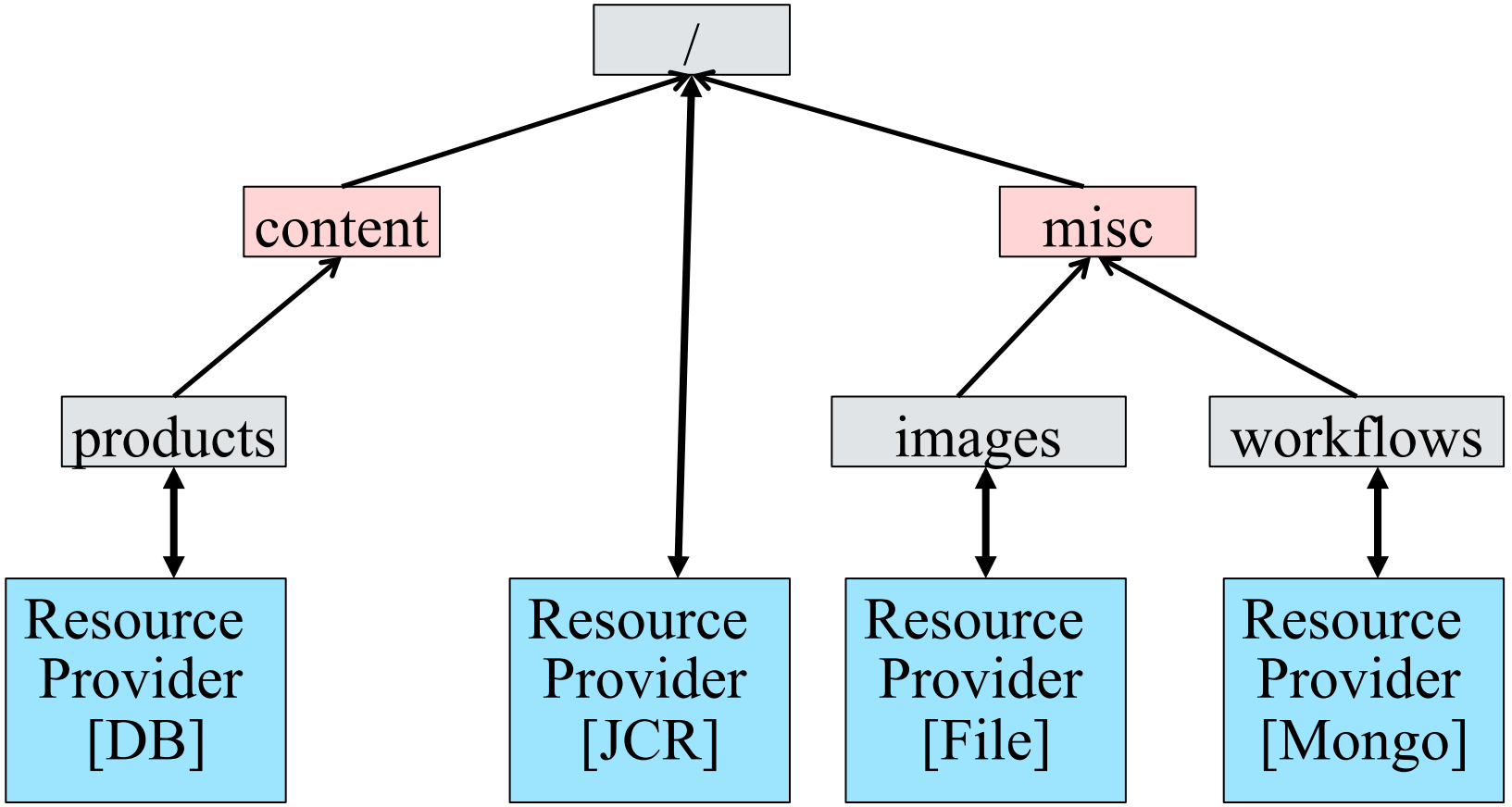
Resource Resolver II

- Central gateway for resource handling
- Abstracts path resolution
- Abstracts access to the persistence layer(s)
- Configurable
  - Mappings (Multi site mgmt, beautify paths)

Resource Tree



Mounting Resource Providers



Resource Resolver API

```
public interface ResourceResolver extends Adaptable {

    Resource getResource(String path);
}
```

```
Resource r1 = resolver.getResource("/content/products/ApacheSling");
Resource r2 = resolver.getResource("/misc/images/apache/committers/cziegeler");
Resource r3 = resolver.getResource("/misc/workflows/instances/first");
Resource r4 = resolver.getResource("/libs/myapp/components/products/product.jsp");
Resource r5 = resolver.getResource("/somewhere/over/the/rainbow");
```

Resource API

```
public interface Resource extends Adaptable {

    String getPath();
    String getName();
    Resource getParent();
    Iterator<Resource> listChildren();
    Resource getChild(String relPath);
    String getResourceType();
    String getResourceSuperType();
    boolean isResourceType(String resourceType);
    ResourceMetadata getResourceMetadata();
    ResourceResolver getResourceResolver();
}
```

3 ~~C~~R~~UD~~

The Adapter Pattern

- Resource implements Adaptable

```
<AdapterType> AdapterType adaptTo(Class<AdapterType> type);
```

- Pluggable mechanism
- Each resource *should* be adaptable to ValueMap
  - Storage independent access
- Resources might be adaptable to DSL objects
- Resources might be adaptable to persistent specific objects
  - JCR Node

Reading Resources - The Value Map

```
public interface ValueMap extends Map<String, Object> {
    <T> T get(String name, Class<T> type);
    <T> T get(String name, T defaultValue);
}

String title = vm.get("title", "<no title>");
int length = vm.get("length", 80);
String[] names = vm.get("names", String[].class);
```

Traversing Resources

```
public interface Resource extends Adaptable {
    Resource getParent();
    Iterator<Resource> listChildren();
    Resource getChild(String relPath);
    ResourceResolver getResourceResolver();
}
```

4 CRUD

CRUD Support

- Latest development
  - Check out from svn
  - MongoDB provider
- Basic API is stable
- Transient storage
  - Changes are not persisted until commit

Create and Delete

```
public interface ResourceResolver {

    Resource create(Resource parent, String name, Map<String, Object> properties)
    throws PersistenceException;

    void delete(Resource resource)
    throws PersistenceException;

    void revert();

    void commit() throws PersistenceException;

    boolean hasChanges();
}
```

```
Resource products = resolver.getResource("/content/products");
Resource a = resolver.create(products, "a", null);

Resource instances = resolver.getResource("/misc/workflow/instances");
Resource b = resolver.create(instances, "xyz", null);

resolver.delete(resolver.getResource("/somewhere/over/the/rainbow"));

resolver.commit();
```

Update

```
public interface ModifiableValueMap extends ValueMap {

}
```

```
ValueMap vm = rsrc.adaptTo(ModifiableValueMap.class);
if ( vm != null ) {
    vm.put("title", "Apache Sling Rocks");
    vm.put("votes", 500);

    rsrc.getResourceResolver().commit();
} else {
    // not modifiable!
}
```

5 Factories

How to Get a Resource Resolver?

- SlingHttpServletRequest

```
ResourceResolver getResourceResolver();
```

- ResourceResolverFactory

```
public interface ResourceResolverFactory {

    String USER = "user.name";
    String PASSWORD = "user.password";


    ResourceResolver getResourceResolver(Map<String, Object> authenticationInfo)
    throws LoginException;

    ResourceResolver getAdministrativeResourceResolver(
                        Map<String, Object> authenticationInfo)

    throws LoginException;
}
```

Resource Provider Factory

```
public interface ResourceProviderFactory {

    String ROOTS = "provider.roots";

    String PROPERTY_REQUIRED = "required";

    ResourceProvider getResourceProvider(Map<String, Object> authenticationInfo)
    throws LoginException;

    ResourceProvider getAdministrativeResourceProvider(
            Map<String, Object> authenticationInfo) throws LoginException;
}
```

Resource Provider

```
public interface ResourceProvider {
    Resource getResource(ResourceResolver resourceResolver, String path);
    Iterator<Resource> listChildren(Resource parent);
}
public interface DynamicResourceProvider extends ResourceProvider {
    boolean isLive();
    void close();
}
```

Resource Provider - CRUD

```
public interface ModifyingResourceProvider extends ResourceProvider {

    Resource create(ResourceResolver resolver,
                    String path, Map<String, Object> properties)
    throws PersistenceException;

    void delete(ResourceResolver resolver, String path)
    throws PersistenceException;

    void revert(ResourceResolver resolver);

    void commit(ResourceResolver resolver)
    throws PersistenceException;

    boolean hasChanges(ResourceResolver resolver);
}
```

Resource Provider - Querying

```
public interface QueriableResourceProvider extends ResourceProvider {

    String LANGUAGES = "provider.query.languages";

    Iterator<Resource> findResources(ResourceResolver resolver,
                                     String query, String language);

    Iterator<Map<String, Object>> queryResources(ResourceResolver resolver,
                                     String query, String language);
}
```

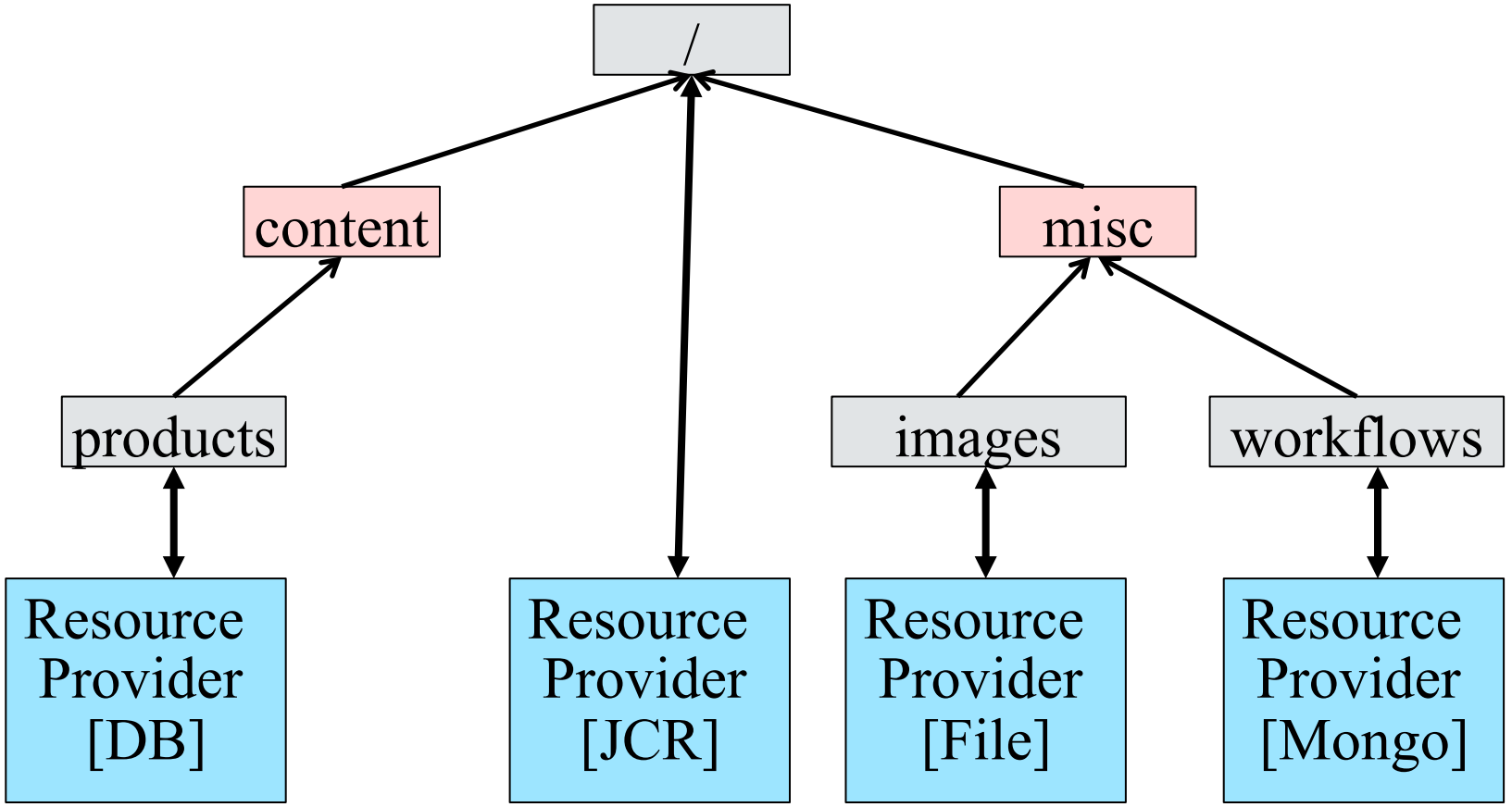
Resource Provider – Resource Resolver Attributes

```
public interface AttributableResourceProvider extends ResourceProvider {

    Collection<String> getAttributeNames(ResourceResolver resolver);

    Object getAttribute(ResourceResolver resolver, String name);
}
```

Resource Tree with Providers



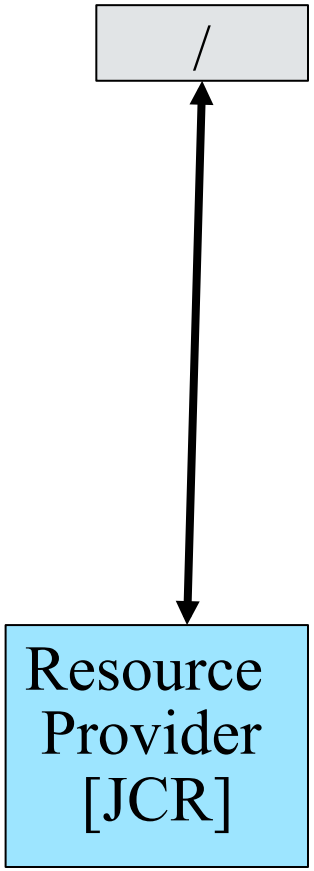
Resource Tree without Providers

- Valid OSGi setup
- Resource Resolver (Factory) are available
- Nothing is working

Resource Tree without Providers

- Resource Provider Factory configuration:
- resource.resolver.required.providers
  - String array of PIDs and service filters
- Default value:
  org.apache.sling.jcr.resource.internal.helper.jcr.JcrResourceProviderFactory

Resource Tree with Required Providers



Latest Resource API

- Full CRUD support
- Query support
- Simple, clean and sufficient API
- Transparent storage access
- Pluggable through resource provider (factories)
  - Separation of concerns

6 Outlook

Apache Sling Resource API

- CRUD Resource API defined and implemented
  - JCR Resource Provider as root provider
  - MongoDB prototype
- TODO
  - Change POST servlet to use new API
  - Test "Look and Feel"
  - Feedback
  - Release ☺
- Wish
  - Additional resource providers
    - Cassandra, CouchDB
    - File system

The End...