

# Crnk Cheatsheet

This document gives a quick overview of the most important Crnk features. The document is work in progress. Please provide feedback what is desired to see.

Make sure to have read the [JSON:API specification](#) to understand the concepts of resource-oriented APIs and the standards established by JSON:API. Also have a look at its additional [recommendations](#).

## 1. Setup

Crnk integrates well with many libraries and frameworks. As such every setup might be a bit different. Have a look at the integration examples and [documentation](#) for detailed information. In general it is easiest to setup Crnk with Spring Boot due to its auto configurations. In Gradle it can look like (see [spring-boot-minimal-example](#)):

*build.gradle*

```
buildscript {
    dependencies {
        classpath "io.spring.gradle:dependency-management-plugin:1.0.6.RELEASE"
    }
}

wrapper {
    gradleVersion = '4.10'
}

apply plugin: 'io.spring.dependency-management'
dependencyManagement {
    imports {
        mavenBom 'org.springframework.boot:spring-boot-dependencies:${SPRING_VERSION}'
        mavenBom "io.crnk:crnk-bom:${CRNK_VERSION}"
    }
}

apply plugin: 'java'

mainClassName = "io.crnk.example.service.ExampleApplication"

dependencies {
    compile "io.crnk:crnk-spring"
    compile "io.crnk:crnk-home"

    compile 'org.springframework.boot:spring-boot-starter-web'

    testCompile 'org.springframework.boot:spring-boot-starter-test'
    testCompile "io.crnk:crnk-client"
    testCompile 'com.squareup.okhttp3:okhttp:3.4.1'
}
```

## 2. Resource

A basic resource:

```
@JsonApiResource(type = "tasks")
public class Task {

    @JsonApiId
    private Long id;

    public Long getId(){return id;}
    public void setId(Long id){this.id = id;}

    ...
}
```

To rename a field:

```
@JsonProperty("alternativeName")
private String name;
```

To ignore a field:

```
@JsonIgnore
private String name;
```

To restrict access to a field:

```
@JsonApiField(sortable=false, filterable=false, postable=false, patchable=false,
readable=true)
private String name;
```

To inherit from another resource (omit `resourcePath = "task"` to let `SpecialTask` have its own url):

```
@JsonApiResource(type = "task", subTypes = SpecialTask.class)
public class Task {

    ...
}

@JsonApiResource(type = "specialTask", resourcePath = "task")
public class SpecialTask extends Task{

    ...
}
```

To nest a resource in the URL like <http://example.com/posts/1/comments/2> use [here](#).

## 3. Repositories

For more information see [here](#).

To implement a basic repository with in-memory filter using `querySpec.apply` (or directly use `InMemoryResourceRepository`):

```
public class TaskRepository extends ResourceRepositoryBase<Task, Long> {

    private Map<Long, Task> tasks = new ConcurrentHashMap<>();

    public TaskRepositoryImpl() {
        super(Task.class);
    }

    @Override
    public ResourceList<Task> findAll(QuerySpec querySpec) {
        return querySpec.apply(tasks.values());
    }

    @Override
    public <S extends Task> S create(S task) {
        task.setId(tasks.size());
        tasks.put(task.getId(), task);
        return task;
    }

    @Override
    public <S extends Task> S save(S task) {
        tasks.put(task.getId(), task);
        return task;
    }

    @Override
    public void delete(Long id) {
        tasks.remove(id);
    }
}
```

## 4. Client

To query a remote JSON:API repository:

```
CrnkClient client = new CrnkClient("http://localhost:8080");
ResourceRepository<Task, Serializable> taskRepo = client.getRepositoryForType(Task
.class);
QuerySpec querySpec = new QuerySpec(Task.class);
querySpec.addFilter(
    new FilterSpec(PathSpec.of("task.assignee.name"), FilterOperator.NEQ, "Joe")
);
querySpec.addSort(new SortSpec(PathSpec.of("task.assignee.name"), Direction.DESC));
querySpec.setLimit(10L);
ResourceList<Task> list = taskRepo.findAll(querySpec);
```

## 5. Relationships

More information available [here](#)

The subsequent example establishes a relationship to **Project** with the **project** field. It is backed by a primitive relationship identifier **projectId**. **projectId** is always written to the response (**SerializeType.ONLY\_ID**). The **project** relationship is looked up in the project repository with **projectId** if an inclusion has been requested and the task repository did not initialize **project** (**LookupIncludeBehavior.AUTOMATICALLY\_WHEN\_NULL**):

```
@JsonApiRelationId
private Long projectId;

@JsonApiRelation(lookup = LookupIncludeBehavior.AUTOMATICALLY_WHEN_NULL, serialize =
SerializeType.ONLY_ID)
private Project project;
```

An eager project relationship where the project is always returned together with the task as inclusion:

```
@JsonApiRelation(serialize = SerializeType.EAGER)
private Project project;
```

To setup a relationship that is served by querying the opposite side (to get all tasks of a project, all tasks are searched for this project):

```
public class Project{
    @JsonApiRelation(
        lookup = LookupIncludeBehavior.AUTOMATICALLY_WHEN_NULL, opposite = "project",
        repositoryBehavior = RelationshipRepositoryBehavior.FORWARD_OPPOSITE)
    private List<Tasks> tasks;
}
```

If neither a **RelationshipRepositoryBehavior** nor **@JsonApiRelationId** is applicable,

`RelationshipRepositoryV2` or rather `BulkRelationshipRepositoryV2` can implement arbitrary custom logic to lookup relationships.

## 6. Information

To attach additional (typically not persisted) information to a resource:

```
class Task{
    ...

    @JsonApiMetaInformation
    private TaskMeta meta;
}

public class TaskMeta implements MetaInformation {
    public String value;
}
```

To add additional links to resources next to the default `self` link:

```
class Task{
    ...

    @JsonApiLinksInformation
    private TaskLinks links;
}

public static class TaskLinks implements SelfLinksInformation, LinksInformation {
    private String value;
    private String self;
    ...
}
```

To attach links and meta information to lists:

```

class TaskList extends ResourceListBase<Task, TaskListMeta, TaskListLinks> {
}

class TaskListLinks implements LinksInformation {

    public String name = "value";

    ...
}

class TaskListMeta implements MetaInformation {

    public String name = "value";

    ...
}

class TaskRepository implements ... {

    ...

    @Override
    public TaskList findAll(QuerySpec querySpec){
        TaskList list = new TaskList();
        list.setMeta(...)
        list.setLinks(...)
        list.add(...)
        return list;
    }
}

```

## 7. Exception Mapping

For more information see [here](#).

Mapped Exceptions:

- 400 **BAD\_REQUEST**: `BadRequestException`
- 401 **UNAUTHORIZED**: `UnauthorizedException`
- 403 **FORBIDDEN**: `ForbiddenException`
- 404 **NOT\_FOUND**: `ResourceNotFoundException`
- 405 **METHOD\_NOT\_ALLOWED**: `MethodNotAllowedException`
- 409 **CONFLICT**: `OptimisticLockException`
- 422 **UNPROCESSABLE\_ENTITY**: `ValidationException` and `ConstraintViolationException`
- 500 **INTERNAL\_SERVER\_ERROR**: `InternalServerErrorException`
- 504 **GATEWAY\_TIMEOUT**: `TimeoutException`

To implement a custom mapping:

*TestExceptionMapper.java*

```
package io.crnk.test.mock;

import io.crnk.core.engine.document.ErrorData;
import io.crnk.core.engine.error.ErrorResponse;
import io.crnk.core.engine.error.ExceptionMapper;
import io.crnk.core.repository.response.JsonApiResponse;

import java.util.List;

public class TestExceptionMapper implements ExceptionMapper<TestException> {

    public static final int HTTP_ERROR_CODE = 499;

    @Override
    public ErrorResponse toErrorResponse(TestException cve) {
        ErrorData error = ErrorData.builder().setDetail(cve.getMessage()).build();
        return ErrorResponse.builder().setStatus(HTTP_ERROR_CODE).setSingleErrorData
(error).build();
    }

    @Override
    public TestException fromErrorResponse(ErrorResponse errorResponse) {
        JsonApiResponse response = errorResponse.getResponse();
        List<ErrorData> errors = (List<ErrorData>) response.getEntity();
        StringBuilder message = new StringBuilder();
        for (ErrorData error : errors) {
            String title = error.getDetail();
            message.append(title);
        }
        return new TestException(message.toString());
    }

    @Override
    public boolean accepts(ErrorResponse errorResponse) {
        return errorResponse.getHttpStatus() == HTTP_ERROR_CODE;
    }
}
```

## 8. Filters/Interceptors

- **DocumentFilter** to intercept the response **Document**.
- **ResourceModificationFilter** to intercept changes to a resource.
- **ResourceFilter** to filter access to resources, e.g. to implement access control policies.
- **RepositoryDecoratorFactory** to intercept/decorate calls to repositories.



- `JpaRepositoryFilter` and the specialized `JpaCriteriaRepositoryFilter`, `QuerydslRepositoryFilter` to intercept requests to JPA repositories.

Implementations can be available to service discovery or be registered with a `Module` through `Module.setupModule(...)`.

## 9. Security

- Setup authentication by providing a `SecurityProvider`. JAX-RS, Spring and Servlet integration already come with an implementation out-of-the-box.
- Setup access control by using the `SecurityModule` from `crnk-security` or implement custom logic with a `ResourceFilter`. Spring Boot sets up the module automatically if found on the classpath and `SecurityConfigurer` allows its customization.

See [here](#), a longer topic, no shortcuts here...

## 10. Data Access

There are a number of ready-to-use repository implementation that can greatly speed up development.

- Use `crnk-data-jpa` to access JPA entities.
- Use `crnk-activity` to access Activiti workflow and tasks.
- Use `crnk-meta` to get information about resources and repositories themselves.

For more information see [here](#).