

## **D3.1 Joint Evaluation and Administration System (JES) - Specification**

### **1 Document History**

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### **2 Contents**

Joint Evaluation and Administration System (JES) - Specification .....	1
1 Document History .....	1
2 Contents .....	1
3 Abbreviations .....	3
4 Introduction .....	3
4.1 Requirements Priorities .....	4
4.2 Previous Systems .....	4
5 Use Cases .....	5
5.1 Actors .....	5
5.2 General .....	6
5.2.1 Create Account .....	6
5.2.2 Edit Account .....	7
5.2.3 Change/Forgot Password .....	7
5.2.4 Manage Access Rights .....	7
5.2.5 Login/Logout .....	7
5.3 View Calls .....	8
5.4 Funding .....	8
5.4.1 Create/Manage Call .....	8
5.4.1.1 Call State .....	9
5.4.2 Publish Call .....	9
5.4.3 Cancel Call .....	9
5.4.4 Select Proposals .....	9
5.5 Proposals .....	10
5.5.1 Create Proposal .....	10
5.5.1.1 Proposal state .....	11

5.5.2	Submit Proposal .....	11
5.5.3	Cancel Proposal .....	12
5.6	Appoint Evaluators .....	12
5.6.1	Appointment Objectives .....	12
5.6.2	Appoint for Call .....	13
5.6.3	Appoint for Proposal .....	14
5.7	Evaluation .....	14
5.7.1	Evaluate Proposal .....	14
5.7.2	Consensus Evaluation .....	14
5.7.3	Manage Evaluation .....	15
5.8	JES Reports .....	15
6	Non-Functional Requirements .....	15
6.1	Physical Architecture .....	15
6.2	Security .....	15
6.3	Response Time and Performance .....	16
6.4	GUI Features .....	16
6.5	Multilingual Support .....	16
7	Business Objects .....	17
7.1	Using CERIF .....	17
7.1.1	User Account .....	17
7.1.2	Person (CF) .....	17
7.1.3	Organization (CF) .....	17
7.1.4	Electronic Address (CF) .....	18
7.1.5	Postal Address (CF) .....	18
7.1.6	Call .....	18
7.1.7	Evaluation Scheme .....	18
7.1.8	Proposal .....	19
7.1.9	Consortium .....	19
7.1.10	Individual Evaluation .....	19
7.1.11	Consensus Evaluation .....	19
8	Business Classifications .....	19
9	Appendix: CERIF .....	19
9.1	CERIF Usage .....	19
9.2	CERIF Coverage .....	20
9.3	CERIF Complexity .....	20
9.4	CERIF Independent Objects .....	21
9.5	CERIF Multi-Language Objects .....	22
9.6	CERIF Link Objects .....	22
9.7	CERIF Classification Values .....	23
9.8	CERIF Classifications (Semantics) .....	23
9.8.1	Type Schemes .....	24
9.8.2	Subject Headings .....	25
9.8.3	Role Schemes .....	25

### 3 Abbreviations

Abbrev	Description
(CF)	This object comes from CERIF (with possible simplification)
BS	Black Sea region
CERIF	Common European Research Information Format: database schema, semantics and XML schema for exchange of research info (researchers, projects, results, etc)
CRIS	Current Research Information System: keeps info about researchers, projects, results, etc
CV	Curriculum Vitae (resume)
EPSS	Electronic Proposal Submission Service: used by the EU Framework Programs for proposal submission
ERA	European Research Area
FK	Foreign Key: refers to a PK, it is never "owned" by the record containing the FK
FP7	Seventh Framework Program of the EU for research and development
HTTP	Hyper Text Transfer Protocol
HTTPS	Hyper Text Transfer Protocol - Secure
ISONI	Information System for Organizing Scientific Research, Ministry of Education and Science, Bulgaria
NFR	Non-Functional Requirement: does not correspond directly to a business function, but still has significant impact on the usability of the system. Can express design constraints or high-level design decisions
PFK	FK that is part of the PK of a dependent table
Pinoccio	System used by FP7 "rapporteurs" to record the Consensus Reports and final scores for each proposal
PK	Primary Key, identifies uniquely a database record (object). In particular "own PK" is auto-generated by the database (surrogate) or set by the system (natural)
Rivet	System used by FP7 proposal evaluators to record Individual Assessment Reports as part of the "remote evaluation" process
RSS	Really Simple Syndication: a standard way to publish news on a website, so they can be merged with news feeds from other sites and read in a RSS or email reader
SME	Small or medium enterprise
TL	Task leader or Team leader
TODO	An open question that needs to be decided before implementation can commence
UC	Use Case: standardized description of usage scenarios contributing to a business goal
UML	Unified Modeling Language
URL	Uniform Resource Locator: a web address

### 4 Introduction

This is a specification for the Black Sea European Research Area (BS-ERA) "Joint Evaluation System" (JES).

JES is used to:

- Set up joint research calls by BS-ERA
- Publish calls on a web site
- Submit project proposals by researchers

- Hire evaluators, allocate proposals for evaluation
- Record consensus evaluations of proposals
- Make a final list of projects for funding

JES COULD be extended to:

- Consult CRIS of BS countries to create lists of researchers and send them information about current and upcoming calls
- Manage project contracts and project execution

Currently the specification is an outline draft, i.e. more a concept than a detailed specification. It will be fleshed out after guidance from other team leaders and/or the project steering committee.

#### 4.1 Requirements Priorities

This document uses capitalized words to indicate the priority of individual requirements. We use the "MoSCoW" classification (<http://en.wikipedia.org/wiki/MoSCoW>)

Priority	Meaning
MUST	MUST have the requirement. It has to be included in the current system version in order for the version be a success. If even one MUST requirement is not included, the project delivery should be considered a failure (note: requirements can be downgraded from MUST, by agreement with all relevant stakeholders; for example, when new requirements are deemed more important). The Minimum Usable SubseT
SHOULD	SHOULD have the requirement if at all possible. Also critical to the success of the project, but not necessary for delivery in the current version. SHOULD requirements are as important as MUST, although SHOULD requirements are often not as time-critical or have workarounds, allowing another way of satisfying the requirement, so can be held back until a future version
COULD	COULD have the requirement if it does not affect anything else. Less critical and often seen as nice to have. A few easily satisfied COULD requirements in a delivery can increase customer satisfaction for little development cost.
WONT	WON'T have this time but WOULD like in the future. Either the least-critical, lowest-payback items, or not appropriate for the current version. As a result, WON'T requirements are not planned into the schedule. WON'T requirements are either dropped or reconsidered for inclusion in later versions. This, however doesn't make them any less important.

Requirements that are not marked otherwise are considered MUST.

#### 4.2 Previous Systems

JES is based on concepts from several EU systems:

System	Description
EPSS	Electronic Proposal Submission Service used by the EU Framework Programs for proposal submission
Rivet and Pinoccio	internal EU systems used by proposal evaluators and "rapporteurs" respectively to record project Assessment Reports and Consensus Reports
ISONI	Information System for Organizing Scientific Research (project calls and proposal evaluations) specified by Ministry of Education and Science (Bulgaria) and Sirma Solutions Corp

System	Description
CERIF	Common European Research Information Format sponsored by EU, specifying a database schema, semantics and XML schema for exchange of research info.

## 5 Use Cases

We specify the functional requirements for JES using UML use cases (UC). The current version of the specification includes only:

- Title and short description for each UC.
- Business rules related to the UC

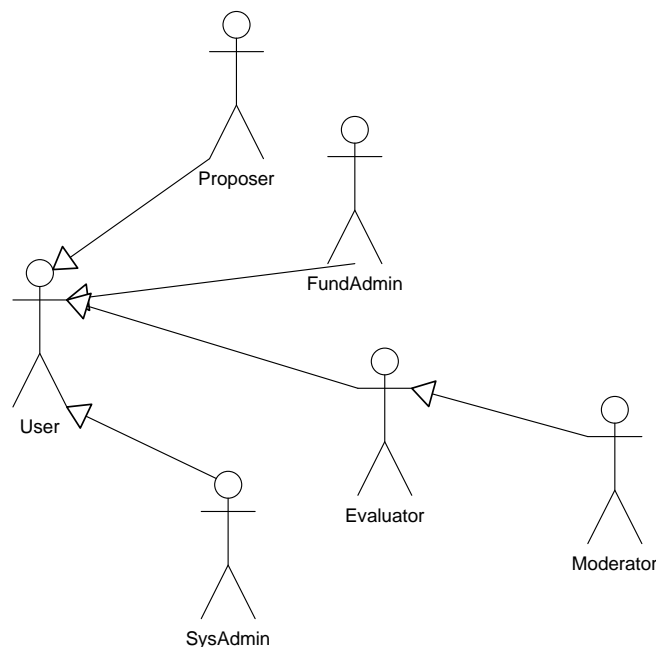
In the next version the UC info will be expanded with basic, alternative and error scenarios (sequences), extension points, etc.

### 5.1 Actors

JES actors are the different kinds of users that can use it. JES does not integrate with any systems.

Actor	Description
FundAdmin	Official from BS-ERA.NET that sets up funding schemes and calls, and participates in evaluator appointment and selection of proposals for funding
Proposer	Researcher that submits a project proposal. Only the coordinating partner of a consortium has authenticated access to JES
Evaluator	Evaluates project proposals
Moderator	Gets individual evaluators to come to consensus and
SysAdmin	System administrator that sets up users, roles, classifications and system parameters
User	General public user that can view calls on the JES website

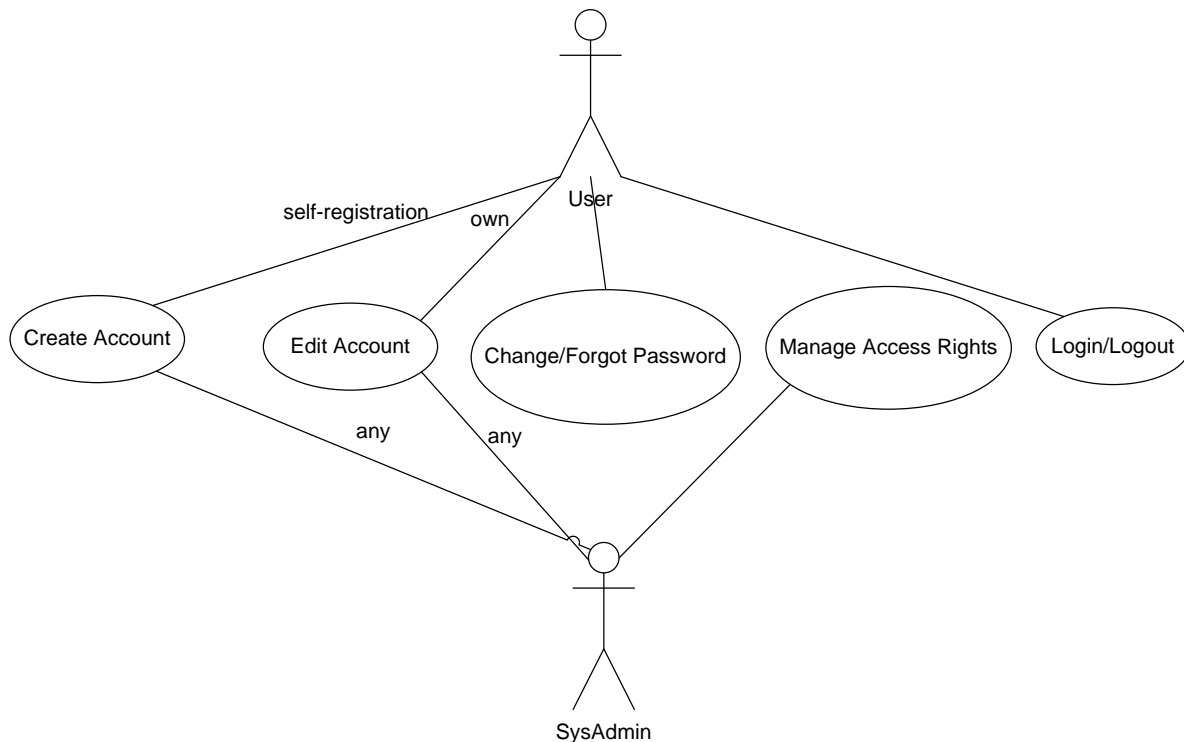
JES actors are shown below. We also show their generalization relations: a more specific actor (e.g. Proposer) can do everything that a more general actor (e.g. User) can do, and more.



## 5.2 General

The general UCs include functions related to user accounts and login that are standard for almost any IT system.

The following diagram shows which actors can access which UC. Due to generalization relations (see 5.1), all actors can access the UCs of "User".



### 5.2.1 Create Account

The User Account holds key info about the user, including username and password. Scenarios:

- Any user can create account for themselves (self-registration)
- Proposer can self-register with this role. For any other role: the user makes a request for that role, SysAdmin is notified about the request and takes decision whether to grant or refuse the role. Until such decision, the user stays Deactivated and cannot login.
- SysAdmin can create account, fill out registration data and provide role for any user.

Business rules:

- The actor "User" is anonymous and therefore does not have a user account
- Before creating a new account, JES asks the user to fill out a code given as a mangled picture (CAPTCHA). This prevents automated scripts from creating numerous accounts on the JES site
- JES asks the user to type the username and password twice (username/password confirmation). This prevents the common case of lost accounts and/or passwords due to mistyping
- The username equals the user's email address. WONT: new registrations are NOT confirmed by sending an email, which would make the process more cumbersome
- Usernames must be unique in JES

- Usernames are case insensitive and must conform to the syntax for email address.
- Passwords are case sensitive and can include any characters
- JES does not allow weak passwords to be used. JES requires at least 6 chars. The password should not consist entirely of uppercase letters, lowercase letters or digits.

### **5.2.2 Edit Account**

- Any user can edit their own account data, after login. The password is changed following the protocol in 5.2.3
- SysAdmin can edit the data of any user. The password can simply be edited (password reset by SysAdmin)

Business rules:

- Usernames cannot be changed

### **5.2.3 Change/Forgot Password**

- To change their password, the user needs to type the old password first. This prevents account hijacking if the workstation and browser are left unattended
- If the user selects the "Forgot password" function, JES asks for the user's email address and sends a new password to that email address (password reset by JES)

### **5.2.4 Manage Access Rights**

- SysAdmin can give any role to any user, including appointment of new SysAdmins (distribution of administration duties)
- SysAdmin can Deactivate any user, in which case the user cannot login to JES until his role is restored
- SysAdmin should review periodically the requests for access by other users (see 5.2.1) and decide on them: grant the requested role or reject the request, in which the user stays Deactivated

Business rules:

- A user holds only one role in JES.
- A user cannot change his role in JES.
- WONT: multiple roles and/or role changing could be useful for Proposer and Reviewer, so this may need to be revised.
- JES is pre-configured with one initial SysAdmin
- JES prevents the last SysAdmin from being Deactivated. This avoids the case of JES becoming orphaned with no SysAdmin

### **5.2.5 Login/Logout**

- Any anonymous user can view the JES site
- A user can login with their username and password, in which case he sees more information and can perform actions according to his role
- A user can logoff at any time
- If a user is inactive for a set period of time (session timeout), he is logged off automatically. This is done for better security and to save system resources

- If the user goes to a JES URL but is not yet logged in, JES displays an intervening login page, then follows on to the requested URL (transparent login). This facilitates clicking on links in notification emails
- A user can check flag "Remember Me", in which case JES remembers his credentials on the same browser (auto login). In this way the user does not have to retype the username and password again

### 5.3 View Calls

The View UCs are used by any user (including anonymous users) to access call information:

- Browse: go through a list of all calls. Order by any of the displayed columns. Click on a call to view it.
- Search: search calls by the following criteria: research topics, eligible countries, proposal deadline, state, full-text search of all text fields and call attachments
- View: view the complete call information, including accepted proposals (for Closed calls only)

FundAdmin also uses these functions, and in addition:

- Can view the list of all proposals for the call, and separately the accepted proposals
- Has access to additional functions to manage and edit calls

JES also COULD implement:

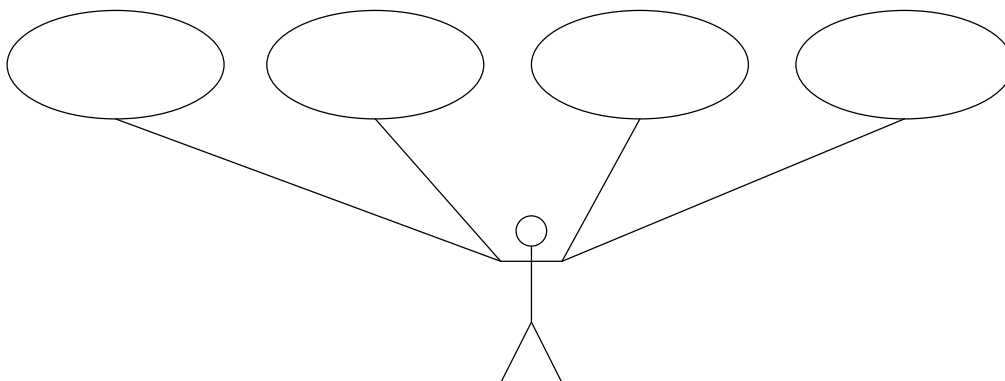
- Subscription to research topics and news by email
- Publication of calls and news as RSS feeds

If that is desired, JES should distinguish between:

- Anonymous User: has no user account, can view calls
- Registered Users: has user account, can view calls, can subscribe to email or RSS feeds

### 5.4 Funding

The Funding UCs are used by FundAdmins to setup and administer calls and make final funding decisions.



#### 5.4.1 Create/Manage Call

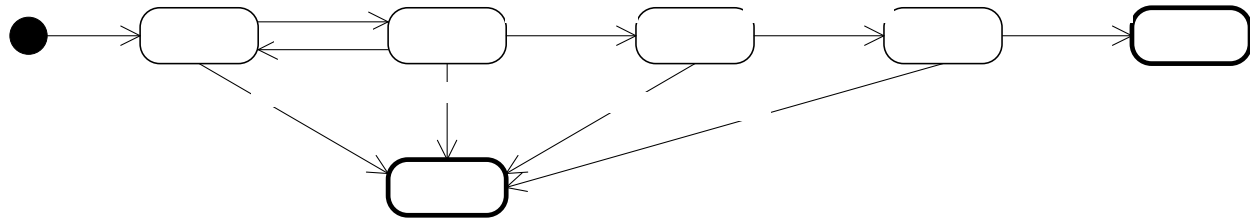
A Funding Call is a jointly funded research call for BS-ERA. It is a complex object that includes research topics, description, amount of funding, percentage by participating country, eligibility,



consortium formation rules, evaluation scheme, proposal deadline, state, etc. See 0 for more details.

#### 5.4.1.1 Call State

State is the most important attribute of Call as it determines its lifecycle:



- A FundAdmin can create a call and edit its full data
- A FundAdmin can manage any published calls (edit call data)
  - TODO: determine change restrictions if there are any submitted Proposals. The changes should not be so extensive that they change the nature of the call or hamper equal treatment to all potential proposers

Business rules:

- The deadline must be set in the future
- When editing call data, the deadline can be extended but not shortened
- A FundAdmin can manage calls created by any FundAdmin. JES COULD implement separation of concerns, so that each call is managed by a separate group of FundAdmins.

#### 5.4.2 Publish Call

- When the FundAdmin is done editing call data, he Publishes the call.
- If any Proposals are submitted for the call, the Proposers are notified by email that the call was changed
  - JES COULD also track the detailed changes and send them in the notification
- JES makes the call available for searching and viewing on the web site (see 5.3)
- JES allows the submission of Proposals for the call
- When the deadline of a published call expires, JES puts the call in state Evaluating and stops accepting proposals
- When all Evaluation Reports are received, JES puts the call in state Evaluated

#### 5.4.3 Cancel Call

- A FundAdmin can cancel a call at any time before it has been Closed
- If any Proposals are submitted for the call, the Proposers are notified by email that the call was canceled

#### 5.4.4 Select Proposals

The Funding Decision (final list of projects for funding) is made by a committee of FundAdmins based on:

- The list of proposal scores and the Evaluation Reports for each proposal

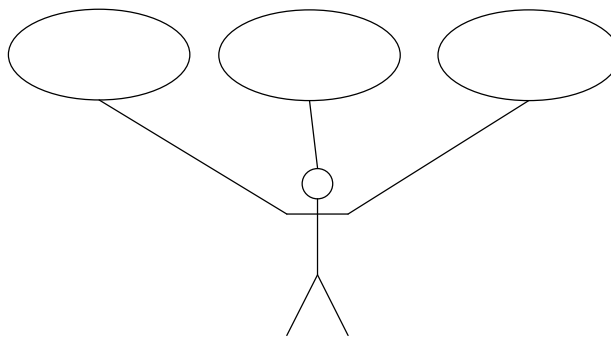
- Additional criteria not tracked in JES: availability of funding, proportion of country representation in proposal consortia related to the proportion of country contributions

Scenario:

- FundingAdmin selects a Call in state Evaluated
- FundingAdmin reviews the list of proposal scores and Evaluation Reports
- FundingAdmin marks which proposals are selected for funding
- JES sends notification emails to each Proposer informing them about the funding decision, and providing additional information. TODO: should the full Evaluation Reports be emailed?
- JES publishes the list of selected Proposals to the web site

## 5.5 Proposals

The Proposals UC are used by Proposers to submit and manage proposals



JES COULD implement 2-phase proposal submission as in ITEA2/EUREKA:

- First the proposer makes an informal short proposal, whereas he only describes his project's idea
- A proposal drafting workshop could also be organized at this time
- Appointed evaluators make a quick assessment of the idea, decision whether the idea is acceptable, and suggest improvements to its presentation
- Proposers whose idea is accepted take the time to develop a formal full-length proposal

### 5.5.1 Create Proposal

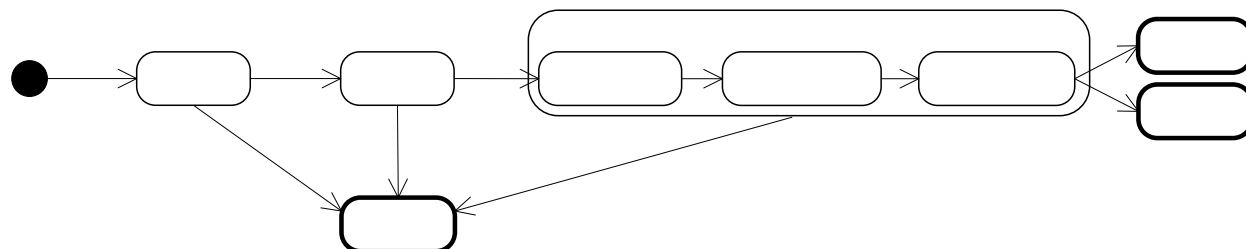
- The Proposer (a researcher that has self-registered in JES) finds an open Published Call
- Proposer creates a Proposal. This is a complex object including consortium (participants), research topics, breakdown of activities, breakdown of cost per task and participant, requested BS-ERA contribution, attachments (the detailed proposal itself)
  - JES presents to the proposer the documents to be developed by Task 3.6: work programme of the call, guide for applicants, application forms (template for developing the proposal attachment)
- The language of the proposal will be recorded by the proposer

Business Rules:

- JES checks the basic eligibility of the proposal, including: proposal is submitted before the deadline, country eligibility, research topics relevance to the call, language, financial terms. JES notifies the proposer of any errors
- A proposer can create any number of proposals.
- Proposers are often submitted by consortia. However, only the leading party creates a user account in JES, that's why we sometimes use "proposer" in singular form

#### 5.5.1.1 Proposal state

The proposal state is a key attribute that determines the proposal's lifecycle:



- The high-level states are: Draft, Submitted, Canceled, Evaluating, Accepted, Rejected
- "Evaluating" is a composite state. It's used to tell the Proposer and public users that the proposal is under evaluation, without revealing internal details. It includes these finer-grained states:
  - IndividualReport: one but not all Individual Evaluation Reports are recorded by Evaluators
  - EvaluationReports: all Individual Evaluation Reports are recorded by Evaluators
  - ConsensusReport: consensus is reached and the Consensus Report and proposal score are recorded by the Moderator

#### 5.5.2 Submit Proposal

- When the proposer is satisfied with the proposal, he Submits the proposal
- JES checks again the business rules described in 5.5.1 (including deadline). If they are satisfied:
  - JES makes a copy of the proposal
  - JES registers the proposal for the appropriate call
  - JES sends a confirmation email to the proposer, including the registration ID
- The proposer can edit and submit the same proposal any number of times, as soon as it is before the deadline.
  - The copy in the previous item is required, so that a proposal edited after the deadline will not change the successfully submitted version

After submission, the proposer receives notifications about his proposal by email:

- Any changes to the Call (5.4.1)
- Acceptance or Rejection letter (after 5.4.4)
- JES COULD provide further forms of communication, e.g. requests for clarification and corresponding answers (but EPSS does not have such)

### 5.5.3 Cancel Proposal

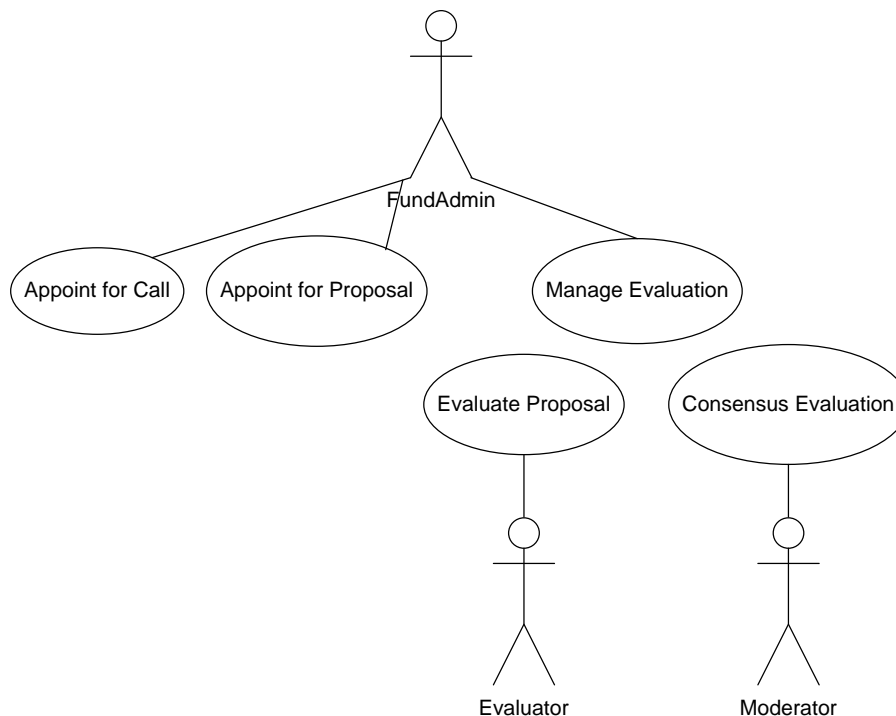
- The proposer can Cancel his proposal at any time before the Evaluating state
- A Canceled proposal is not considered further
- JES COULD allow cancellation after Evaluating but before final decision. If so and Evaluators are appointed for the proposal (5.6.3), they are notified by email to stop working on the proposal, and their relation to the proposal is removed

## 5.6 Appoint Evaluators

FundAdmin uses these UCs to appoint evaluators:

- For one Call (well ahead of the call deadline)
- For individual Proposals in the call (after the call deadline)

These UCs precede the Evaluation UCs (see 5.7). The diagram below shows the UCs in rough time order (from left to right)



### 5.6.1 Appointment Objectives

The objectives of evaluator appointments are as follows, in decreasing order of importance. Please note that some objectives are contradictory.

- Evaluators should be well-established researchers in the respective research topics of the call
- Evaluators should have level Fluent Reading in the language of the proposal
- Evaluators should have no conflict of interest with proposals that they evaluate, or with competing proposals
- Individual evaluator's workload should be well-balanced within the call (should not have too many proposals to evaluate), and the evaluator's workload preference should be satisfied

- Evaluators should have level Fluent Reading in English (TODO: or the language of the proposal, if Evaluation Reports should be returned in the same language as the proposal)
- There should be enough evaluators for the expected number of proposals
- There should not be too many evaluators (each appointment carries an overhead, especially for face-to-face meetings)
- The set of evaluators should be well-balanced in respect of industry/SME/academy, men/women, member/non-member countries of BS-ERA. TODO: define what "well-balanced" means for each criterion
- Evaluators should not serve on BS-ERA calls too often

TODO: Decide on the objectives and harmonize them to avoid contradictions as much as possible

### 5.6.2 *Appoint for Call*

FundAdmin uses this UC to appoint evaluators for the call.

This below is a sample process. TODO: decide on the precise process, by taking into account the stated Appointment objectives

- First FundAdmin should create and publish a call for evaluators, well ahead of any Funding Call, and with ongoing submission
  - The call for evaluators should be published as a minimum on the BS-ERA website, and perhaps in other research-oriented sites and publications
  - The call should be renewed periodically, by giving information about upcoming Funding Calls and the respective research topics.
  - JES COULD help FundAdmin find evaluators by searching through national CRIS using the research topics of the call
- Then, candidate-evaluators self-register in JES
  - The information about each evaluator should be sufficient to support Appointment Objectives, and should at a minimum include: names, organization, research topics, academic degrees and granting institutions, CV, languages and level, involvement in present or future proposals, organization type (industry/SME/academy), sex (male/female), country, email address, web address, postal address, password, availability, workload preference, evaluator/moderator preference
  - FundAdmins periodically review outstanding candidate-evaluators
  - Candidate-evaluators are granted Evaluator role by a SysAdmin, on instruction of FundAdmin
- Finally, FundAdmin creates the list of evaluators for the call
  - JES presents a list of candidates that satisfy "hard" Appointment Objectives (e.g. matching research topics, language of the call, no conflict of interest)
  - FundAdmin selects evaluators, perhaps through a randomized selection process
  - JES generates and sends out invitation letters to selected evaluators
  - The selected evaluators confirm availability for the call in JES
  - FundAdmin reviews the confirmation progress periodically

- This should be done well ahead of the call deadline. JES WONT control this

### **5.6.3 Appoint for Proposal**

After the call deadline, FundAdmin uses this UC to appoint Evaluators for each submitted Proposal.

- JES proposes a combinatorial variant for allocation of Evaluators to Proposals. This is a random assignment that takes into account the Appointment Objectives
  - JES respects "hard" Appointment Objectives (e.g. matching research topics, language of the proposal, no conflict of interest)
  - JES calculates and presents "scores" based on the "soft" Appointment Objectives. Some scores apply to the variant as a whole (e.g. deviation from the desired balance ratios), others are per-evaluator then aggregated for the variant (e.g. workload of each evaluator)
- FundAdmin reviews the variant and can make changes. Every change is recorded (with comment from the FundAdmin) to ensure auditability
- JES generates and sends out official appointment letters stating proposals to evaluate, evaluation deadline, logistic arrangements, confidentiality and non-conflict legalese, financial terms, etc

The same process is used to appoint Moderators. However, they can take on a larger number of proposals (e.g. 3x more) since they don't evaluate.

## **5.7 Evaluation**

The Evaluation UCs are used to:

- Evaluate proposals and record individual evaluation reports (Evaluator)
- Record consensus evaluations of proposals (Moderator)
- Manage evaluation (FundAdmin)

### **5.7.1 Evaluate Proposal**

This UC is used by Evaluator to evaluate a proposal and record the individual evaluation report

- Evaluator logs to JES
- JES shows the list of proposals allocated to that Evaluator, sorted by state
- Evaluator selects a proposal he has not yet evaluated (state Individual Report)
- JES shows all data about the proposal.
  - JES COULD hide personal data (anonymize). However, anonymization is often inappropriate (the credentials of the proposer matter a lot), and effective anonymization is nearly impossible
- JES shows individual evaluation form, formatted according to the call's Evaluation Scheme
- Evaluator fills out the report, including criteria scores and explanatory remarks
- Evaluator can save any number of drafts
- Evaluator finally Submits the report, after which he cannot change it

### **5.7.2 Consensus Evaluation**

This UC is used by Moderator to build consensus evaluation of a proposal and record it.

**TODO: Decide how the consensus-building will work.**

- Below we describe the EC FP7 scheme: remote individual evaluation, followed by face-to-face to consensus building with the help of a moderator ("rapporteur"). The moderator doesn't read the proposal and has no vote (doesn't create individual evaluation reports). In my opinion this scheme is too complicated and expensive for BS-ERA
- In contrast, ISONI uses 2 evaluators per proposal. If there is disagreement between their scores, a 3<sup>rd</sup> evaluator is appointed, then the simple average is taken. This scheme could be made fully remote (online) and is more economical

A sample consensus-building scheme:

- Moderator logs to JES
- JES shows the list of proposals allocated to that Moderator, sorted by state
- Moderator selects a proposal in state EvaluatorReports
- JES shows a composite page, including key proposal info, all evaluator scores and remarks grouped by evaluation criterion, average scores and deviations
- Moderator saves/prints the page, then convenes the evaluators
- Moderator and Evaluators come to consensus scores for each criterion (these may differ from the average scores) and remarks
- Moderator records these in JES
- JES sets the proposal state to ConsensusReport

### **5.7.3 Manage Evaluation**

This UC is used by FundAdmin to speed up the evaluation process and COULD include:

- FundAdmin reviews the number of started and completed Evaluation Reports per proposal
  - FundAdmin sends out reminder emails to slow evaluators
- FundAdmin reviews proposals in state EvaluatorReports
  - For proposals that stay in this state too long, JES sends out reminder emails to Moderators

## **5.8 JES Reports**

TODO: what sorts of reports would be useful?

- JES will export to Excel so the reports can be post-processed by the user for maximum flexibility

## **6 Non-Functional Requirements**

The section defines the Non-Functional Requirements (NFR) for JES. They are described as brief bullet points, and will be expanded in a future version of the specification

### **6.1 Physical Architecture**

- JES is a centralized web-based system. Rationale: easier use (thin client) and easier administration (at only one place)

### **6.2 Security**

JES does not include extremely sensitive information, but the privacy of research proposals, evaluations and proposal selection must be respected.

- JES users login with username and password (see 5.2.3). JES WONT use login with electronic signature, since not all BS countries have it, there is no established EU intra-country Certification Authority yet, and this is not required by the business case
- JES access rights are based on Roles (see 5.1) (Role Based Access Control)
  - Proposers and Evaluators see only the Proposals that they are related to (an element of Object-Based Access Control)
- JES can be used through either HTTP or HTTPS connection. Rationale: HTTP is simpler, but security-minded users can still use HTTPS encryption if they want

### 6.3 Response Time and Performance

- JES MUST provide the following response times

Operation\ Resp time	90% of users	all users
View/Edit data	3 sec	30 sec
Reports	3 min	4 min

- JES MUST support 50 concurrent users, and COULD support 500 concurrent users. This is validated through a load test with the following characteristics:
  - 75% of users view data (repeatedly search, look at a detail page, etc)
  - 25% of users enter data
  - Sleep time between pages is 60 seconds

### 6.4 GUI Features

- JES paginates long lists of objects in order to save system resources and transfer time.
  - JES allows the user to navigate to First, Previous, Next, Last, an any individual page (by number)
  - The default page size is 20. The user can change the page size. JES saves this preference to the user account (for registered users only)
  - If the number of objects is less than 2\*page size, JES shows only one page and no paging controls

### 6.5 Multilingual Support

- JES must use Unicode to support many different scripts
- All text and full-text search must be case-insensitive
- JES COULD also provide proper stemming for search in all supported languages (morphological search)
- JES will allow the user to switch between supported languages at any time
- JES will be able to display all its static text (labels, prompts, error messages) in these languages: TODO
- Calls will be entered in all of these languages: TODO
- Proposals may be submitted in one of these languages: TODO

TODO: decide the important questions above



## 7 Business Objects

This section describes the various business (data) objects used in JES. The description is still draft, in future versions of the specification it will be:

- Deepened by elaborating sub-objects down to atomic fields
- Expanded to describe more characteristics, such as data type, length, pattern, mandatory/optional, business rules for data consistency

### 7.1 Using CERIF

CERIF (Common European Research Information Format) is an industry standard sponsored by EU, specifying a database schema, semantics and XML schema for exchange of research information. JES will reuse CERIF as much as possible in order not to reinvent the wheel, and facilitate possible future data exchange.

However, CERIF has two shortcomings in relation to JES:

- On one hand, it is very flexible but also complicated. E.g. for each object it allows any number of language translations for fields such as title and description; it allows arbitrary relations between almost any two objects, etc.
- On the other hand, it doesn't cover all areas of data required by JES. E.g. it covers Project, but not Project Proposal; covers Funding Scheme but in a minimal way, doesn't cover Proposal Evaluations

Therefore JES will:

- Use CERIF objects where such are available, simplifying as appropriate. Such objects are marked (CF) below
- Add objects where they are not available in CERIF

CERIF is described in an Appendix.

#### 7.1.1 *User Account*

Represents a registered JES user (JES also supports anonymous users that can only view calls). Includes:

- Username. Equals email. Case insensitive.
- Password. Case sensitive. Checked for strength (see 5.2.1)
- Role: FundAdmin, Proposer, Evaluator, Moderator, SysAdmin, User. Determines access rights
- "Remember me" cookie (see 5.2.5)

COULD include:

- Research topics of interest: for Subscription to calls/news by email/RSS (see 5.3)
- Login/usage statistics: for Reporting (see 5.8)

#### 7.1.2 *Person (CF)*

- Used to represent a Proposer (consortium coordinator) and Evaluator/Moderator
- JES WONT track individual consortium participants other than the coordinator

#### 7.1.3 *Organization (CF)*

- Used to represent a Consortium partner in a Proposal

- TODO: should JES record address details of the consortium coordinator only, or all partners?

#### **7.1.4 Electronic Address (CF)**

Contact address of Person or Organization. Includes

- Type: web, email, skype, other instant messenger, phone, mobile, fax
- Number or string

COULD also include:

- Usage: home, work, assistant, secondary, etc

#### **7.1.5 Postal Address (CF)**

Postal address of Person or Organization. Includes the typical fields:

- Address Lines
- Postal code

#### **7.1.6 Call**

Represents a call for funding research. Main business object of JES. Includes:

- Code, Title, Description
- Attachments: detailed info
- Amount of funding, currency, percentage by participating country
- Research topics, percentage of funding per topic
- Funding scheme, e.g. required percentage of co-funding or own funding by proposer
- Eligibility and consortium formation rules, e.g. balance between industry/SME/academy for each proposing consortium
- Proposal deadline
- State: determines lifecycle (see 5.4.1.1)

Has links to:

- FundAdmin who created the call (5.4.1)
- Evaluation scheme (see 7.1.7)
- Evaluators and Moderators appointed to the call (5.6.2)
- Proposals submitted for the call (5.5.1)
- Proposals finally accepted (5.4.4)

#### **7.1.7 Evaluation Scheme**

Formalizes the evaluation rules for a call. These are published to proposers and must be respected by evaluators.

- Has a list of Criteria including:
  - Name, Description, Detailed instructions (for evaluators)
  - Max points
  - Threshold
- Overall threshold

An evaluation scheme can be used by several calls. In the simplest (ideal) case JES will use a single evaluation scheme.

#### **7.1.8 Proposal**

#### **7.1.9 Consortium**

#### **7.1.10 Individual Evaluation**

#### **7.1.11 Consensus Evaluation**

### **8 Business Classifications**

Business classifications are the various kinds of nomenclatures, types and roles to be used by JES. Business classification terms are almost as important as the business objects themselves, since they often determine the processing semantics. See 9.4 for some examples.

TODO: define all classifications

### **9 Appendix: CERIF**

CERIF (Common European Research Information Format) is an industry standard sponsored by EU, specifying a database schema, semantics and XML schema for exchange of research information.

CERIF aims for the following:

- Enabling the ERA eInfrastructure
- Standardization / Integration / Interchange
- Middle (Interoperability)-Layer for EU Research Information

Useful CERIF links:

- <http://www.eurocris.org/cerif/tutorial>: Tutorial introductions. Some of the information below is adapted from these tutorials.
- <http://www.eurocris.org/cerif/cerif-releases/cerif-2008>: current CERIF release
- [http://www.eurocris.org/fileadmin/cerif-2008/CERIF2008\\_1.1\\_FDM.pdf](http://www.eurocris.org/fileadmin/cerif-2008/CERIF2008_1.1_FDM.pdf): CERIF model (Introduction and Specification)

#### **9.1 CERIF Usage**

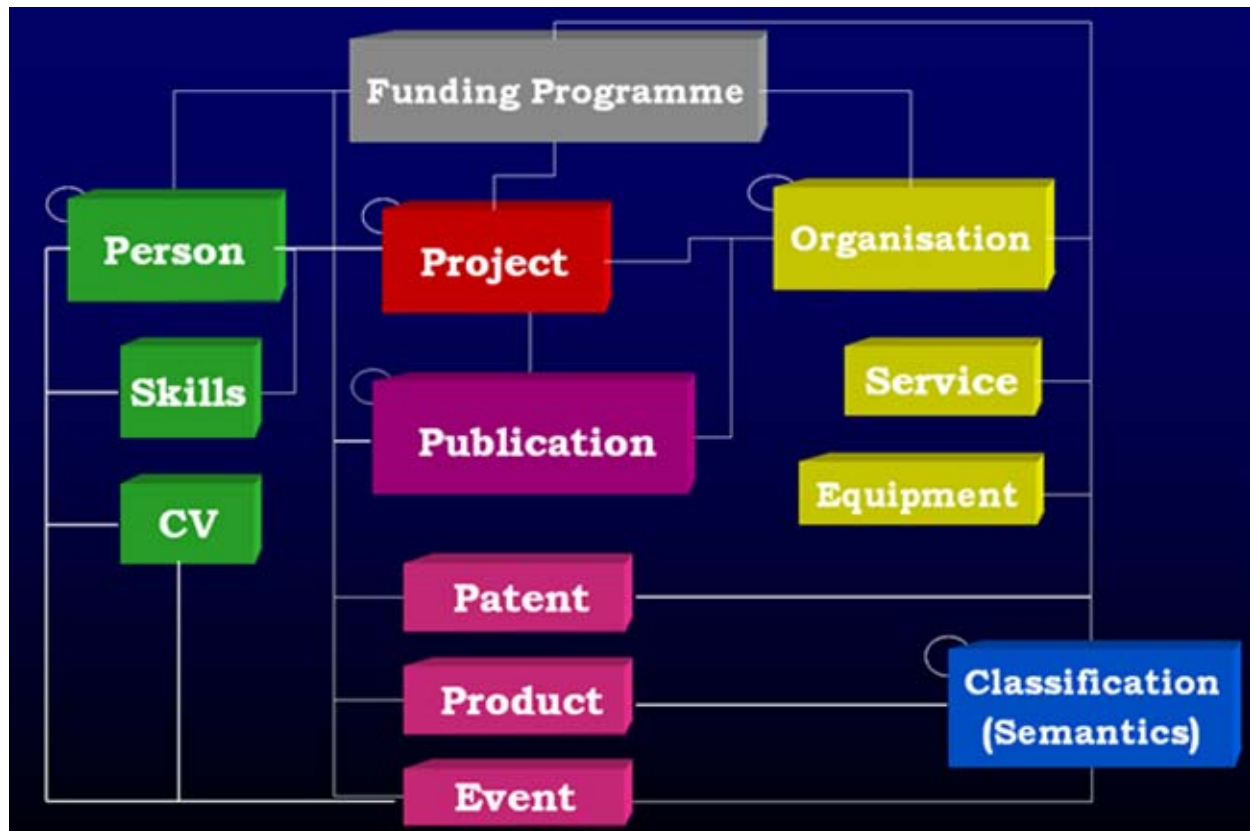
CRIS that relate to the CERIF format include the following:

- BulCRIS (BG): Bulgarian CRIS, the data model was informed by CERIF
- ICERIS (IS): Access to Information on Icelandic Research Projects & R&D Results
- AURIS-MM (AT): Access to Austrian University Research extended with multimedia
- SICRIS (SI): Access to University Research in Slovenia
- HUNCRIS (HU): Access to R&D in Hungary
- SRIS (UK): Scottish Research Information Systems, public research in Scotland
- CRIS-MER (EC): Research information on Migration and ethnic Relations (planned)
- STFC (UK): Corporate Data Repository
- METIS (NL): used by Dutch Universities

- Fdok (NO): University of Bergen, results
- FRIDA (NO): Joint university CRIS
- IWETO (BE): Integrating Flemish Research Information
- BioDiversa ERANET (project)
- IST World (EU Support Action project)
- Videlectures.net (Teaching Videos)

## 9.2 CERIF Coverage

CERIF is organized in 7 main areas, corresponding to the different colors in the diagram below:



- Funding programme: research agenda, funding schemes, etc
- People (researchers): personal info, skills, CV info, addresses
- Projects
- Organizations: research organization info, services, equipment and facilities
- Publications, being one of the main project results
- Other project results: patent, product, event...
- Classification (semantics): various classifications for objects and relations

## 9.3 CERIF Complexity

CERIF is very complex. CERIF 2008 version 1.1 (current version as of this writing) has more than:

- 204 tables (objects), of which:

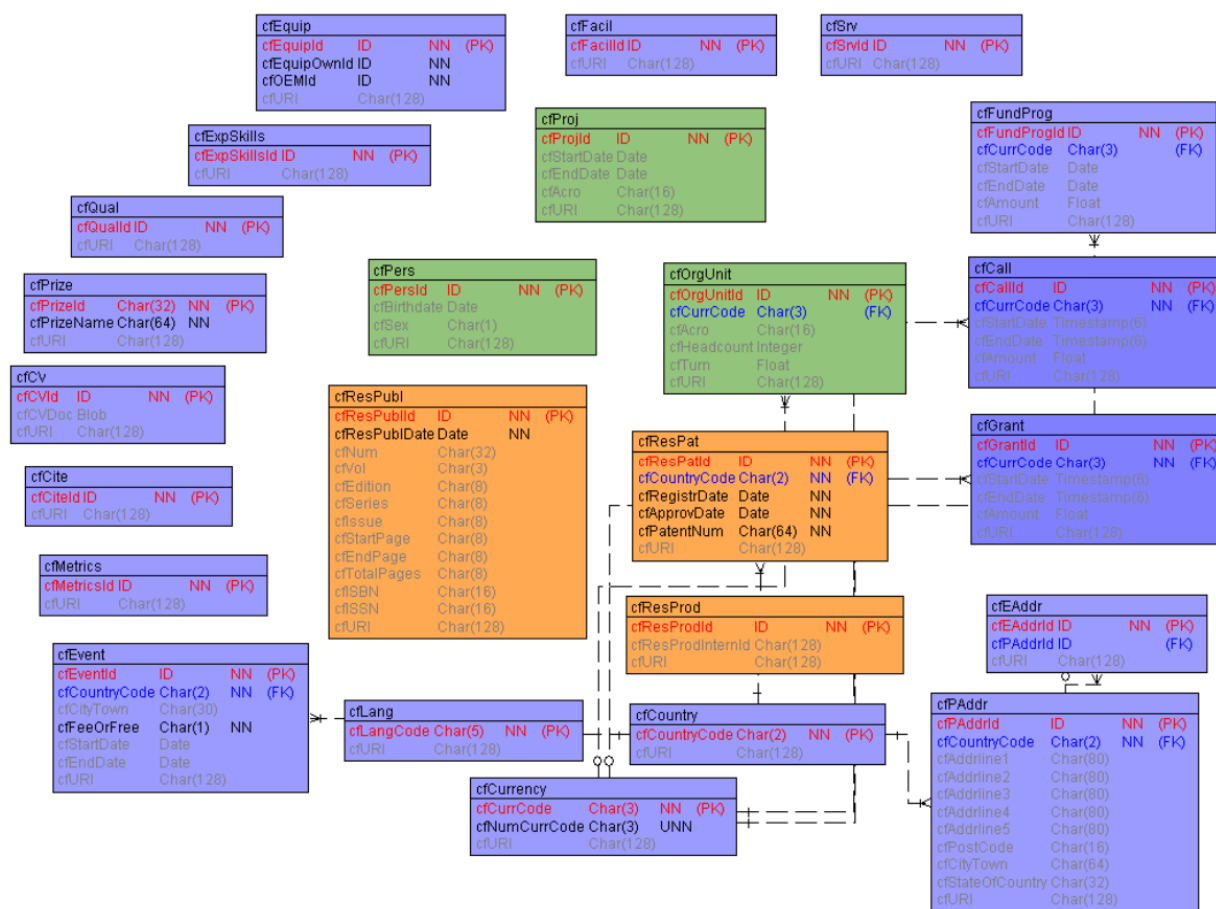
- 26 are independent: main objects that have own PK
- 178 are dependent: association or auxiliary objects that don't have own PK but have PFK referring to independent object(s)
- 1220 fields (average of 6 fields per table)
- 428 relations

Because of this complexity, JES will not use CERIF as-is but will simplify objects as appropriate (see 7.1).

## 9.4 CERIF Independent Objects

Independent CERIF objects are split somewhat arbitrarily into the following "kinds", distinguished by color in the following diagram:

- Main (green): Person, Organization (more precisely Organizational Unit), Project
- Result (orange): Publication, Patent, Product
- Second Level: Physical/Postal Address, Electronic Address, Equipment, Facility, Service, Experience and Skills, Qualification, Prize, CV, Citation, Metrics, Event
- Funding Program, Call, Grant: although considered secondary by CERIF, these are main objects for JES (and will be elaborated significantly)



## 9.5 CERIF Multi-Language Objects

CERIF allows the textual attributes of each object to be represented in any number of languages. There is a separate table for each textual attribute, which we consider to be an unfortunate complication that greatly increases the number of tables:

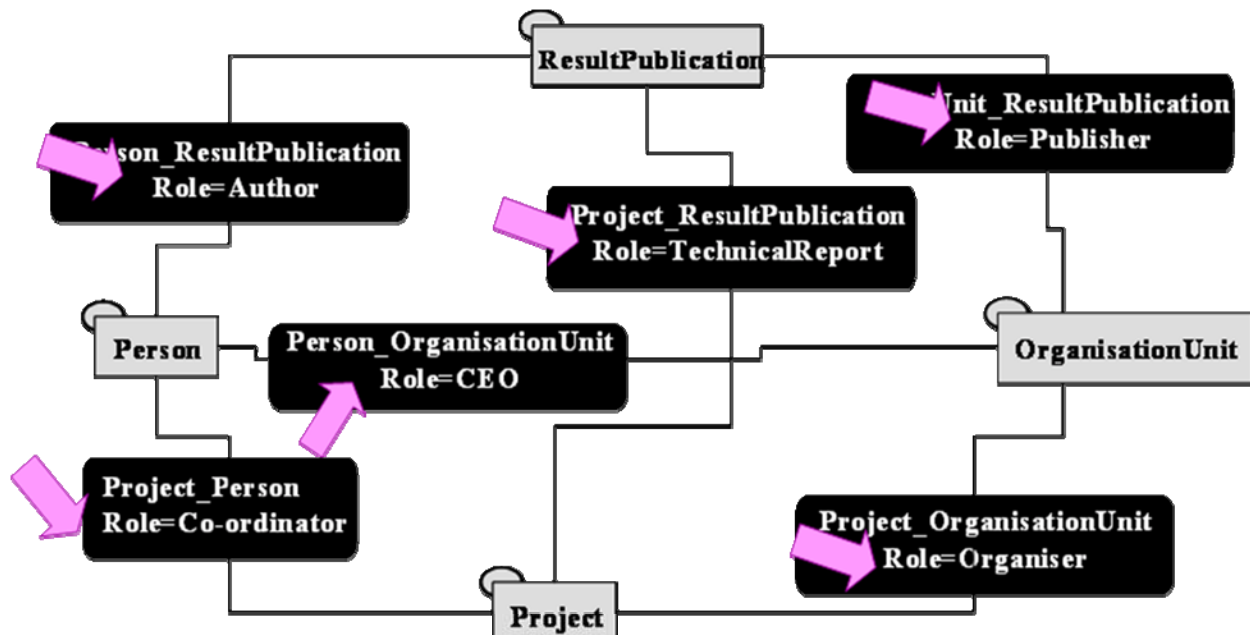
<b>cfProjTitle</b> cfProjId ID NN (PFK) cfLangCode Char(5) NN (PFK) cfTrans NChar(1) NN (PK) cfTitle Char(255) NN	<b>cfProjAbstr</b> cfProjId ID NN (PFK) cfLangCode Char(5) NN (PFK) cfTrans NChar(1) NN (PK) cfAbstr NClob	<b>cfProjKeyw</b> cfProjId ID NN (PFK) cfLangCode Char(5) NN (PFK) cfTrans NChar(1) NN (PK) cfKeyw Char(255)
<b>cfOrgUnitName</b> cfOrgUnitId ID NN (PFK) cfLangCode Char(5) NN (PFK) cfTrans NChar(1) NN (PK) cfName Char(255) NN	<b>cfOrgUnitResAct</b> cfOrgUnitId ID NN (PFK) cfLangCode Char(5) NN (PFK) cfTrans NChar(1) NN (PK) cfResAct NClob	<b>cfOrgUnitKeyw</b> cfOrgUnitId ID NN (PFK) cfLangCode Char(5) NN (PFK) cfTrans NChar(1) NN (PK) cfKeyw Char(255)
<b>cfResPublTitle</b> cfResPublId ID NN (PFK) cfLangCode Char(5) NN (PFK) cfTrans NChar(1) NN (PK) cfTitle Char(255) NN	<b>cfResPublSubtitle</b> cfResPublId ID NN (PFK) cfLangCode Char(5) NN (PFK) cfTrans NChar(1) NN (PK) cfSubtitle Char(255) NN	<b>cfResPublAbstr</b> cfResPublId ID NN (PFK) cfLangCode Char(5) NN (PFK) cfTrans NChar(1) NN (PK) cfAbstr NClob

For each language variant CERIF includes:

- cfLangCode: language of the variant
- cfTrans: whether this is the "O"riginal text, "H"uman translation or "M"achine translation

## 9.6 CERIF Link Objects

Almost any pair of independent objects can be related through the use of a Link (relation) object. For example, the potential Link objects of Publication, Person, OrgUnit and Project are shown conceptually in black on the diagram below. Please note that independent objects can also have self-Links, for example Person\_Person (symbolized by the loops next to the gray boxes):



The structure of all Link objects is similar, e.g.:

cfPers_Pers				cfProj_OrgUnit				cfOrgUnit_Equip			
cfPersId1	ID	NN	(PFK)	cfProjId	ID	NN	(PFK)	cfOrgUnitId	ID	NN	(PFK)
cfPersId2	ID	NN	(PFK)	cfOrgUnitId	ID	NN	(PFK)	cfEquipId	ID	NN	(PFK)
cfClassId	ID	NN	(PFK)	cfClassId	ID	NN	(PFK)	cfClassId	ID	NN	(PFK)
cfClassSchemeId	ID	NN	(PFK)	cfClassSchemeId	ID	NN	(PFK)	cfClassSchemeId	ID	NN	(PFK)
cfFraction	Float			cfFraction	Float			cfFraction	Float		
cfStartDate	Timestamp(6)	NN	(PK)	cfStartDate	Timestamp(6)	NN	(PK)	cfStartDate	Timestamp(6)	NN	(PK)
cfEndDate	Timestamp(6)	NN	(PK)	cfEndDate	Timestamp(6)	NN	(PK)	cfEndDate	Timestamp(6)	NN	(PK)
								cfCurrCode	Char(3)		(FK)
								cfAvailability	Char(64)		
								cfConditions	Char(255)		
								cfPrice	Float		

and includes the following fields:

- cfObjId1, cdObjId2, referring to the PKs of the two linked objects
- cfClassId, cfClassSchemeId determining the role of the link (see 9.8).
  - For example in cfProject\_OrgUnit we could have cfClassId="CEO", cfClassSchemeId="Person\_OrgUnit Roles" denoting that the person is the CEO of the org.
- cfStartDate, cfEndDate determining the validity period of the relation, allowing a time dimension
- cfFraction, allowing the expression of fractional relations (e.g. an Org is owned 45% by another Org)

As you can see from the last example (cfOrgUnit\_Equipment), link-specific fields are provided in some cases

Multiple links are allowed between the same objects, in order to allow for:

- Multiplicity of roles between the objects (cfClassId,cfClassSchemeId)
- Roles varying in time (cfStartDate, cfEndDate)

The PK of each Link object is composite, consisting of:

- PFK for the independent objects and classification
- Own PK for the time period

## 9.7 CERIF Classification Values

For each independent object there can be any number of Classification records that allow the object to be classified under various types, research topics, etc (see 9.8).

Classification Values are structured similarly to Link objects:

cfPerson_Classification			cfOrganisationUnit_Classification			cfProject_Classification		
cfPersonIdentifier		(PFK)	cfOrganisationUnitIdentifier		(PFK)	cfProjectIdentifier		(PFK)
cfClassificationIdentifier		(PFK)	cfClassificationIdentifier		(PFK)	cfClassificationIdentifier		(PFK)
cfClassificationSchemeIdentifier		(PFK)	cfClassificationSchemeIdentifier		(PFK)	cfClassificationSchemeIdentifier		(PFK)
cfFraction			cfFraction			cfFraction		
cfStartDate		(PK)	cfStartDate		(PK)	cfStartDate		(PK)
cfEndDate		(PK)	cfEndDate		(PK)	cfEndDate		(PK)

While a Link represents an instance of a particular **Role** between two objects, a Classification Value represents the **Type/Topic/etc** of one object.

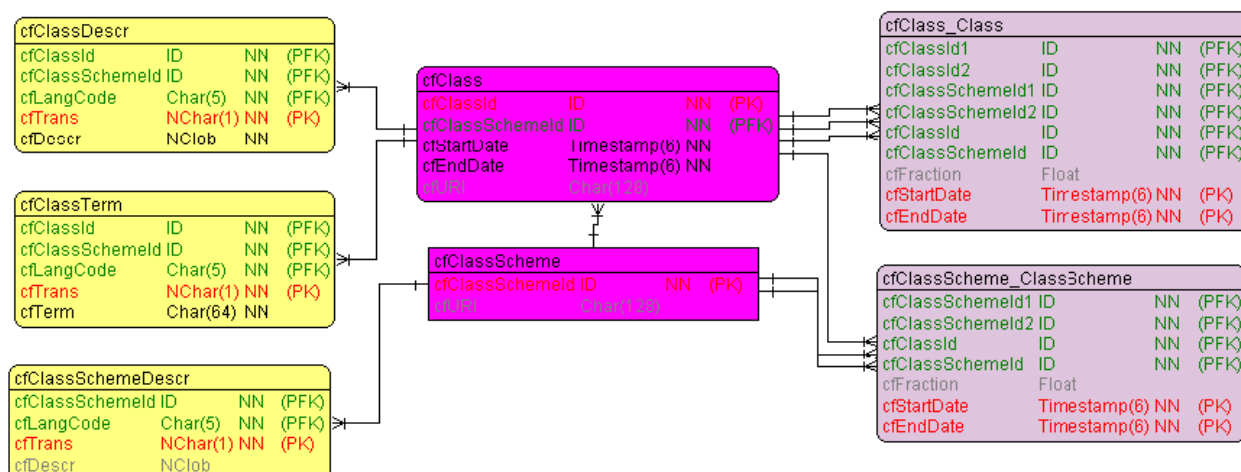
## 9.8 CERIF Classifications (Semantics)

CERIF includes a generic classification mechanism that includes schemes and classifications to be used by all objects and relations.

- Allows to capture any Schema or Structure: Roles, Types, Flat lists, Taxonomies (Subject Headings), Ontologies
- Flexible and extensible in all directions: new Schemas, new Terms (Concepts), new Relationships between schemas and terms
  - Relations between schemas can be used for schema Derivation, Mapping or Ontological relations
  - Relations between terms can be used for Hierarchies (isA), term Mapping, etc

The classification objects are shown in the diagram below:

- The main objects (pink) are cfClassScheme (e.g. "Person\_OrgUnit Roles") and cfClass (a classification value or term, e.g. "CEO")
  - Start/EndDate (validity interval) allows for historization of values
- The language objects (yellow) allow for multi-lingual value (cfClassTerm) and description of scheme and value (cfClassSchemeDescr, cfClassDescr).
- The link objects (grey) allow for relations between schemes and terms, to express e.g. inheritance or mapping



The "CERIF 2008 – 1.1 Semantics" document presents several classifications, e.g.:

- cfPublicationTypes is a classification of cfResultPublication and includes terms such as Book, Article, PhD Thesis, etc.
- cfPerson-ResultPublicationRoles is a classification (role) of the association cfPerson\_ResultPublication and includes terms such as "is author of", "is editor of", "is publisher of"

Unfortunately classification in the context of research funding is not yet developed and is a topic of the upcoming CERIF 2010 release

We give below several examples of various usage of classifications.

### 9.8.1 Type Schemes

Create a Flat List of classification values (terms with associated descriptions). Used to express type/topic, etc (see 9.7)



<b>Classification</b> ClassID cfART (Article) ClassSchemeID cfPT (Publication Types) Term [EN] Description [EN] An article is usually published in ... StartDate, EndDate 2008-10-08, open URI http://www.eurocris.org/CERIF/cfPT=cfART	<b>ClassificationScheme</b> ClassSchemeID cfPT Description [EN] The CERIF Scheme for Publication Types ... URI http://www.eurocris.org/CERIF/cfPT
<b>Classification_Classification</b> ClassID1 cfART (Article) ClassID2 btART (Article) ClassSchemeID1 cfPT (Publication Types) ClassSchemeID2 btPT (Publication Types) ClassId isEqualTo ClassSchemeID EquationRelationships StartDate, EndDate 2008-10-08, open	<b>ClassScheme_ClassScheme</b> ClassSchemeID1 cfPT (Publication Types) ClassSchemeID2 btPT (Publication Types) ClassID isMappingOf ClassSchemeID CERIF-BibTex Mapping StartDate, EndDate 2008-10-08, open

Explanation: cfART (Article) is a term in the scheme cfPT (Publication Types). It is mapped to the btART term (BibTex "Article") ("cf" stands for CERIF, and "bt" stands for BibTex, which is a format for describing bibliographic entries). The mapping is exact (isEqualTo, which is a term from the EquationRelationships scheme). Codes, as well as English terms and descriptions are provided for all these entities. Their validity interval starts from 2008-10-08 and is open.

## 9.8.2 Subject Headings

Create a hierarchy of topics (Taxonomy)

<b>Classification</b> ClassID AE (Answer Extraction) ClassSchemeID LT (Language Technology) Term [EN] Answer Extraction Description [EN] AE is the method ... StartDate, EndDate 2008-10-08, open URI http://www.lt-world.org/Technologies/IE/AE	<b>ClassificationScheme</b> ClassSchemeID LT (Language Technology) Description [EN] The Language Technology Schema is an ontology ... URI http://www.lt-world.org/
<b>Classification_Classification</b> ClassID1 AE (Answer Extraction) ClassID2 IE (Information Extraction) ClassSchemeID1 LT (Language Technology) ClassSchemeID2 LT (Language Technology) ClassId isA ClassSchemeID Taxonomic Relationships StartDate, EndDate 2008-10-08, open	<b>ClassScheme_ClassScheme</b> ClassSchemeID1 LT (Language Technology) ClassSchemeID2 ONT (Ontology) ClassID isA ClassSchemeID Taxonomic Relationships StartDate, EndDate 2008-10-08, open

Explanation: AE (Answer Extraction) is a term in the scheme LT (Language Technology). It's a sub-topic of IE (Information Extraction) (has isA relation to it). The LT scheme is a kind of Ontology

## 9.8.3 Role Schemes

Define the semantics of Link objects (relations), see 9.6

<b>Classification</b> ClassID PM (is manager of) ClassSchemeID PPR (Person-Project-Roles) Term [EN] is manager of Description [EN] Responsible for the successful ... StartDate, EndDate 2008-10-08, open URI http://www.lt-world.org/PPR-Roles/PPR=PM	<b>ClassificationScheme</b> ClassSchemeID PPR-Roles Description [EN] Person-Project Roles in the LT World System URI http://www.lt-world.org/PPR-Roles
<b>Classification_Classification</b> ClassID1 PM (is manager of) ClassID2 pMM (project management) ClassSchemeID1 PPR-Roles (Org1-Roles)	<b>ClassScheme_ClassScheme</b> ClassSchemeID1 PPR-Roles (Org1-Roles) ClassSchemeID2 pMM-Roles (Org2-Roles) ClassID isMappedTo

ClassSchemeID2 <b>pMM-Roles (Org2-Roles)</b> ClassId <b>isSimilar</b> ClassSchemeID <b>SimilarityRelationships</b> StartDate, EndDate <i>2008-10-08, open</i>	ClassSchemeID <b>Project MM Mappings</b> StartDate, EndDate <i>2008-10-08, open</i>
--	--

Explanation: PM (Person "is manager of" Project) is a term in the PPR (Person-Project-Roles) scheme (PM is a role that a person can play in a project).