Informatization of the Croatian Archival Service –
From the Idea to the Realization of
ARHiNET Project

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Summary
Being a central national archival institution, Croatian State Archives (CSA) takes care for planning of archival activities, coordination of archives’ professional work and performing information-documentation service about archival records on national level. In the year 2006, CSA started the construction of new archival information-evidence system which should cover all archival functions: keeping, preserving, arranging and using of archival records. Technical characteristics of new information system include WEB application with MS SQL server as a basis and C# computer language. Advantages of this solution are building of uniform base and uniform system of data protection with minimal costs. Its main characteristics are availability, reliability, flexibility and extensivity with general and specific defined functionalities. System is created on modular basis which practically means design and implementation of particular modules as separate projects and their continuous connecting in unique system.

ARHiNET system encloses several modules: Arranging of archival material, Archival documentation, Register books, National archival service’ central evidences, Service for archival records outside archives and User service. Realization of this development project of archival service will enable establishment of unique national integrated system of data exchange among the institutions that keep archival material as well as standardization and increasing quality of provision and services in archives.

Key words: archival information system, web application, standardization and rationalization of business processes in archives, design and implementation of new services in archives
ARHINET – the Idea
The tasks of the Croatian State Archives (CSA) as the central archival institution include planning, coordination of professional work of the archives and managing the archival records information-documentation service on national level. The basic information resource is the Register of archival fonds and collections of the Republic of Croatia which contains data on all archival material in the state and of its creators and owners. After many years of working on collecting, processing and presentation of data concerning archival records and records’ creators and owners, the need for standardization of arranging and description of archival material, archival principles and vocabulary, as well as for unifying of archival work, has emerged.
Subsequently, CSA started the construction of new archival information system which should cover all archival functions: keeping, preserving, arranging and using of archival records. Its goal is to, in the unique data base, make possible standardization and control of records, and in the same time rationalization and standardization of business processes in Croatian archives. The project team, consisted of experts from CSA and the Avicena Company from Split, had set the basic guidelines which the information solution would have to support:
1. the use of available and acceptable technologies,
2. creating the technological preconditions for including all of the owners of the archival records into the unique system,
3. modulation, extensivity and simple upgrading,
4. the simplicity of use.
Considering the technologies that were on the work group's disposal and having in mind the guidelines that were defined by the project team, it was decided that the information system must be defined as a web application. This decision is based on following facts: disposability, simplicity of maintaining and financial aspect.

Archives.Net- the Realization
The project team has decided to start the development in small steps, always considering the entirety of the information solution in its own complexity. That, practically, meant that the single solutions were defined in a relatively short period of time, and that they were presented and implemented after the testing phase. After the analysis of all the state archives activity area, complexity and extremely large and functionally different logical business processes, it was decided to approach to the making of the system using the modulation principles. In practice that meant:

a. to define the basic business processes through the separate modules which will, in a specific moment, be able to function as a unique system
b. to ensure that the modules can be realized as an independent separate sub-projects
c. to ensure maximum flexibility of modules in a sense of adding, alterations and supplements of new functionalities

d. to ensure the possibility of mutual integration of different modules

The same business processes are defined and relating to CSA, regional state archives and other owners of archival records. Having in mind specific quality of single users, the project team has divided the functionalities into two segments: common and specific quality functionalities.

Technical characteristics of ARHiNET system include web application with MS SQL 2005 server as a basis, C# computer language and partly JAVA and all on the dot.net technology. The management of digital contents is also one of system functionalities, and it encompass several business processes: digitalization of archival records, processing of digitalized documents, saving master copies for storage, automatically creation of web copies in JPEG format and presentation of digital content within program solution.

**ARHiNET –Project Overview**

*Diagram 1: Initiation phase*

<table>
<thead>
<tr>
<th>Conditions</th>
<th>Impulse</th>
<th>Preliminary requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Analysis</td>
<td>Analysis of preliminary requirements for ARHiNET</td>
<td>Conducting of risk analysis Conducting of preliminary project planning Decision on the project enterprise Analysis of QA requirements</td>
</tr>
<tr>
<td>Results</td>
<td>Specification of proposed solution</td>
<td>Preliminary project plan Project decision report Preliminary QA plan</td>
</tr>
</tbody>
</table>

**P0: Project kick-off**

**P1: Project enterprise decided**
Diagram 2: Definition phase

<table>
<thead>
<tr>
<th>Subphase “Definition of requirements”</th>
<th>technical</th>
<th>project control</th>
<th>quality assurance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Goal: Requirements defined with adequate clarity</td>
<td>Preliminary requirements specification of proposed solution</td>
<td>Project decision report preliminary project plan project order</td>
<td>Preliminary QA plan</td>
</tr>
<tr>
<td>Activities</td>
<td>Kick-off activities</td>
<td>Risk evaluation</td>
<td>Coordinating of user requirements specification with client</td>
</tr>
</tbody>
</table>

**T21: Requirements defined and checked**

<table>
<thead>
<tr>
<th>Subphase “Definition of the product”</th>
<th>drawing up the project agreement</th>
<th>Planning the project</th>
<th>Planning the CM system</th>
</tr>
</thead>
<tbody>
<tr>
<td>Goal: Product defined with adequate clarity</td>
<td>Drawing up the project agreement</td>
<td>Planning the project</td>
<td>Planning the CM system</td>
</tr>
<tr>
<td>Activities</td>
<td>Review of the OOA model</td>
<td>Review of the software requirements specification</td>
<td>Review of project plan</td>
</tr>
<tr>
<td>Checking of the requirements</td>
<td>Setting up the basis CM system</td>
<td>Setting up the project infrastructure</td>
<td>Review of the QA plan</td>
</tr>
<tr>
<td>Elaboration of product features</td>
<td>Coordinating the software requirements specification with the client</td>
<td>Coordinating the software requirements specification with the client</td>
<td>Review of the feasibility studies</td>
</tr>
</tbody>
</table>

**T22: Product defined and checked**

<table>
<thead>
<tr>
<th>Subphase “Drawing up a tender”</th>
<th>Review of the OOA model</th>
<th>Review of the software requirements specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Goal: Tender submitted</td>
<td>Review of the OOA model</td>
<td>Review of the software requirements specification</td>
</tr>
<tr>
<td>Activities</td>
<td>Review of the project plan</td>
<td>Planning the QA measures</td>
</tr>
<tr>
<td>Checking of the requirements</td>
<td>Review of the QA plan</td>
<td>Review of the feasibility studies</td>
</tr>
<tr>
<td>Elaboration of product features</td>
<td>Review</td>
<td>Review of the feasibility studies</td>
</tr>
</tbody>
</table>
### Articles
- Checking the requirements
- Selecting and defining the contractual framework
- Defining the services
- Estimating the effort
- Coordinating price/performance
- Producing the tender document

### Results
- User req. spec.
- Domain model
- SW req. spec.
- Feasibility studies
- Tender
- Prototype(s)
- RR plan
- OOA model

### T23: Tender defined, checked and submitted
- Project agreement
- Project plan
- CM plan
- Basis CM system
- Estimation report
- Open Source SW decision report

### P2: Project plan drawn up and checked
- QA plan
- Review reports

### Q2: QA plan drawn up and checked

#### Diagram 3: Prototyping phase

<table>
<thead>
<tr>
<th>Technical</th>
<th>Project control</th>
<th>Quality assurance</th>
</tr>
</thead>
<tbody>
<tr>
<td>SW req. spec.</td>
<td>Feasibility studies</td>
<td>Project order</td>
</tr>
<tr>
<td>Tender</td>
<td>Prototype(s)</td>
<td>Project plan</td>
</tr>
<tr>
<td>RR plan</td>
<td>OOA model</td>
<td>CM plan</td>
</tr>
<tr>
<td>Domain model</td>
<td>Open Source SW decision report</td>
<td>Basis CM system</td>
</tr>
</tbody>
</table>

#### Subphase “Design”
- Designing the architecture
- Selecting/defining a prototyping development environment
- Elaborating/defining design principles and style guides
- Deciding on reuse of patterns/sample solutions/component ware
- Evaluation of Open Source components
- Phased adoption of patterns/component ware
- Phased creation of an OOD model

#### Subphase “Implementation”
- Phased implementation of a user interface
- Phased implementation of functions and sequences
- Phased adoption of design patterns/sample solutions/componentware
- Saving checked states of the product in the CM system
- Defining the preparatory measures for deployment
- Setting up the test
- Design of test cases
- Review of the test plan
- Review of solution documentation
- Ongoing validation of development
Producing documentation of solution
Performing the system test

T43: System test completed

Subphase “Preparation of operations”
Goal: System ready for use

Finalizing the product documentation
Drawing up the introduction plan
Elaborating and conducting user training courses
Performing process integration

T44: Preparation of operations completed

Approved product of ARHiNET
Documentation of solution for ARHiNET
Product documentation for ARHiNET
Introduction plan for ARHiNET
GUI Styleguide
Evaluation report

P5: Product accepted

QA plan
Test plan
Review reports
Test reports
Acceptance report

Diagram 4: Design phase
<table>
<thead>
<tr>
<th>Activities</th>
<th>Results</th>
<th>Projects &amp; Guidelines</th>
<th>Technical</th>
<th>Project Control</th>
<th>Quality Assurance</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>T31: Architecture specified and checked</strong>&lt;br&gt;Subphase “Detailed design”&lt;br&gt;Goal: Components defined</td>
<td>Defining global methods and components&lt;br&gt;Refining the OOD model&lt;br&gt;Designing the individual components&lt;br&gt;Producing the detailed design specification(s)</td>
<td>Planning the product integration&lt;br&gt;Defining the preparatory measures for use</td>
<td>Design of test cases&lt;br&gt;Review of the OOD model&lt;br&gt;Review of the detailed design specification(s)&lt;br&gt;Review of the test plan</td>
<td>Setting up the test infrastructure&lt;br&gt;Decision on the use of existing software</td>
<td>Revision of the QA plan&lt;br&gt;Drawing up the evaluation plan&lt;br&gt;Review of the adaptations specification(s)</td>
</tr>
<tr>
<td><strong>T32: Internal structure specified and checked</strong>&lt;br&gt;Subphase “Design when using existing software”&lt;br&gt;Goal: Adaptations specified</td>
<td>Evaluation/testing of existing SW&lt;br&gt;Evaluation of Open Source SW components&lt;br&gt;Determining the need for adaptations&lt;br&gt;Producing the adaptations specification(s)</td>
<td></td>
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<tr>
<td><strong>T33: Use of existing software specified</strong></td>
<td>Architectural design specification&lt;br&gt;Detailed design specification(s)&lt;br&gt;OOD model&lt;br&gt;RR plan&lt;br&gt;Prototype(s)&lt;br&gt;Evaluation report&lt;br&gt;Adaptations specification(s)</td>
<td>Project plan&lt;br&gt;CM plan&lt;br&gt;Complete CM system</td>
<td>QA plan&lt;br&gt;Test plan&lt;br&gt;Review reports&lt;br&gt;Evaluation plan</td>
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**Diagram 5: Implementation phase**

- **Software requirements specification**
- Architectural design specification
- Detailed design specification(s)
- Adaptations specification(s)
- RR plan
- Feasibility study (studies)
- Prototype(s)
- Project order
- Project plan
- CM plan
- Complete CM system
- QA plan
- Test plan
<table>
<thead>
<tr>
<th>OOD model</th>
<th>Open Source SW decision report</th>
<th></th>
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</thead>
<tbody>
<tr>
<td><strong>Subphase “Producing the code”</strong></td>
<td></td>
<td>Revising the QA plan</td>
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<tr>
<td>Goal: Developed components implemented</td>
<td></td>
<td>Conducting code reviews</td>
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<tr>
<td>Coding the software</td>
<td></td>
<td>Finalizing test planning</td>
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<tr>
<td>Performing stand-alone tests</td>
<td>Project checks and control</td>
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<tr>
<td>Producing the product documentation</td>
<td>Detailed planning and organization of integration</td>
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<tr>
<td><strong>T41: Code produced and checked</strong></td>
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<tr>
<td><strong>Subphase “Adapting existing SW”</strong></td>
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<tr>
<td>Goal: Purchased/RR components adapted</td>
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<tr>
<td>Adaptation of SW and interfaces</td>
<td>Management of components in the CM system</td>
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<td>Stand-alone test of adaptations</td>
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<tr>
<td>Adaptation of product documentation</td>
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<tr>
<td><strong>T42: Code adapted and checked</strong></td>
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<tr>
<td><strong>Subphase “Integration and test”</strong></td>
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<tr>
<td>Goal: System tested</td>
<td>Providing for acceptance</td>
<td>Producing the test reports</td>
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<tr>
<td>Creating tools for integration, testing and installation</td>
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<tr>
<td>Phased integration and testing of the system</td>
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<tr>
<td>Performing the system test</td>
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<tr>
<td><strong>T43: System test completed</strong></td>
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<tr>
<td><strong>Subphase “Preparation of operations”</strong></td>
<td></td>
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<tr>
<td>Goal: System ready for operations</td>
<td></td>
<td>Review of product documentation</td>
</tr>
<tr>
<td>Completing the product documentation</td>
<td>Performing the acceptance procedure</td>
<td>Producing the acceptance report</td>
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<tr>
<td>Drawing up the introduction plan</td>
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<tr>
<td>Elaborating and conducting user training courses</td>
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<tr>
<td>Performing process integration</td>
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<tr>
<td><strong>T44: Preparation of operations completed</strong></td>
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<tr>
<td><strong>P4: Product ready for acceptance</strong></td>
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<td><strong>P5: Product accepted</strong></td>
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<td><strong>Q4: Product checked</strong></td>
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Diagram 6: Operations phase

Results

Approved product
Product documentation
Introduction plan

Project plan
CM plan
Release note
RfA note

QA plan
Test plan
Review reports
Test reports
Acceptance report

Approved product
Product documentation
Introduction plan

Project plan
CM plan
Release note
RfA note

QA plan
Test plan
Review reports
Test reports
Acceptance report

Diagram 6: Operations phase

Subphase “Pilot operation”
Goal: Ready for productive operations

Preparation of pilot operation
Installation of the product

T51: Start of pilot operations

Support of pilot users

Subphase “Productive operations”
Goal: Stable productive operation

Installing and commissioning the product

T52: Start of productive operations

Support of product deployment
Analyzing problem reports and change requests
Eliminating errors
Making approved changes

P5: Product accepted

Software requirements specification
Released product
Preparation for performing the operations

Project order
Deployed CM system

Planning of phase-specific QA measures
Recording of metrics data
Producing the acceptance report
Revising the test plan/complementing the test data
Performing of regression tests

Technical

Project control

Quality assurance

Project checks and control
Performing the acceptance procedure

Releasing maintenance releases
Deciding on problem reports and change requests

Support of pilot users

Support of product deployment
Analyzing problem reports and change requests
Eliminating errors
Making approved changes

Support of pilot users

Support of product deployment
Analyzing problem reports and change requests
Eliminating errors
Making approved changes
Deployed product
Release note
Project plan
QA plan
Quality-related evaluations, metrics data
Acceptance report
Test plan & Test reports

Diagram 7: Termination phase

Pre-conditions
Order terminated, completed or negative project decision

Activities
Archiving of relevant documents and data
Producing a final report
Holding a review of the project
Collecting reusable project results
Consideration of deviations

Results
Archived documents and data
Reusable project results
Project file
Final report
Project experience report

P6: Project terminated

List of abbreviations: CM = Configuration management, HW = Hardware; GUI = General User Interface; SW = Software; OOA = Object-oriented Analysis; OOD = Object-oriented Design; QA = Quality Assurance; Rfa = Ready for acceptance; RR = Round Robin (back up procedure)

Conclusion
The information system of state archives is a dynamic structure which is in a phase of a continued growth and development. The defining of new functionalities and making meaningful the additional modules make this project interesting, dynamic and challenging. ARHiNET enables inclusion of all owners of archival records in Croatia into a unique system which represents a great turning point in the work of state archives and owners of archival records, as well as a long-term developing interest of archival service.

New archival information system contains several modules: Arranging of archival material, Archival documentation, Register books, National archival service’ central evidences, Service for archival records outside archives and User service. Realization of this development project of archival service will enable establishment of unique national integrated system of data exchange among the institutions that keep archival material as well as standardization and increasing quality of provision and services in archives.