Assessment of Open Source Software for Public Administrations

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Summary

- Context
- Goal
- Our work
- Evaluation of our work
- Conclusions and future developments
CONTEXT
In May 2019, AgID (the Agency for Digital Italy) publishes the “Guidelines on acquisition and re-use of software for the Public Administration”
They promote the **use of open source software** and re-use of already available software.

When searching for software, PAs **must first consider open-source software** and software already developed by other PAs.
GOAL
To produce a procedure to assess and compare open source software for PAs
The procedure considers both technical and economical aspects.

It fully conforms to the AgID Guidelines.
OUR WORK
OVERVIEW
The procedure is implemented in a spreadsheet that can be easily compiled by PAs
The procedure consists of 3 phases:

1. Technical assessment
2. Economical assessment
3. Comparison
software x
software y
software z
software x
software y
software z

GL assessment criteria

Technical assessment

Economical assessment

TCO model
software x
software y
software z

GL assessment criteria

Technical assessment

Economical assessment

Multi-criteria decision making

Weights of the criteria

TCO model

Weight of the TCO
TECHNICAL ASSESSMENT
Each software is technically assessed according to the assessment criteria of the guidelines.

We defined a **quantitative measurement** of the criteria.
Technical assessment criteria

- Coverage of functional and non-functional requirements
- Interoperability
- Protection of personal data
- Security
- Accessibility
- Presence of a maintainer
- Presence of support
- Dependencies
- Skills of the PA
- Number of PAs interested
- Vitality
<table>
<thead>
<tr>
<th>Presence of a maintainer</th>
<th>1</th>
</tr>
</thead>
<tbody>
<tr>
<td>No maintainer</td>
<td></td>
</tr>
<tr>
<td>Maintainer outside the PA</td>
<td>✔</td>
</tr>
<tr>
<td>Maintainer inside the PA</td>
<td></td>
</tr>
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</table>

<table>
<thead>
<tr>
<th>Dependencies</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of dependencies with proprietary software</td>
<td>0</td>
</tr>
<tr>
<td>Number of dependency with open-source software</td>
<td>3</td>
</tr>
</tbody>
</table>
ECONOMICAL ASSESSMENT
The **Total Cost of Ownership (TCO)** of the software is estimated
Our TCO model

- Developed on the bases of the literature and already existing TCO models
- Reviewed together with the Piedmont Region
CAPEX costs

- Integration with the existing systems
- Hardware
- Compliance to the specs
- Verification of compliance to the legislation
- Service design
- Installation
- Data migration
- Training of the users
OPEX costs

- Annual cost of SaaS
- Software licenses (if any)
- Annual support
- Maintenance
- Damages
Additional parameters of TCO

- Estimated number of years of adoption (default: 5)
- Number of PAs that divide costs
It is not mandatory to estimate each cost
But it is mandatory to estimate the TCO
The softwares are compared using **TOPSIS**, a multi-criteria decision making algorithm (suggested by the Italian anti-corruption agency)
As input, the algorithm takes the results of the technical and economical assessment and the weights of the criteria.

As output, it produces a **rank of the softwares**
<table>
<thead>
<tr>
<th></th>
<th>TCO</th>
<th>Interoperability</th>
<th>Data protection</th>
<th>Security</th>
<th>Accessibility</th>
<th>Requirements coverage</th>
<th>Maintainer</th>
<th>Support</th>
<th>Dependencies</th>
<th>PA skills</th>
<th>Number of PAs</th>
<th>Vitality</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weight</td>
<td></td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>0,7</td>
<td>0,7</td>
<td>0,7</td>
<td>0,7</td>
<td>0,6</td>
<td>0,8</td>
</tr>
<tr>
<td>Sw A</td>
<td>8.805.230,00 €</td>
<td>1</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>92,47%</td>
<td>1</td>
<td>1</td>
<td>3</td>
<td>2</td>
<td>3</td>
<td>517,45</td>
</tr>
<tr>
<td>Sw B</td>
<td>9.005.230,00 €</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>2</td>
<td>72,93%</td>
<td>2</td>
<td>2</td>
<td>0</td>
<td>2</td>
<td>338</td>
<td>105,55</td>
</tr>
<tr>
<td>Sw C</td>
<td>9.205.230,00 €</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>2</td>
<td>69,90%</td>
<td>1</td>
<td>2</td>
<td>4</td>
<td>2</td>
<td>11</td>
<td>92</td>
</tr>
</tbody>
</table>

**Rank**

<table>
<thead>
<tr>
<th></th>
<th>Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sw A</td>
<td>2</td>
</tr>
<tr>
<td>Sw B</td>
<td>1</td>
</tr>
<tr>
<td>Sw C</td>
<td>3</td>
</tr>
</tbody>
</table>
We proposed a set of weights of the criteria, which depend on the category the software belongs to (e.g. management software, networking)
EVALUATION OF THE PROCEDURE
In January 2020, 7 PAs tested the procedure and evaluated it using a questionnaire we presented them
Main results

- The difficulty of the procedure was evaluated as **low or medium**
- The majority of PAs compiled the procedure **in 2 or 4 hours**
EXTENSION OF THE ASSESSMENT CRITERIA
We proposed a possible extension of the assessment criteria of softwares
Proposed extensions

- The quality characteristics defined in the **ISO/IEC 25010:2011 standard**
- Aspects of context (e.g., degree of responsiveness and activity of the community, presence of trusted software developers)
CONCLUSIONS AND FUTURE DEVELOPMENTS
Conclusions

- We developed a procedure for technically and economically assessing open-source software.
- The procedure can be an easy-to-use tool supporting PAs in choosing software.
Future developments

- Extension of the assessment criteria
- The information necessary to compile the procedure can be included in the software description
Acknowledgments

- AgID
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- The PAs that evaluated the procedure
THANKS

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