Open source CMS in E-Government

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1. ABSTRACT

To face the phenomenal ascent of the information consumption, the administration services crumbles and are sometimes threatened by the lack of the support and the cost related. The eGov is a mature concept promising to defy the challenge. The Foss CMS seem to supports the eGov requirements in reliable way.

2. INTRODUCTION

Nowadays, the digital information is taking a large importance in the human life. Even if the fundamental needs are still the same (food, transport, communication, etc.). However, for the optimistic, it is time now to process an enhancement of these needs. For these pessimistic, this is only a new complexion of these needs.

Suddenly, computing has bring a lot of solutions to the daily life. It's a fact that Internet is a major actor for that. But do not forget, it was only possible with multiple free platforms and browsers (Mozilla for example). Everywhere, and everyone can not, today hide this immersion. It is not a surprise that the Free Software and the Open Source Software "FOSS" is the big winner, because it has the principal vector of this shaking.

Since immemorial time the administration is confronted to many dilemmas. Thus, good service to the citizen, cost, security, efficiency and so on, where until still are a daily headache. The use of the technology make a backward steps not possible. Its look like a trap !
Hence the emergence of specialized tools for administration, and the arrival of new concepts of management and ways of doing, gives a new born called "eGov", which slowly and softly find it way in the public and continue to grow to form a reality of nowadays, what is called virtual bureau.

Great ! As every thing support and need to be supported. A strong believe is established that eGov success had it root in the CMS support. A huge variety of CMS are today available, these contributes to enhance the actual solutions. There is no doubt about their the future deal when added to the eGov as Plugin.

In this paper we would like to analyze the existent Foss-CMS, those applied to the eGOV. Our study will start with a general notions of eGOV (see 3.), where we define the “Sepyer” schema, the requirements for the three parts (namely: administration, business partner, and citizen). Here two examples (Sachsen eGov and eCH) are quickly introduced.

Follows the Foss-CMS (see 4.) part, where we define FOSS, then CMS in FOSS. A brief enlightening concerning composition, features, main aspects, and FOSS / Property available CMS in schema are given here. Came then the application of FOSS-CMS to eGov, where we try to convince the reader about the good founding of this solution. We joins two examples (only illustration and links) about concrete projects we met.

As recommended by M. Luis Teran, The next section (see 5.) focus on the analysis of Plone. For that concern we offer a comparison between different solutions, and then we overfly PloneGov since it is related to our main subject.

Our Work finishes with a conclusion, where we mention our experience in the subject, and we made some suggestions.
3. EGOV

3.1. Definition

The term "e-government" is linked to the idea of being able comfortably to take administrative services from a home computer, and in fact, retrieve the (compound) information processed and provided by the administration via the Internet. To achieve this task, the administration try to have efficient and cooperative processes. The information technology is used to link up citizen and employees.

The target of eGov can be reachable only when the public administration is modernized by using the IT, which implies an adaptation of the structures, leading to change (most of the time) in the organization, culture and the available technology.

According to “Speyer” (fig. 1), the eGov can be structured as following:

![Diagram](image)

*Fig. 1: Speyer, 2003*

The different parts are described as follow:

**a) E-Communication:**

Many information services for communication solutions are used to extend and enhance the interactivity, using:

- Internet relay chat (IRC)
- E-mail
- Web-based Discussion forums and chat rooms
- Complex audio and Video-based applications (eg. video conferencing systems, Remote-cooperation, etc.)
b) **E-Forms:**
Used to carry the so-called “meta-data” based on HTML / PDF data.

c) **E-Transactions:**
Means the processing order (work flow) used in the modern electronic document, and the file tracking methods (trace & track).

d) **E-Commerce:**
Implies the web marketplaces the administration can offer (e.g. electronic payment system).

e) **E-Service:**
The administration decision (e.g. driving license, approvals,...), can be used proposed as web services

f) **E-Workflow:**
This is the draw of the conventional internal processes, and the interrelated links between different services inside the administration.

g) **E-Democracy:**
For electronic images of democratic processes (e.g. E-voting).

### 3.2. Requirements, limitations and examples

The eGov involve 3 parts (fig. 2):
- Administration
- Business
- Citizen (public user)

Each part had different functionalities, needs, and actions. Here is an overview on the requirements for each.

*Fig. 2: Three parts schema (Source : Mayer A.)*
a) Administration part:

*Modernization challenge of public administration using IT:*

This can implies a change in the entire public administration processes, organization, and culture. The introduction of the networking in the offices is certainly the first step in the right direction, but introduction of sophisticated services like E-Procurement, or online assistance will not be easy to concrete it.

**Interdisciplinary**

Since different specialties are involved, many departments are concerned

**Legal constrains:**

In a democratic system, the separation of powers, the public administration is defined as the sum of state activities that do not belong to the legislature, jurisdiction or the executive body (Thieme 1984). This affect directly the organizational structure.

**Exceed bureaucracy:**

Institution migration from bureaucratic to economic incentive systems, which implies to redefine the activities more process-oriented.

**Modeling limitation:**

Difficulties to apply the structured modeling techniques (e.g. Petri-Netz) to enable tracking paths, workflows, formal methods and optimizations. Once done, E-Business solution can be easily integrated. There is an important problem concerning the joining all transactions and to make a fusion of them. This should finally leads to the “one-way interpretation” meaning from the start to the goal.

**Security and confidentiality**

Sensitive data on person, as for example health reports, judicial acts, and so on are handled with caution. The administrations are reticent to provide access to such information.

**Synchronization of transactions:**

As each process handle with different object, the synchronization is perceived as a hard matter. As for example, the process of delivering a passport. It requires many informations, from different departments (commune, police, ...). Hence multiple queries usually forged in cascade (problem of joining the transactions), and to establish a fusion that can be interpreted in only one way (from start-to-goal). The transaction should be also coherent externally and internally.

**Clear strategy:**

This is central point to follow the state of the actual things. It is easy than to evaluate and update the current development. It is easy to measure the proximity (or how far is) of our goal.

**Codes behind:**

The exchange should be only on the contents, the coding should be avoided to the other parts, thats a good reason to use n-tiers technologies, and services oriented architectures (SOA)

**Cost**

Is to be minimized. The administration budget is restricted.
b) Business part:
The business part is less complicated since the structure and infrastructure are usually oriented to enable the eBusiness. Nevertheless, the following aspects are still a constrains

**Modeling:**
The business processes should be modeled as Petri-Netz to enables formal methods and Workflow to be optimized. The fusion in one-way interpretation (see below) reduces the effort to forge a simple and coherent objects. It is also important to consider the optimization of overall processes.

**Laws constrains:**
Due to the logical structure of the Business Process Models (i.e oriented more toward improvement of business inter-processes and improvement of causal dependencies between the tasks). Hence there are many restrictions imposed by the law. The efficient processes are those lying on relaxed regulations.

**Others:**
Similarities are evident with the administration part, we can enumerate them here:

- **Security and confidentiality:**
  Concerning data of clients, as for example nutritional habits, account depots, etc.

- **Synchronization of transactions:**
  which can be a big challenge for the multinational companies.

- **Codes behind**
  This complexity is to be hided.

- **Cost**
  To be minimized also here.

c) Citizens (users) part:
 Shares many aspects from both administration and business parts. The most important parts are:
- Complexity hided
- Availability of services
- Assistance
- Security during transactions
- Cost

3.3. Examples
Here are how some administrations defines the exigencies and the limitations, established in form of strategies.

a) **Sachsen Administration in Germany - Inspired from BSI – (fig. 3):**

- **Focus on Sachsen National Politic:**
  based on planning development and implementation of process model

- **E-Gov to modernize administration:**
  have a positive impact on bureaucracy reduction, which help businesses to progress. It is considered as a catalysis to the future development

- **User orientation focus:**
  facilitate the management of the services for the public and the businesses. The offered recipients should presented in a way that the targeted groups accepts them easily.
Cooperative development:
In modern complex controls inside the administration and between each other, the implementation of cooperation process is primordial

Multidisciplinary approach
To ensure the large institutions implication (commune, police, hospitals,..)

Fig. 3: Sachsen eGov - Source BSI
b) Swiss Administration for eCH (inspired from FSUIT)
Business and the population expects their affairs to be dealt in a flexible and efficient way, existing administrative processes must be optimized across organizations at different levels, and the various administrative authorities must cooperate more closely via their ICT systems:

- Efficiency & citizen-oriented administration
- Use of synergies by harmonized processes
- Increase of the quality of economic location
- The business community conducts the administrative procedures with the authorities electronically.
- The population can conduct important - frequent or complex - administrative procedures with the authorities electronically.
- Respect of exchange norms
- Respect of data security norms

3.4. Foss (OS/F) CMS

a) FOSS
FOSS came from the abbreviation of “Free and Open Source Software” (fig. 4).

Free software:
The Free software means that the users have a freedom to use the software, to copy, distribute it, and change it. The GNU is one the most organization promoting the free software concepts.

Open Source Software
In this category, the software should be charge free (even after modification and the derivatives), and its code should be available.

Fig. 4: GNU Source
b) CMS & FOSS

What is a CMS

Different definitions were given to the CMS. Some of them:

- CMS is Collection of Procedures used to manage a Workflow in a collaborative environment. (Wikipedia)

- CMS is a software tool (equipment for some) to manage easily the data content on different mediums like websites, Intranet, and so on. The content management and the maintenance are done by the users themselves. Those systems are built in a way where the user does’nt need an advanced technical knowledge to handle them.

- CMS is a computer application used to create, edit, manage, and publish content in a consistently organized fashion. CMS is frequently used for storing, controlling, versioning, and publishing industry-specific documentation such as news articles, operators' manuals, technical manuals, sales guides, and marketing brochures. The content managed may include computer files, image media, audio files, video files, electronic documents, and Web content.

- CMS is a system to collaboratively design, editing and organization of content. These can consist of text and multimedia documents. The information content is referred in a context.

Composition of CMS:

The CMS is composed of two parts:

- **Content management application (CMA):** Allows the content manager or author, who may not know Hypertext Markup Language (HTML), to manage the creation, modification, and removal of content from a Web site without needing the expertise of a Webmaster.

- **Content delivery application (CDA)** Uses and compiles the information to update the Platform.

CMS features:

The features of a CMS system vary, most of them include Web-based publishing, format management, updating control, indexing, search, and backup. The templates are frequently met in the CMS, actually XML is very popular for such template, because it is no doubt easy to reference tags as PDF, medias, within the structure. It is also to be mentioned the very liked side of behavior tracking in ad hoc architecture. Here one means recording any changes (keyword indexing, updating, etc.) made to files by individuals. An additional feature is indexing, search, and retrieval. This enable efficient retrieval.

There are CMS based on web as WCMS (Web-CMS) which can also be a part of ECM (Enterprise Content Management). The web is mainly used, and with actual powerful databases, an increasing amount of data can be incorporated. Rise here what can be called "media-neutrality" which means the information should be independent from the data-format. Once again, XML a comfortable solution because it enables the use of meta-data. Thus, the complexity behind to corresponding a text or a document to a form (in a web for example) is avoided.

CMS can be installed on standalone, or as client / server architecture, enables to connect it to a database. It is also possible to wired it to several servers in a a Network. Therefore, the data can be handled throw Internet giving by the way an access to a
large users using web browsers. Other point is the access rights granting, security, management,...etc, which is an important part for monitoring. For the client-side, the data is from a server downloaded, and displayed. Here are some exigences that a CMS should fulfill:

- Publishing process support, where different persons participate in different tasks.
- New content view possibility: changes are visible
- Template support: possibility with different types and different websites
- Content-life management

CMS as solution:
Since the talk made above on the CMS, many organisms have already setup a CMS, to manage their data. Hence, it is important to consider some aspects before any strategic choice of CMS. First, the organization's size and geographic dispersion (especially for multinational firms) are very relevant for the data migration phase. It can take a huge resources (time, technicians, materials,...) to be performed. Secondly, the diversity of the electronic data forms (text, medias, videos,...) used is also a matter to be considered, because the content can be difficult to manage. Nevertheless, there are also some others sides, which the effect are very relevant, but which need to be analyzed, as:

- Use of networking (for example SOA, etc.)
- Maturity and test results
- Adaptation of versions, and change of software (statistically the organizations change their CMS every 3 years)
- All-in-One and data sharing

FOSS & Property CMS:
There are a huge amount of free / Property (licensed) CMS software available. This set is continually growing, enabling a wide choice to the developers and users. Here are some of them:

**Free CMS**:
- Drupal
- Plone
- Joomla
- OpenCMS
- ...

**Property CMS**
- Sitefinity
- Typo

The schema (fig. 5) is an overview of the current available CMS. Depending of the needs and constrains, the choice is made.
2010 Content Technology Vendor Map

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www.realstorygroup.com/try

Fig 5: Contents technologies: Source Real Story Group
c) FOSS-CMS & eGov

Overview
To built the required applications which supports the eGov services, the Foss offers a large possibilities of CMS, which can easily fulfilled the eGov. We want here to extend this point, and to study the possibility to built an eGov on Foss.

Why CMS for eGov
A small enlightenment was given in the previous section (4.3). Here we study in detail why the OS/F solution can be preferred (or is it smart enough) comparing to the closed source solution to support the eGov services. Let remember the main advantages of eGov:

- Reduction of processing and settlement times
- Avoiding bureaucracy
- Focus on ore tasks
- Actuality
- Knowledge management
- Customer oriented
- Standard attraction
- Public service enhancement
- Provide country's authorities informations and services to businesses and citizens

It is out of doubt the administration offer a huge amount of informations and data. Hundred (see thousands) of web pages, containing texts, forms, hyperlinks, charts, videos, and so on. It is not easy (as mentioned above) to manage such huge amount of material. The users consulting the administration data need also an assistance. Here no doubt a concrete need to use a CMS to deal with all the stuff. The role of such a system in maintaining a high service quality is central. Let resume what a CMS can bring to eGov as advantages:

Optimality in operating
Effort reduction, with charge free. Procedures are automatized.

More quality:
Using the templates it is possible to adapt a controlled structure. This can be said also regarding the websites design.

Efficiency and safety:
High computing performance can be reached.

Sustainable commitment
This help the synergies to be used, and by the way an efficient and modern eGov.

Support guarantee
Using what is called “Hotline” and such such medium to enable the contact, many operational issues can be avoided

Compliance with internal administrative procedures and online shared stuffs
It is important to check that the delivered material (for business partner or citizen) are coherent with administrative procedure. As for example, enable to get a driving license whereas the driver is forbidden to drive a car by the police.
d) Examples
To build the required applications supporting the eGov services, Foss offers a large variety of CMS, more and less able to fulfill the eGov requirements. Later in the analysis (see 5.) we study closer the possibility to build an eGov on Foss solution. One of the concrete examples are given in the following. Explanations are avoided (link available for versed readers), but solution are greatly well working. We appreciate again to remember that our choice was only ported to FOSS based examples.

- PloneGov (fig. 6)  [http://www.bern.ch/leben_in_bern]

![Fig. 6: eGov in Bern City](image)

- iZUG (fig. 7): [http://www.4teamwork.ch/de/kunden/kanton-zug]

![Fig. 7: eGov in Zug city](image)
4. ANALYZE

4.1. Notions

According to the eGov criteria, the following components are relevant to ensure a good performance:

- Web content Management
- Portal Content Management
- Search & Information Access
- Multi-channel Publishing
- Collaboration and Socializing

Hence, two categories of software (fig. 8), namely open source and property, are available to fulfill the requirements.

**Fig. 8: Property / Open source soft. for eGov (source: RealStoryGroup)**

Despite the components completeness offered by Property Software (e.g. IBM and Microsoft), they remind attached to the basis of Fees obligations and vendor black box solution. The aim of this work here is ported to the FOSS solutions; the focus is naturally oriented to Alfresco, Plone and Drupal, as they fulfill the requirements.
4.2. Global view (fig. 9)

According to “CMS Match” Web site, a comparison between CMS (Drupal, Plone) and ECM (Alfresco) is possible:

![Comparison Chart](image)

**Fig. 9: Drupal, Plone, Joomla, Alfresco – Global Comparison**

Here some details concerning the most relevant properties (i.e. on abscise). The more versed readers are forwarded to the “CMS Match” website (see references).

4.3. Content Management (fig. 10)

![Content Management Properties Comparison](image)

**Fig. 10: Content management properties comparison**

Content management for Drupal, Plone and Joomla are more reliable than Alfresco
4.4. Core Applications (fig. 11)

![Core applications comparison table]

Definitely, Alfresco is very bad in the core application like Chat platform, contact form,...Drupal is less adapted to the networking since it has restriction with Http proxies.

4.5. Security (fig. 12)

![Security strong sides comparison table]

A nice score is drawn for Plone for the Security sides. Joomla and Drupal had some restrictions. Alfresco is the worst one.
4.6. Users (fig. 13)

<table>
<thead>
<tr>
<th>Feature</th>
<th>Drupal</th>
<th>Plone</th>
<th>Joomla</th>
<th>Alfresco</th>
</tr>
</thead>
<tbody>
<tr>
<td>Avatar</td>
<td>Yes</td>
<td>Add-on for limited</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Buddy List</td>
<td>Yes</td>
<td>Add-on</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Memberlist</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Memberlist Search</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>OpenID Login Support</td>
<td>Yes</td>
<td>Add-on</td>
<td>Yes</td>
<td>Limited</td>
</tr>
<tr>
<td>Paid Content Subscriptions</td>
<td>Yes</td>
<td>Add-on</td>
<td>Yes</td>
<td>Add-on</td>
</tr>
<tr>
<td>Private Messaging System</td>
<td>Yes</td>
<td>Add-on</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Public User Page</td>
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<td>Yes</td>
<td>Yes</td>
<td>(Paid)</td>
</tr>
<tr>
<td>Registration Form</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Registration Form Custom Fields</td>
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<td>Yes</td>
<td>Yes</td>
<td>Add-on</td>
</tr>
<tr>
<td>User Access Control</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>User Contributions</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Limited</td>
</tr>
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<td>User Groups</td>
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<td>Add-on</td>
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<td>Add-on</td>
</tr>
<tr>
<td>User Points / Karma Rating</td>
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<td>Add-on</td>
<td>Limited</td>
<td>Add-on</td>
</tr>
<tr>
<td>User Preferences</td>
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<td>Limited</td>
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<td>Yes</td>
</tr>
<tr>
<td>User Profile Custom Fields</td>
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<td>Yes</td>
<td>(Add-on)</td>
</tr>
<tr>
<td>User Photos</td>
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<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>User Signatures</td>
<td>Yes</td>
<td>Add-on</td>
<td>Yes</td>
<td>Yes</td>
</tr>
</tbody>
</table>

*Fig. 13: Users advantages comparison*

Drupal and Joomla gives more freedom to the users. It is the reason of their popularity comparing to Plone and Alfresco.

4.7. Plone

It came that *Plone characteristics are potentially better than the others*, even if the most tracking advantage belong to alfresco, and the popularity to Drupal. It was also ranged as the best CMS by “cmswire.com”. Plone fulfills better the eGov requirements. There is one point missing, concerning the cost. This can not be precisely given because it depends heavily with the scale and the size of the project to be build using Plone.

It was shown that CMS Plone is a strong component, and is also adapted to be coupled with a websites. Our trial later is to check the matching with the eGov.

Various contents (multimedia, graphics,..) can be included using upload from computer to the Plone-user folders. This way facilitates navigation.
So adding image and publishing it directly in the web is easy (fig.15)

Plone is strongly positioned for:
- Collaborative & Social Software
- Portal & Content Integration
- Web Content Management

Despite the drawbacks (support, messaging, users settings), there is lot of essays with Plone to build eGov services. The following enlightens ploneGov, used for eCH (Federal Administration), and and for iZug (Cantonal Administration) as examples based on Plone.

4.8. PloneGov

a) Notion
PloneGov is CMS platform developed by 4TeamWork Gmbh, which roots from Plone (see above). It was developed within “Zope” application server, and Python programming language. The design should support the eGov services between the Swiss administration (Federal, cantons, communes), businesses, and the citizens. It implements the specifications of "E-Government Strategie Schweiz 2007". Different Swiss organisms adopted it as, as for example eCH, Canton Zug, Canton Basel, Canton Bern. PloneGov works on “user develops to user” principle, which means there is no Profit behind. The participating parts are only “Early adopters”, which means, first involved practically. The ploneGov.ch organism works on promotion of the PloneGov as main eGov in Switzerland. Ideally, the targets to reach are:
- Involve administrative organisms (communes, etc)
- Cost reduced as possible
- Ensuring continuous expertise & testing the product maturity
b) **Important elements**

To ensure functionalities, PloneGov is conceptualized with some important components:

- **Web-CMS**: Enable web access to the content via “ch.ch” for example
- **Team domain “GEVER light”**: To help the control throw Web browser for (meetings, tasks, documents, mailing)
- **Intranet / Extranet**: Ensure a secure exchange. Use SSL 128-bits information platform
- **Forum**: Platform seen as a ideas pool.

---

c) **Architecture (fig. 16)**

PloneGov cares about the actual and future complexity generated from the separate powers in the administration. An internal architecture with three parts was developed:

- **Front-office**: It play the role of virtual office for business partners & citizens.
- **Middle-office**: For processing, monitoring, dispatching of tasks and documents.
- **Back-office**: For archiving, and other systems support.

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![Fig. 16: PloneGov (Front / Middle / End) Offices](image)

The promising modeling and architecture of PloneGov gives enough conviction to assume that it can assure:

- Virtual location sharing of the administration within (eventually9 the same time
- No dictate of the commercial software since it is Open Source
- Ready to be enhanced taking in count the possibility of plug-in via Internet
- Reduced cost with upgrade possibility
- Self expertize the solution and by the way the know-how is kept
5. CONCLUSION

The actual work was a good opportunity to have a closer idea about how to elaborate IT solution involving three parts (administration, business partner, citizen). As a newbie in this domain the different documentation relative to eGov introduction, as well as “Speyer”, were of great help to make the first step. The translation of this concept into real applications is not that easy, since the meaning (e.g. E-transaction) can not be entirely cough, without understanding some internal processes belonging to the administration, the angular stone of the entire building.

In the both given examples (Sachsen and eCH), we find the both model too different, because each had its own purpose. But for sure, there are intersecting in the basic functionalities, namely, virtual bureau, security, avoiding bureaucracy, and large content availability for users.

The Foss's CMS part was the kernel of this work. The idea behind the Open source software, specially those specialized for CMS is completely wonderful, and need to be supported. One can hardly imagine the future IT platforms serving all different kind of data (i.e. multimedia, files, etc.), on intranet or web, without CMS. It became a “must”!! Merging CMS into eGov turns to be a potential solution to enhance the administration performance, and seems to be compatible with the three-parts modeling. In practice, the eGov based on Foss CMS emerges. We mention here two examples (Bern, and Zug) as pioneers in this experience. Other public administration are no doubt concerned with this discussion, since the advantages for such a solution are unavoidable.

The choice of a convenient CMS among the available variety is not of this easiness. Different websites offers stuff to compare and help to make decision. Our trial was to compare Foss solutions, and analyze them. We choose Plone, Drupal and Alfresco for this purpose. Its turns out that, unlike it was thought, the third had less performance when dealing with contents, although its context tracking powerful side. The second deserve its success to its simplicity resulting in a large popularity. The first was the one giving the best behaviors. PloneGov attempts to spread this solution nearby the administrations, offers its expertise to be consulted and supported.

This work is far to be exhaustive and complete. It should stay humble and recognize what is missing. Many sides were not developed, as for example a focus on web integration, add-ons, Plugins, binding with usual office tools (Word, Excel, ect.), the importance of meta-data (mainly XML approach) and the workflows. Also the possible breaking points (i.e. compatibility, networking problems, performance, DOS “denied of service”) analyze when a large amount of heterogeneous data are put together) were not treated. Issues came from bad choices and less expertise. We believe that eGov based on Foss, developed In-house, guaranties to get in those traps, since “user develop to user” and “early adapters” principles are extra shield (beside the conventional tools).

Our suggestions are in three parts:

Enhance modeling using Petri-Netz (i.e enables the use of processes optimization), to analyze workflows. This helps the administration to modernize their structures.

For the existing IT solutions, we suggest to adopt Plone for eGov platforms, with enhancement in the connectivity and users requirements. The matching with existing softwares (e.g. share point, office, etc) should be examined, and Plugin could be a great help here.

For scratch IT solutions, make a mixture between Plone, Alfresco and OpenFire (Foss Messaging solution). This solution needs a huge resources, and can be possible in practice in case of huge organisms (e.g. UNO, Phillip Morris, etc.).
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