CRF Reporter, to 2014 and beyond

Technical considerations for the support of the future GHG reporting regimes
Bonn, Germany, March 2011

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UNFCCC secretariat, ITS
Current CRF Reporter – The good

- All Annex I Parties successfully use it for their submissions.
- User interface meets the requirements.
- Its use of metadata has proven it self.
- Clear XML exchange format allows Parties to interface with their national systems.
- CRF XML allows flexible integration with GHG IS.
- Sectorial experts can work independently.
- It is well supported by the UNFCCC secretariat.

- It supports the process!
Current CRF Reporter – Major issues

• It is a desktop application accessible only to one person at the time.
• It is slow, generating a submission can take more than 12 hours.
• User needs to manage backups.
• Difficult to implement small fixes.
• Users often require support.
Current CRF Reporter – Major risks

• Underlying software technology is partly not supported.
• It exists of many components and dependencies that need to be managed (These components all have their own changes)
• Need to support many versions of desktop OS’s and MS office versions.
• Database continues to grow significantly.
• Internal calculation engine is complex and not flexible.
• Use of generic approach makes it hard to implement changes
• Recalculation DB logic is error prone.
• Performance issues are very difficult to address.
Current CRF Reporter – Conclusion

- Desktop only approach is outdated and too limited.
- We need to be aware of the time frame the system will be used (ten years +) and future change during its life span needs to be considered now.
- We need to be aware of various user platforms.

- Current CRF Reporter has reached the end of its lifetime and needs to be replaced!
How to move forward

• Look at the baseline.
  
  *What have we got?*

• Look at the various software components.
  
  *What do we need?*

• Look at development options.
  
  *How will we get it?*

• Look at hosting options.
  
  *How will we run it?*
New CRF software – what have we got?

• Basic functional requirements of the software are clear.
• Tree based structure with data entry grids works well.
• Automated generation of tables based on data in system works well.
• The existing well defined XML exchange format utilized by both Parties systems and secretariat’s systems.
New CRF Software - What do we need?

User interface
XML interface

Server component
Validation
Calculation
Auto complete

Data layer + Database
Report generation
Submission
Metadata

QA / QC

Security
New CRF Software – Security

- At the core of the system.
- Design needs to support various deployment modes.
- Needs to enable authorization of submissions on a national level.
- Needs to support user roles.

- Needs to secure Parties important and sensitive emissions data!
New CRF Software – User interface

- Need to support it for many years after the development.
- Lots has changed in the approach to rich UIs in data focused application since the original CRF Reporter.
- Web based client removes dependency on client OS, software and libraries (but dependency on browser).
- Continues to use tree-node and data grid
- Use of HTML5/JavaScript features and AJAX is desirable.

- New CRF Software should be web based.
New CRF Software – XML interface

• We know the current XML / Metadata widely used by Parties.
• Used by 3rd party developers to integrate with CRF.
• Used for submission process.
• Most stable part of current CRF Reporter.

• CRF XML should not change other than the required metadata changes to reflect guidelines.
New CRF Software – Web server

• Core component, choices around this will determine the limitations of the system!

• Technology chosen should:
  a) be stable, mature with an expected life of at least ten years.
  b) Have sufficient practitioners to find staff to support it.
  c) Support various deployment scenarios.
  d) Have appropriate licensing model.

• **Important decisions remain to be taken.**
New CRF Software – Data layer + Database

• Designed for performance.
• Should be understandable by humans and system.
• Should support multiple submissions.
• Recalculation DB can be generated retrospectively give a certain submission.
• Implementation should allow for changing the database.
• Should fit with the chosen deployment model (Licensing).
• Should partly be metadata driven.

• **Complete redesign of this part is required.**
New CRF Software – Business logic layer

• Updating of a business rule should not require a code deployment.
• Business rules should not be too generic and executed at an appropriate level.
• QA/QC reports from the CRF Software will be used during the review process (transparency to Parties).

• Validation, calculation or autocomplete rules should be implemented using a business rules engine.
New CRF Software – Submission process

- End to end, from CRF software to UNFCCC submission portal.
- Secure so that only authorized user can perform the submission.
- Containing reviewed tables, generated XML and accompanying letter.
- Design should make the whole process automatic (attention is needed to managing the formal approval by Party officials).
New CRF Software

<table>
<thead>
<tr>
<th>User interface</th>
<th>Server component</th>
<th>Data layer + Database</th>
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</thead>
<tbody>
<tr>
<td>XML interface</td>
<td>Validation</td>
<td>Report generation</td>
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<td></td>
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<td>Workflow</td>
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New CRF Software – *How will we get it?*

Development options:

- In-house development by UNFCCC.
- Outsource by means of a Request For Proposal.
New CRF Software – Development options

- In-house development by UNFCCC

<table>
<thead>
<tr>
<th>Pros</th>
<th>Cons</th>
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<tbody>
<tr>
<td>Full in-house knowledge and understanding of the requirements</td>
<td>UNFCCC does not have experience developing such software in-house</td>
</tr>
<tr>
<td>Full in-house understanding of Metadata definitions and implementation</td>
<td>New staff needs to be hired for this, therefore the quality of the team cannot be guaranteed before hand.</td>
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<tr>
<td>Full in-house understanding of current CRF Reporter and its mistakes</td>
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New CRF Software – Development options

- Outsource by means of a Request For Proposal

<table>
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<tbody>
<tr>
<td>Team of experienced developers and project manager will work on development.</td>
<td>Developers will have to be introduced to the world of GHG emission reporting</td>
</tr>
<tr>
<td>Secretariat can concentrate on documenting functional and requirements, technical architecture and interface definitions.</td>
<td>RFP process will take time</td>
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<tr>
<td>Full transparency to Parties on the development process</td>
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New CRF Software – How will we run it?

Hosting options:

1. Desktop installation like current CRF Reporter.
2. 42 National server side installation, hosted by Parties.
3. Single server installation operated by UNFCCC.
5. Combination of these options.

• Each has pro’s and con’s, detailed analysis is needed.
New CRF Software – Future

• The new software will be used for quite some time and a transparent approach for managing the software and its associated costs after the closure of the development project needs to be in place. It will be a task of the development project to establish such a approach (see a second presentation by Sergey Kononov).
Thank you for your attention!

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New CRF Software – Hosting options

- Desktop installation like current CRF Reporter.

<table>
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<tr>
<td>Same as current</td>
<td>Need to support end users with various degree of IT understanding</td>
</tr>
<tr>
<td>No network connection required</td>
<td>Need to support many different OS/ Language/ Hardware configurations</td>
</tr>
<tr>
<td>No need to implement multi user mode</td>
<td>Need to also support the chosen database solution</td>
</tr>
<tr>
<td>No hosting costs for UNFCCC</td>
<td>Impact of the continues data growth not managed</td>
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<td>Backups not guaranteed.</td>
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<td>Different users could host different versions of the software</td>
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New CRF Software – Hosting options

- 42 National server side installation, hosted by Parties.

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<td>Hosted by professional IT department.</td>
<td>Need to support multiple parties with various levels of IT maturity.</td>
</tr>
<tr>
<td>Higher trust in backup and recovery.</td>
<td>Different Parties could host different versions of the software.</td>
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<tr>
<td>No hosting costs for UNFCCC.</td>
<td>Implementing emergency fixes complicated by Parties internal change processes.</td>
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<td></td>
<td>System can only be access via network.</td>
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New CRF Software – Hosting options

- Single server installation operated by UNFCCC.

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<td>Operated by professional IT department.</td>
<td>System security needs to be well defined.</td>
</tr>
<tr>
<td>High trust in backup and recovery.</td>
<td>UNFCCC responsible for system availability.</td>
</tr>
<tr>
<td>All parties use same version of the software.</td>
<td>Required SLA may not fit with UNFCCC’s default SLA.</td>
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<tr>
<td>Managed change procedure.</td>
<td>System can only be accessed via internet.</td>
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<tr>
<td>Direct access to all parts of the system in case of problems.</td>
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New CRF Software – Hosting options

- Single server installation operated by 3rd Party.

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<td>All parties use same version of the software.</td>
<td>3rd Party needs to be managed.</td>
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<td>Managed change procedure.</td>
<td></td>
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<td>One dedicated partner when supporting the system.</td>
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New CRF Software – Hosting options

• Combination of these options.

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<tr>
<td>Parties can chose their preferred option.</td>
<td>UNFCCC needs to support multiple models.</td>
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