Proposal for Extended Change Tracking in ODF

ODF TC / ADC SC

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Current ODF Change Tracking

BACKGROUND
Current State – ODT

- Supports basic use cases but not formatting, table changes or edits to non-text objects

<table>
<thead>
<tr>
<th>Insert/delete</th>
<th>• Text, table, image, shape, chart</th>
</tr>
</thead>
<tbody>
<tr>
<td>Edit</td>
<td>• Text</td>
</tr>
<tr>
<td>Format</td>
<td>• Text</td>
</tr>
<tr>
<td></td>
<td>• No information about the format change</td>
</tr>
</tbody>
</table>
Current State – ODS

• Supports fairly robust table structure change tracking but not formatting

Insert/delete
  • Table (insert only), row, column

Edit
  • Text

Format
  • Not supported
Overview

“EXTENDED” PROPOSAL
Tenets

- Build off and strengthen what already exists
  - Support backward compatibility
  - Support re-use of existing, tested code
  - Maintain ODF “native” feel

- Preserve the idea that the document shows the latest changes
  - Content area of the document is reflective of all changes accepted

- Document-centric change tracking
  - Changes are treated at the ODF feature level
    - XML storage representation is implementation detail subordinate to user-level changes
  - Changes are explicitly related to document features
  - Unambiguous representation of changes and what they mean
  - Clear to implementers where to expect which changes for each type of content
Goals

• Focus on primary scenarios per customer feedback – text documents
• Extend current ODF change tracking to add missing support:

<table>
<thead>
<tr>
<th>Text</th>
<th>Move</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Format</td>
</tr>
<tr>
<td>Style</td>
<td>Insert/delete/edit</td>
</tr>
<tr>
<td>Page</td>
<td>Size</td>
</tr>
<tr>
<td></td>
<td>Orientation</td>
</tr>
<tr>
<td>Table</td>
<td>Insert/delete row/column</td>
</tr>
<tr>
<td></td>
<td>Resize row/column</td>
</tr>
<tr>
<td></td>
<td>Format cell</td>
</tr>
<tr>
<td></td>
<td>Merge/split cell</td>
</tr>
<tr>
<td>Image</td>
<td>Format</td>
</tr>
<tr>
<td>Shape</td>
<td>Edit text</td>
</tr>
</tbody>
</table>
Overview

- Use existing `<text:tracked-changes>`, add new capabilities under `<text:changed-region>`
- Follow the insert/delete-style patterns of existing ODF change tracking
- Recommend specializing change elements with names reflective of the document feature being tracked

- This is a work in progress
  - It was a goal to not bring a full solution
  - It’s important to have SC/community input not only at the markup/schema level but on general CT direction
Composite Changes

• Allow “composite” changes that require multiple markup changes to represent a single user action

Sub-changes exist within the `<text:changed-region>`

– Let each `<text:changed-region>` represent a single user action
– Let sub-changes represent the markup changes needed to reflect that

```xml
<text:tracked-changes>
  <text:changed-region text:id="1">
    <text:insertion ct:id="1">
      ...
    </text:insertion>
  </text:changed-region>
  <text:changed-region text:id="2">
    ...
  </text:changed-region>
</text:tracked-changes>
```
Examples

“EXTENDED” PROPOSAL
Move

• Handled as a simple delete + insert
• Specializes the elements to identify the user action as a move
• Uses composite change mechanism since the action involves multiple markup changes
Move Text

Line two
Line one
Line two
Line three

```xml
<text:tracked-changes>
  <text:changed-region text:id="1">
    <ct:move-insertion ct:id="1">
      <office:change-info> ... </office:change-info>
    </ct:move-insertion>
    <ct:move-deletion ct:id="2">
      <office:change-info> ... </office:change-info>
      <text:p text:style-name="P1">Line two</text:p>
    </ct:move-deletion>
  </text:changed-region>
</text:tracked-changes>

<ct:move-to-start ct:id="1" ct:sub-id="1"/>
<text:p>Line two</text:p>
<ct:move-to-end ct:id="1" ct:sub-id="1"/>
<text:p>Line one</text:p>
<ct:move-from ct:id="1" ct:sub-id="2"/>
<text:p>Line three</text:p>
```
Formatting

• Supports editing of styles
  – Page size
  – Page orientation
  – User-defined styles
  – Local formatting (automatic styles)
  – Table row/column resize

• Preserves the previous style applied to the content
Edit a Style

Remove bold
↓
Remove bold

New style requires normal (non-bold)

Before change, entire text region was **bold**, sub-region was **bold-italic**

New style added – no cached state

Previously applied style is cached

After change, sub-region is *italic* only
Tables

- Supports insert/delete table row and column
- Supports merge/split table cell
- Supports cell formatting
<text:tracked-changes>
  <text:changed-region text:id="1">
    <text:insertion>
      <office:change-info> ... </office:change-info>
    </text:insertion>
    </text:changed-region>
  </text:tracked-changes>

<table:table>
  <table:table-column> ... </table:table-column>
  <table:table-row> ... </table:table-row>
  <text:change-start text:change-id="1"/>
  <table:table-row> ... </table:table-row>
  <text:change-end text:change-id="1"/>
</table:table>

Insert Table Row

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
</table>
Delete Table Column

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
</tr>
</thead>
</table>

```xml
<text:tracked-changes>
  <text:changed-region text:id="1">
    <text:deletion ct:id="1"/>
      <office:change-info> ... </office:change-info>
    <table:table-column> ... </table:table-column>
  </text:deletion>
  <text:deletion ct:id="2">
    <office:change-info> ... </office:change-info>
    <table:table-cell> ... </table:table-cell>
  </text:deletion>
  <text:deletion ct:id="3">
    <office:change-info> ... </office:change-info>
    <table:table-cell> ... </table:table-cell>
  </text:deletion>
  </text:changed-region>
</text:tracked-changes>

<table:table>
  <table:table-column> ... </table:table-column>
  <text:change text:change-id="1" ct:sub-id="1"/>
  <table:table-row>
    <table:table-cell> ... </table:table-cell>
  </table:table-row>
  <text:change text:change-id="1" ct:sub-id="2"/>
  <table:table-row>
    <table:table-cell> ... </table:table-cell>
  </table:table-row>
  <text:change text:change-id="1" ct:sub-id="3"/>
  <table:table-row>
    <table:table-cell> ... </table:table-cell>
  </table:table-row>
</table:table>
```
## Merge Table Cells

<table>
<thead>
<tr>
<th></th>
<th>a</th>
<th>b</th>
</tr>
</thead>
<tbody>
<tr>
<td>c</td>
<td></td>
<td>d</td>
</tr>
</tbody>
</table>

### Before

<text:tracked-changes>
  <text:change-region text:id="1">
    <text:insertion ct:id="1">
      <office:change-info> ... </office:change-info>
      <table:table-cell>
        <text:p>c</text:p>
      </table:table-cell>
      <text:deletion ct:id="2">
        <office:change-info> ... </office:change-info>
      </text:deletion>
    </text:insertion>
  </text:change-region>
</text:tracked-changes>

### After

<text:insertion ct:id="1">
  <office:change-info> ... </office:change-info>
  <table:table-cell>
    <text:p>a</text:p>
    <text:change-start text:change-id="1" ct:sub-id="1"/>
    <text:p>c</text:p>
    <text:change-end text:change-id="1" ct:sub-id="1"/>
    <table:table-cell>
      ... <table:table-cell>
    </table:table-row>
    <table:table-row>
      <text:change text:change-id="1" ct:sub-id="2"/>
      <table:covered-table-cell/>
      <text:change-end text:change-id="1" ct:sub-id="1"/>
      <table:table-cell> ... <table:table-cell>
    </table:table-row>
  </table:table-cell>
</text:insertion>
</table:table>
Images

• Supports tracking formatting changes
• ODF does not define image formatting effects
  – Typically implementation-specific features
• Straightforward approach
  – Treat as delete + insert
  – Both images need to be maintained anyway so the change can be rejected
Format Image (Replace)

→

```
<text:tracked-changes>
  <text:changed-region text:id="1">
    <text:deletion ct:id="1">
      <office:change-info> ...
        <draw:frame ... >
          <draw:image xlink:href="Image1.jpg" ... />
        </draw:frame>
      </office:change-info>
    </text:deletion>
  </text:changed-region>
</text:tracked-changes>

<text:change text:change-id="1" ct:sub-id="1"/>
<text:change-start text:change-id="1" ct:sub-id="2"/>
<draw:frame ... >
  <draw:image xlink:href="Image2.jpg" ... />
</draw:frame>
<text:change-end text:change-id="1" ct:sub-id="2"/>
```
Shape

• Supports tracking text changes
• ODF does not currently allow change markers in `draw` namespace elements
• Simple to support, same as regular text
<text:tracked-changes>
 <text:changed-region text:id="1">
  <text:insertion>
   <office:change-info> ... </office:change-info>
  </text:insertion>
 </text:changed-region>
</text:tracked-changes>

<draw:rect ...
 <text:p>text</text:p>
 <text:change-start text:change-id="1"/>
 <text:p>added</text:p>
 <text:change-end text:change-id="1"/>
 </text:p>
</draw:rect>
CONCLUSION & DISCUSSION
Extended Proposal Summary

• Builds off the base of existing change tracking to make ODT support more robust
• Focuses on high-value user needs
• Uses simple, explicit, ODF-style markup
  – Implementations can ignore types of changes they don’t support
• Document main content area reflects the latest changes