ConTEXt

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work in progress

Contents

Introduction

This document introduces the cross reference mechanism, viewer control, fill–in fields, JavaScript support, comments, attachments and more. It is a rewrite of the MkII widgets manual. There is (always) more available than discussed in manuals so if you miss something, take a look at test suite or when you're brave, peek into the source code as there can be examples there.

Interactivity has always been available in ConTEXt and in fact it was one of the reasons for writing it. In for instance the YandY Windows previewer, one could have hyperlinks and we used that for a while when checking documents. Later Acrobat showed up and pdf stepwise added interactive features that we always supported right from the start. Unfortunately there is a viewer dependency and the documentation of pdf lagged behind, so solutions based on trial and error could not work well in a follow up on pdf. Some features disappeared or became so limited that they effectively became useless. Especially multi–media have a reputation of unreliability. Because open source viewers never really catched up (at least not in this area) the momentum was lost to make sure that documents could have audio and video embedded in reliable ways. Even forms and basic JavaScript control of for instance layers is often missing.

That said, we do support a lot but can support more when it makes sense. Deep down in ConTEXt we always had the mechanisms to deal with this, so extensions are not that hard to program. Somehow we thought that publishers would like these features but that never really was the case, so there was no pressure from that end. Most features are user driven or just there because at some point we wanted to make some fancy presentation. In fact, the `s-present-*` files provide examples of interactivity.

The original pdf reference was a couple of hundred pages and looked quite nice. A later print has many more pages and still looks ok, but nowadays we have to do with a pdf document. If you want to see what pdf supports you can study this (now about) 750 page standard. It is, being an iso standard, not public but you can probably find a (maybe older) copy someplace on the web.

When reading this manual you need to keep in mind that we assume that you design a decent layout and when you make something for an electronic medium, we hope that you pay attention to the way you can enhance accessibility.

If you miss something here, don't hesitate to ask for clarification, or even better, provide an example that we then can use to discuss (an aspect of) some mechanism.

1 Annotations

Before we discuss interactive features (in following chapter) a few words will be spent on so called annotations. This term is used in Acrobat and is somewhat confusing as hyperlinks conceptually are not really annotations while comments are. The term relates to the way pdf files can have added functionality. It might help understand the following chapters better when you know what model is used inside a pdf.

If you open a pdf file in an editor you will finds lots of objects. Numbers are an object, as are strings and booleans. Symbols (represented as strings with a leading slash) are also objects. Objects can be collected in indexed tables (arrays) and hash tables (dictionaries). Serialized arrays are bounded by square brackets:

```
[ (value1) (value2) ]
[ 1 2 3 ]
[ 1 2 (value1) (value3) true /foo ]
```

and hashes by double angle brackets:

```
<<
    /Key1 (value1)
    /Key2 (value2)
    /Key3 123
    /Key4 true
    /Key5 [ 1 2 3 4 ]
>>
```

A pdf file is a collection of objects:

```
1 0 obj
    ...
endobj
```

Instead of a number, string, boolean, array or dictionary an object can also be a stream of bytes:

```
1 0 obj << /Length 123 >>
stream
... 123 bytes ...
endstream
```

```
endobj
```

Objects can refer to each other and can be looked up via a so called xref table. We refer to object with number one and revision zero as follows:

```
/foo 1 0 R
```

When an object is updated it can be added to the end of the file and the version number can get bumped. A program that does something with the pdf is supposed to do something clever with these numbers. More often the revision stays zero.

A document is normally a sequence of pages. When a file is opened the cross reference table is loaded and the so called catalog is looked up. From there pages can be found. Pages have a content stream and can refer to resources, like fonts, special color spaces, complex objects (xforms) and among other things annotations.

The page is rendered from the content stream but that stream has no information about hyperlinks and such. The `/Link` annotation objects that implement interactivity are independent and kind of layered over the rendered page. They describe rectangular areas that a viewer can use to intercept mouse clicks. If you want to see where the actions happens, search for `/Dest` and `/Annot` in an (uncompressed) pdffile. When you process a file with

```
\nopdfcompression
```

you get an uncompressed file and with an appropriate editor you can see where annotations end up.

The main reason for mentioning these details is that when you are checking a file for problems you need to look for annotation objects instead of the page stream. You also need to realize that these annotations in no way interfere with the page stream. They only exist because a viewer can use that information to add functionality. Their reference point is the lower left corner of the page. This is a conceptual difference with html where hyperlinks are often in-line and part of the content stream. Both approaches have their advantages and disadvantages. From the perspective of quality typesetting it makes much sense to have them overlayed and explicitly defined (in terms of dimensions) but users will of course in most cases define them inline. This means that in order to make the pdf some analyzing and juggling has to take place. In ConTEXt we always have done as much as possible at the TEX (therefore bypassing some limitations in the engine) end in MkIV we don’t use the engine’s features at all.

2 Enabling

Interaction is turned off by default. Of course cross referencing work without interaction but there are no hyperlinks. You turn on interaction with the `\setupinteraction` command:

```
                        1             2
\setupinteraction [...,...] [..,..=..,..]
                       OPT
1   NAME

2   state              =  start stop
    style              =  STYLE COMMAND
    color              =  COLOR
    contrastcolor      =  COLOR
    title              =  TEXT
    subtitle           =  COLOR
    author             =  TEXT
    date               =  TEXT
    keyword            =  TEXT
    focus              =  standard frame width minwidth height minheight fit
                          tight
    menu               =  on off
    fieldlayer         =  auto NAME
    calculate          =  REFERENCE
    click              =  yes no
    display            =  normal new
    page               =  yes no page name auto
    openaction         =  REFERENCE
    closeaction        =  REFERENCE
    openpageaction     =  REFERENCE
    closepageaction    =  REFERENCE
    symbolset          =  NAME
    height             =  DIMENSION
    depth              =  DIMENSION
    focusoffset        =  DIMENSION
```

The `state` key is the switch you need to use. In addition you might want to setup the style and color.

```
\setupinteraction
  [state=start,
   style=,
   color=,
   contrastcolor=]
```

This is the least intrusive way to get interaction in your document. By default the style is bold and the `color` defaults to green. The `contrastcolor` is used when a hyperlink refers to the same page and defaults to red. A neutral setup makes sense because nowadays the reader kind of knows what can be clicked on.

The `title`, `subtitle`, `author`, `date` and `keyword` parameters are passed to the document and will show up when you request document information.

The `openaction` parameter can for instance be used to start at a specific page, while the `closeaction` can be used to trigger a JavaScript cleanup script. The `openpageaction` and `closepageaction` can for instance initialize and reset states, something we do in some presentation styles.

The `click` parameter controls how a viewer responds to pressing a mouse button on an annotation: highlight or not. The `display` parameter determines if a cross document link opens in the current window.

The `menu` parameter is a quick way to disable menus, of which there can be many: at each side of the page, stacked or not, etc. The `symbolset` determines the look and feel of symbols used in for instance menus, buttons and status bars.

The `page` parameters is a bit special, and it function is an inheritance from the early days. Some dvi and pdf viewers supported named destinations, others only page references. This parameter can be used to force one or the other. There was a time that there was a limit on the number of named references, so going page was the only option[1]

Personally I consider an electronic document an entity to be seen full screen on a dedicated device. However some users prefer the target of a link to fit the width of the screen and alike. The `focus` parameter can (within) reasonable bounds provide this. The `focusoffset` is then used to keep things a bit visual convenient.

The `height` and `depth` parameters are sort of special and probably never used. When we go back in time, to when we started adding interactivity, there were a few issues that needed to be dealt with:

---

[1] We're talking of 1995 when we made documents of many thousands of pages with tens of thousands of hyperlinks, cross linked tables of contents, registers, active graphics, etc. Think of dictionaries used in very specific projects, or quality assurance manuals.

- We need to make sure that we have something to click on, so we need to add some offset if needed.
- We need to handle nested hyperlinks, which is why ConTeXt didn't use the link features of for instance pdfTeX but built its own.
- Hyperlinks should break properly across lines without side effects, again a reason for bypassing some of the TeX engine's behaviour.
- We have to make sure that there is at least a consistent height and depth of hyperlinks. These tight links with viewer supplied bounding boxes to click on just look real bad! So, we had to do better.

Normally the two mentioned parameters are not used. However, their value will kick in when we say `\setfalse \locationstrut`, in which case the given height and depth will be used. Some advice: don't mess with this. We only have this because it permits special effects.

If you want to see what the target (destinations) and sources (references) of links are, you can say:

```
\enabletrackers[nodes.references,nodes.destinations]
```

The `fieldlayer` parameter can be used to set a so called viewer layer, so that you can hide them (given that a viewer supports that). The `calculate` parameter can associate a calculator (initializer) with the fields.

You can create an interaction environment with:

```
                      1     2            3
\defineinteraction [...] [...] [..,..=..,..]
                           OPT          OPT
1  NAME
2  NAME
3  inherits: \setupinteraction
```

which then can be used with:

```
                     *
\startinteraction [...] ... \stopinteraction
*  hidden NAME
```

3 Actions

The reference mechanism not only deals with the more traditional cross references, but also takes care of navigation, launching applications (although that is often limited by viewers), running JavaScript, etc. By integrating these features in one mechanism, we limit the number of commands needed for hyperlinks, menus and buttons. Normally such actions are driven by the `\goto` command, but you can also use buttons:

```
\goto[inner reference]
\goto[outer reference::]
\goto[outer reference::inner reference]
```

The inner reference is normally a user defined one, for instance a reference to a named location like a chapter or figure. The outer reference refers to a file or urland is normally defined at the document level and is accessed by the `::`. By using symbolic names updating them becomes easier.

There are also predefined references, like `nextpage` to go to the next page or `forward` to cycle, `nextcontents` for the next level table of contents in a linked list of such tables, etc. Some keywords are actually shortcuts to actions that are delegated to the viewer. Here you need to keep in mind that nowadays we're talking of pdf viewers, but originally (MkII) we also supported dvi viewers. A special class of references are the viewer control ones, like `CloseDocument` or `PreviousJump`. They can be recognized by their capitals.

When we speak of a reference, we actually refer to a whole bunch of possible references. We already mentioned inner and outer references, but special actions are also possible. These are actually plugins. Examples are the JavaScript and url plugins. The interface evolved a bit over a few decades but most has been there right from the start, which is why we keep it as is. Actually, there is not that much new functionality added in MkIV, although the implementation was mostly rewritten. Here is a overview of the syntax, just to give you an idea.

```
\goto[inner]
\goto[inner(foo,bar)]
\goto[inner{argument,argument}]
\goto[inner{argument}]
\goto[outer::]
\goto[outer::inner]
\goto[outer::special(operation{argument,argument})]
```

```
\goto[outer::special(operation)]
\goto[outer::special()]
\goto[outer::inner{argument}]
\goto[special(operation{argument})]
\goto[special(operation{argument,argument})]
\goto[special(operation)]
\goto[special(outer::operation)]
\goto[special(operation)]
\goto[special(operation(whatever))]
\goto[special(operation{argument,argument{whatever}})]
\goto[special(operation{argument{whatever}})]
```

There can be multiple actions, separated by a comma, think of: go to the page with label ‘foo’ and start video ‘bar’.

```
        1     2
\goto {...} [...]

1   CONTENT
2   REFERENCE
```

Examples of operations are `page`, `program`, `action`, `url` and `JS`.[2] The page operation accepts a pagenumber as well as relevant keywords. One can prefix a pagenumber by a file or url tag. The `program` operation starts up a program. It is an example of an old feature that has proven to be unstable, simply because viewers change behaviour over time.

```
                   1       2
\definereference [...] [...,...]

1   NAME
2   REFERENCE
```

The built-in actions are interfaces via shortcuts with camelcase names. In most cases the name is a good indication of what to expect:

```
\definereference [CloseDocument]    [action(close)]
```

---

[2] There are a few more operations but not all make sense at the user level.

```
\definereference [ExitViewer]       [action(exit)]
\definereference [FirstPage]        [action(first)]
\definereference [LastPage]         [action(last)]
\definereference [NextJump]         [action(forward)]
\definereference [NextPage]         [action(next)]
\definereference [PauseMovie]       [action(pausemovie)]
\definereference [PauseSound]       [action(pausesound)]
\definereference [PauseRendering]   [action(pauserendering)]
\definereference [PreviousJump]     [action(backward)]
\definereference [PreviousPage]     [action(previous)]
\definereference [PrintDocument]    [action(print)]
\definereference [SaveForm]         [action(exportform)]
\definereference [LoadForm]         [action(importform)]
\definereference [ResetForm]        [action(resetform)]
\definereference [ResumeMovie]      [action(resumemovie)]
\definereference [ResumeSound]      [action(resumesound)]
\definereference [ResumeRendering]  [action(resumerendering)]
\definereference [SaveDocument]     [action(save)]
\definereference [SaveNamedDocument][action(savenamed)]
\definereference [OpenNamedDocument][action(opennamed)]
\definereference [SearchDocument]   [action(search)]
\definereference [SearchAgain]      [action(searchagain)]
\definereference [StartMovie]       [action(startmovie)]
\definereference [StartSound]       [action(startsound)]
\definereference [StartRendering]   [action(startrendering)]
\definereference [StopMovie]        [action(stopmovie)]
\definereference [StopSound]        [action(stopsound)]
\definereference [StopRendering]    [action(stoprendering)]
\definereference [SubmitForm]       [action(submitform)]
\definereference [ToggleViewer]     [action(toggle)]
\definereference [ViewerHelp]       [action(help)]
\definereference [HideField]        [action(hide)]
\definereference [ShowField]        [action(show)]
\definereference [GotoPage]         [action(gotopage)]
\definereference [Query]            [action(query)]
\definereference [QueryAgain]       [action(queryagain)]
\definereference [FitWidth]         [action(fitwidth)]
```

```
\definereference [FitHeight]       [action(fitheight)]
\definereference [ShowThumbs]      [action(thumbnails)]
\definereference [ShowBookmarks]   [action(bookmarks)]
\definereference [HideLayer]       [action(hidelayer)]
\definereference [VideLayer]       [action(videlayer)]
\definereference [ToggleLayer]     [action(togglelayer)]
```

In the `java-imp-*.mkiv` files you will find examples of similar shortcuts, for instance:

```
\definereference [SetupStepper]  [JS(SetupStepper{step,50})]
\definereference [ResetStepper]  [JS(ResetStepper)]
\definereference [CheckStepper]  [JS(CheckStepper{\StepCounter})]
\definereference [InvokeStepper] [JS(InvokeStepper)]
```

Other examples of redefined references are:

```
\definereference [firstpage]       [page(firstpage)]
\definereference [previouspage]    [page(previouspage)]
\definereference [nextpage]        [page(nextpage)]
\definereference [lastpage]        [page(lastpage)]
\definereference [forward]         [page(forward)]
\definereference [backward]        [page(backward)]
\definereference [firstsubpage]    [page(firstsubpage)]
\definereference [previoussubpage] [page(previoussubpage)]
\definereference [nextsubpage]     [page(nextsubpage)]
\definereference [lastsubpage]     [page(lastsubpage)]
```

Some of these actions expect arguments, for instance:

```
\goto{start}[StartMovie{mymovie}]
```

You can load the module `references-identify` which gives you a command:

```
\showreference[page(123),StartMovie{mymovie}]
```

```
1  reference  page(123)
   kind       special operation
   operation  123
   arguments
```

```
  special   page
2 reference action(startmovie)
  kind      special operation with arguments
  operation startmovie
  arguments mymovie
  special   action
```

`\showreference[JS(Forget_Changes),CloseDocument]`

```
1 reference JS(Forget_Changes)
  kind      special operation
  operation Forget_Changes
  arguments
  special   JS
2 reference action(close)
  kind      special operation
  operation close
  arguments
  special   action
```

`\showreference[manual::contents]`

```
1 reference manual::contents
  kind      outer with inner
  operation
  arguments
  special
```

You should be careful with colons in references. This gives you an idea how ConTEXt interprets what you requested.

`prefix:whatever`	The `prefix` creates a namespace. When references are resolved and there is no hit a lookup without prefix takes place.
`document::whatever`	The `document` is a symbolic reference to an external resource. This is explained elsewhere.

`component:::whatever`	The `component` is a symbolic reference to a component in a product. References defined in such a component are loaded on demand.

4 Hyperlinks

A hyperlink is something that you click on and that brings you to nother spot in the document. The regular links are a side effect of references. The most commonly used references are:

```
\in{figure}[fig:foo]
\at{page}[fig:foo]
\about[fig:foo]
```

The first argument is what gets prepended to the number and the while can be clicked on. Here we create a namespace with `fig:`. This can be somewhat confusing with respect to prefixes but normally the resolver does a direct lookup first.

```
       1     2     3
\at {...} {...} [...]
      OPT   OPT
1  TEXT
2  TEXT
3  REFERENCE
```

```
       1     2     3
\in {...} {...} [...]
      OPT   OPT
1  TEXT
2  TEXT
3  REFERENCE
```

```
          *
\about [...]
*  REFERENCE
```

5 Structure

There is a lot of structure in ConTEXt:

- document structure: projects, products, components, environments
- sectioning, with or without numbers (visible), support for lists and userdata
- lists, most often related to sections, but there are more
- registers
- itemized lists
- images, MetaPost graphics, different types of tables
- typographical objects: constructions, descriptions and enumerations
- notes, like footnotes, endnotes, linenotes
- marginal notes
- formulas (and subformulas)
- text areas, layers, overlays
- graphic placement with captions and references
- cross references to most structural components
- bibliographic databases and citations

- . . . and more . . .

Most of them in some way carry information about their location in the document and on the page, and sometimes their exact position. This also means that we can use that information for annotations. But most users will use the standard functionality.

```
\startsection[title=Whatever]
    ...
\stopsection
```

In addition to typesetting this will add the title to a list. In order to do that some anchor has to be placed in the text, because we need to register the exact location in order to get the right pagenumber after TEX has broken the flow into pages.

```
\placelist[section][criterium=text]
```

This will place a list of all sections. If you want the whole entry to be a clickable areas, you can say:

```
\placelist[section][interaction=all]
```

Otherwise only clicking on the title will bring you to the spot. If you also say:

```
\setuphead[interaction=list]
```

Clicking on the head will bring you back to the table of contents. There are special list rendering alternatives for interactive documents (`alternative=e` onwards). You can use the `list` and `bookmark` parameters to a section head to deviate from the given `title`.

Many commands accept a `reference` as optional argument and when you use an alternative with key/values a `reference` key will do the job.

What should go into this chapter.

6 Comments

Many pdf viewers support text annotations. These are small notes that can be popped up. In ConTEXt we call them comments, because often that's what they are used for. Comments evolved from simple ones using a limited encoding into more advanced ones with representations. A comment looks like:

```
\startcomment
  Hello beautiful world!
\stopcomment
```

When you open a document with comment you will likely see some symbol depicting it. But, it's one of those features that is viewer dependent so when it looks odd or unexpected, check in Acrobat first. The position and size can differ per viewer and when you zoom in the size can either stay the same or scale. The viewer can show the pop up text at the same location or someplace else. Although in principle there is control over this, my experience is that viewers (also Acrobat) keep changing this (not always for the best). Just assume the worst: it will never look good and although for a while we kept up with viewers, the inconsistency (and accumulated waste of time) led us to the current minimalistic approach.

By default, in ConTEXt comments are placed at the spot a bit raised. In this document we put them in the margin, by saying:

```
\setupcomment
  [location=inmargin]
```

Comments can have titles and properties but not all viewers support properties. Contrary to other environments, the first argument is not a category but a title. This because we are compatible with MkII.

```
\startcomment[french]
  In France they use «angle bracket glyphs» in subsentences.
\stopcomment

\startcomment[accents][color=darkgreen]
  You can used an àçéñțêð character too.
\stopcomment
```

And normally empty lines are also supported (again this can differ per viewer):

```
\startcomment[lines][color=darkblue]
  How about an

  empty line?
\stopcomment
```

As we can see here, comments are sort of stacked. These examples also show that we can pass an optional title and set up some characteristics. An inline comment is defined with `\comment`:

```
\comment {How I hate those notes spoiling the layout.} Maybe
some day
I can convince myself to add some features \comment {Think of
comment classes
that can be turned on and off and get their own colors.} related
to version
control.
```

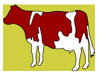
Maybe some day I can convince myself to add some features related to version control. Comments hide part of the text and thereby are to be used with care. Until now I never used them. Anyhow, from now on, one can happily use:

You can use other symbols than the default, and a couple are predefined in the standard: `Comment`, `Help`, `Insert`, `Key`, `Newparagraph`, `Note`, `Paragraph`.

You can also use your own symbols:

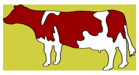
```
\startuniqueMPgraphic{cow}{height,s:color}
    loadfigure "cow.mp" number 1 ;
    refill currentpicture withcolor "\MPvar{color}"    ;
    currentpicture := currentpicture ysized \MPvar{height} ;
\stopuniqueMPgraphic

\definesymbol
  [comment-normal]
  [\uniqueMPgraphic{cow}{height=4ex,color=darkred}]
\definesymbol
  [comment-down]
  [\uniqueMPgraphic{cow}{height=4ex,color=darkgreen}]
```

```
\startcomment[hello][symbol={comment-normal,comment-down}]
    oeps
\stopcomment
```



Again the way this shows up depends on the viewer capabilities so there might be a fallback on the normal comment symbol. You can influence the size of the image (icon):

```
\startcomment[hello]
    [symbol={comment-normal,comment-down},width=\marginwidth]
    oeps
\stopcomment
```



There are some options that you can use for finetuning the comments.

```
\setupcomment [...,...] [..,..=..,..]
                  1              2
                 OPT
1   NAME
2   state      =  start stop none
    method     =  normal hidden
    symbol     =  Comment Help Insert Key Newparagraph Note Paragraph
                  Default
    width      =  fit DIMENSION
    height     =  fit DIMENSION
    depth      =  fit DIMENSION
    title      =  TEXT
    subtitle   =  TEXT
    author     =  TEXT
    nx         =  NUMBER
    ny         =  NUMBER
    color      =  COLOR
    option     =  xml max
    textlayer  =  NAME
    location   =  leftedge rightedge inmargin leftmargin rightmargin text
                  high none
    distance   =  DIMENSION
    space      =  yes
    buffer     =  BUFFER
```

A new instance is defined with:

```
                1       2              3
\definecomment [...] [...] [..,..=..,..]
                        OPT            OPT
1   NAME
2   NAME
3   inherits: \setupcomment
```

The default instance is predefined by

```
\definecomment[comment]
```

You can define your own instances:

```
\definecomment[mycomment]
```

The generated commands have a syntax like:

```
               1            2
\startCOMMENT [...] [..,..=..,..] ... \stopCOMMENT
                OPT          OPT
1   TEXT
2   inherits: \setupcomment
instances: comment
```

and:

```
          1            2          3
\COMMENT [...] [..,..=..,..] {...}
           OPT          OPT
1   TEXT
2   inherits: \setupcomment
3   TEXT
instances: comment
```

Most fields explain themselves. With `state` you can disable this feature. Comments can be hidden in which there is no icon shown. The `nx` and `ny` fields determine the size of the popup.

In case you wonder where the yellow backgrounds come from, here is the trick:

```
\enabletrackers[comments.anchors]
```

7 Attachments

Attachments are (normally) embedded files that the reader can extract. A viewer can decide to just show the content or call an associated program to deal with the file (which one depends on the operating system). As with other annotations they started out depicted by symbols but then browsers started showing them in lists next to the displayed page.

```
\attachment
  [attachment 1]
  [file=interaction-attached-001.txt,
   title=Just some text,
   width=2em,
   height=2em,
   author=Hans,
   subtitle=Plain text]

\attachment
  [attachment 2]
  [file=cow.mp,
   title=Just a graphic,
   author=Hans,
   subtitle=Some MetaPost,
   method=hidden]
```

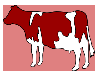
These two attachments differ in one aspect: the second one is hidden, i.e. it has no icon in the text. However, the attachment is in the file and is (often) visible in the side bar. The symbol for the visible one is in the margin, which is achieved with:

```
\setupattachment
  [location=inmargin]
```

You can use your own icon, for instance:

```
\startuniqueMPgraphic{cow}{height,s:color}
    loadfigure "cow.mp" number 1 ;
    refill currentpicture withcolor "\MPvar{color}"    ;
    currentpicture := currentpicture ysized \MPvar{height} ;
\stopuniqueMPgraphic
```

```
\definesymbol
  [attachment-normal]
  [\uniqueMPgraphic{cow}{height=4ex,color=darkblue}]
\definesymbol
  [attachment-down]
  [\uniqueMPgraphic{cow}{height=4ex,color=darkyellow}]
```



This time we get a cow as icon and the cow is also embedded as image. When writing this manual a click in Sumatra just opens the pdf file, but when I embed an mp3 file, a save-as window pops up.

The previous examples directly injected the attachment using the `\attachment` commands with the appropriate arguments. You can add titles, define a name that will be used when the attachment is saved:

```
\attachment[sometag][extra specs]
\attachment[test.tex]
\attachment[file=test.tex]
\attachment[file=test.tex,method=hidden]
\attachment[name=newname,file=test.tex]
\attachment[title=mytitle,name=newname,file=test.tex]
```

but there's also a more indirect way, for instance here we define some attachments:

```
\defineattachment[whatever-1][file=test.tex]
\defineattachment[whatever-2][file=test.tex,method=hidden]
```

that later can be called up with:

```
\attachment[whatever-1][method=hidden]
\attachment[whatever-2]
```

where of course hidden is to be omitted when you want an icon. The commands that are used to define and tune an instance are:

```
                   1     2         3
\defineattachment [...] [...] [..,..=..,..]
                         OPT       OPT
1   NAME

2   NAME

3   inherits: \setupattachment
```

```
                      1           2
\setupattachment [...,...] [..,..=..,..]
                      OPT
1   NAME

2   title      =  TEXT
    subtitle   =  TEXT
    author     =  TEXT
    file       =  FILE
    name       =  NAME
    buffer     =  BUFFER
    state      =  start stop
    method     =  normal hidden
    symbol     =  Graph Paperclip Pushpin Default
    width      =  fit DIMENSION
    height     =  fit DIMENSION
    depth      =  fit DIMENSION
    color      =  COLOR
    textlayer  =  NAME
    location   =  leftedge rightedge inmargin leftmargin rightmargin text
                  high none
    distance   =  DIMENSION
```

There is one predefined instance:

`\defineattachment[attachment]`

So we have:

```
                   1          2
\startATTACHMENT [...] [..,..=..,..] ... \stopATTACHMENT
                  OPT        OPT
1   NAME

2   inherits: \setupattachment

instances: attachment
```

```
                  1           2
\ATTACHMENT [...] [..,..=..,..]
                 OPT         OPT
1  NAME
2  inherits: \setupattachment
instances: attachment
```

Yet another level of abstraction can be achieved with:

```
                        1       2
\registerattachment [...] [..,..=..,..]
1  NAME
2  inherits: \setupattachment
```

For example:

```
\registerattachment
  [sometag]
  [name=fool.txt,
   file=foo.txt,
   title=Fool me,
   subtitle=Not you,
   author= Joker]
```

This is the MkIV replacement for the MkII method:

```
\useattachment[test.tex]
\useattachment[whatever][test.tex]
\useattachment[whatever][newname][test.tex]
\useattachment[whatever][title][newname][test.tex]
```

or with all options:

```
\useattachment[name][file][author][title][subtitle]
```

The `\use...` variant stays around for old times sake and just maps onto `\registerattachment`, you can better use that one because it frees you from remembering which arguments is what for.

8 Bookmarks

Bookmarks are a sort of table of contents displayed by the viewer and as such they take up extra space on the screen. You need to turn on interaction in order to get bookmark data embedded in the document.

```
\placebookmarks
  [chapter,section,subsection,mylist]
  [chapter]
```

A bookmark list is added to the document only when interaction is enabled. The list in the first argument are bookmarked while the second argument specifies what bookmark (sub)trees are opened. if you don't get what you expect, check your document structure! Also, use the `\start-stop` alternatives.

Bookmarks are taken from the section title, but you can overload the title as follows:

```
\startchapter[title=Foot,bookmark=food]
    ...
\stopchapter
```

If you have a more complex typeset title you can also try:

```
\enabledirectives[references.bookmarks.preroll]
```

From MkII we inherit the option to overload the last set bookmark but the previously mentioned approach is better.

```
\chapter {the first chapter}
\bookmark {the first bookmark}
```

You can add entries to a bookmark list:

```
\bookmark[mylist]{whatever}
```

This assumes that you have defined the list.

```
\bookmark [...] {...}
            1      2
           OPT
1  SECTION LIST
2  TEXT
```

If you want to have the bookmark tab open when you start a document, you can say:

```
\setupinteractionscreen[option=bookmark]
```

There are only a few options that you can use. The `number` parameter can be used to hide section numbers. The `sectionblock` parameter controls the addition of section block entries, something that can be handy when you have multiple section blocks with similar section titles. With `force` you force an entry to the file, bypassing mechanisms that to be clever.

```
                           *
\setupbookmark [..,..=..,..]

*  force                 =  yes no
   number                =  yes no
   numberseparatorset    =  NAME
   numberconversionset   =  NAME
   numberstarter         =  COMMAND
   numberstopper         =  COMMAND
   numbersegments        =  NUMBER NUMBER:NUMBER NUMBER:* NUMBER:all
                            SECTION SECTION:SECTION SECTION:* SECTION:all
                            current
   sectionblock          =  yes no
```

9 JavaScript

Annotations can be controlled with JavaScript but it really depends on the viewer if it works out well. Using these scripts is a multi–step process where common functions and data structures can be shared and collected in preambles:

```
\startJSpreamble {name}
  MyCounter = 0 ;
\stopJSpreamble
```

The more action oriented scripts are defined as:

```
\startJScode {increment}
  MyCounter = MyCounter + 1 ; // or: ++MyCounter ;
\stopJScode
```

This script is executed with:

```
\goto {advance by one} [JS(increment)]
```

Nicer is to define a function:

```
\startJSpreamble {helpers} used now
    function Increment(n) {
        MyCounter = MyCounter + n ;
    }
\stopJSpreamble
```

and then say:

```
\goto {advance by one} [JS(Increment{5})]
```

The distribution contains a collection of scripts that can be preloaded and used when needed. You can recognize the files by the `java-imp-` prefix. To prevent all preambles ending up in the pdf file, we can say:

```
\startJSpreamble {something} used later
\stopJSpreamble
```

We already saw that one can also say `used now` and there's also a way to filter specific preambles on usage:

```
\startJScode {mything} uses {something}
```

```
\stopJScode
```

One should be aware of the fact that there is no decent way to check if every script is all right! Even worse, the JavaScript interpreter currently used in the Acrobat tools is not reentrant, and breaks down on typos

The full repertoire of commands is:

```
\startJScode ...¹ ...² ...³ ... \stopJScode
1   NAME
2   uses
3   NAME
```

```
\startJSpreamble ...¹ ...² ...³ ... \stopJSpreamble
1   NAME
2   used
3   now later
```

```
\addtoJSpreamble {...¹} {...²}
1   NAME
2   CONTENT
```

```
\setJSpreamble {...¹} {...²}
1   NAME
2   CONTENT
```

As we're into Lua and because Lua is so lightweight I've wondered several times now if it would make sense to embed Lua in pdf viewers. After all, annotations are an extension mechanism. In the early days of pdf this was actually quite doable because Acrobat reader (and exchange) had a plugin model. However, the more functionality ended up in the program, the least interesting (and popular) the plugins mechanism became. Some open source viewers have an api so in principle adding the lightweight Lua interpreter (of course with lpeg, and quite probably without file io) is possible. It has been discussed at a recent ConTEXt meeting, so who knows . . . For now we're stuck with JavaScript.

An example of JavaScript usage is the following, where we load a video and add some controls. Beware that this kind of functionality is very viewer dependent and therefore also very unstable over time. Even worse, if you look at the loaded JavaScript file you will notice a dependency on soon obsolete (in Acrobat at least) shockwave support. First we load a library that will predefine a video graphic: and then create an instance:

```
\useJSscripts[vplayer]

\setupinteraction
  [state=start]

\externalfigure
  [shockwave]
  [frame=on,
   width=480pt,
   height=270pt,
   file=test.mp4,
   label=foo]
```

The controls are defined with:

```
\goto{START} [JS(StartShockwave{foo})]
\goto{REWIND}[JS(RewindShockwave{foo})]
\goto{PAUSE} [JS(PauseShockwave{foo})]
\goto{STOP}  [JS(StopShockwave{foo})]
```

or, as we have some defined reference shortcuts:

```
\goto{START} [StartShockwave{foo}]
\goto{REWIND}[RewindShockwave{foo}]
\goto{PAUSE} [PauseShockwave{foo}]
\goto{STOP}  [StopShockwave{foo}]
```

It's actually not that hard to add all kind of functionality if only we could be sure of stable support and continuity.

10 Buttons

There is not much to tell about buttons. They are clickable areas on the screen that when clicked on bring you some location or invoke some action in the viewer, for instance triggered by a JavaScript. As usual with many commands, you can define categories of buttons and set them up globally or per category.

```
                   1      2         3
\definebutton [...] [...] [..,..=..,..]
                         OPT       OPT
1  NAME

2  NAME

3  inherits: \setupbutton
```

```
                  1          2
\setupbutton [...,...] [..,..=..,..]
                 OPT
1  NAME

2  state         =  start stop
   samepage      =  yes no empty none normal default
   style         =  STYLE COMMAND
   color         =  COLOR
   contrastcolor =  COLOR
   alternative   =  hidden
   inherits: \setupframed
```

The default button command is:

```
                1        2     3
\button [..,..=..,..] {...} [...]
               OPT
1  inherits: \setupbutton

2  TEXT

3  REFERENCE
```

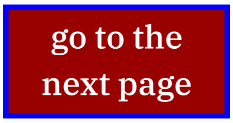
Buttons are an example of a construct that builds upon `\framed` so the keys that apply there also apply to buttons. You can enable or disable buttons with the `state` parameter. As usual there are a `style` and `color` parameters and an additional `contrastcolor` option for tuning the color of a button which action let you stay on the same page. Actually, when you do stay on the same page, the `samepage` parameter let you control if the button should be empty, hidden or whatever.

	frame	text	shown
`yes`	+	+	+
`empty`	+	-	+
`no`	-	-	+
`none`	-	-	-
`normal`	+	+	+
`default`	+	+	+

Here is an example of a button:

```
\button
  [background=color,backgroundcolor=darkred,
   style=bold,color=white,
   framecolor=blue,rulethickness=2pt,
   width=3cm,height=1.5cm]
  {go to the next page}
  [nexpage]
```

This colorful button shows up as:



go to the next page

When you use interaction in presentations you might want to make the page and/or text area active. Here is an example.

```
\defineoverlay
  [PrevPage]
  [\overlaybutton{PrevPage}]

\setupbackgrounds
  [page]
  [background=PrevPage]

\setuptexttexts
  [\overlaybutton{NextPage}]
```

We provide two variants: the normal one with square brackets, but also a more direct one that accepts curly braces, which is handy when you pass an overlay button as argument.

```
\overlaybutton [.*.]
*   REFERENCE
```

```
\overlaybutton {.*.}
*   REFERENCE
```

The difference in usage is shown here:

```
\setuptexttexts [\overlaybutton{NextPage}]
\setuptexttexts[{\overlaybutton[NextPage]}]
```

An overlay button adapts its size to the current overlay so you don't need to worry about passing dimensions.

It is possible to define more complex buttons, like roll-over buttons or buttons that change appearance when you clock on them. These are more resource hungry and also depend on the viewer. These will discussed in the chapter about widgets.

11 Menus

This chapter will discuss interaction menus that normally end up in the margins.

12 Progress

This chapter will discuss progress bars.

13 Widgets

This chapter will discuss forms and special buttons.

14 Page transitions

I’m not sure if this feature is still used but in the early days of pdf support in TeX, users loved it. I never really used it myself. Page transitions only make sense in presentations, and unfortunately the ones provided by the Acrobat viewers are just ugly. Anyhow, one automatically gets them by saying:

```
\setuppagetransitions[random]
```

This way one gets random transitions. Resetting transitions is done by:

```
\setuppagetransitions[reset]
```

If needed one can specify transitions but I strongly advice against this, because these commands are very viewer dependant, therefore: if in despair, use numbers! By default, the next set is used, and one can access them by number,

number	**transition effects**
1 2	`{split,in,vertical}` `{split,in,horizontal}`
3 4	`{split,out,vertical}` `{split,out,horizontal}`
5 6	`{blinds,horizontal}` `{blinds,vertical}`
7 8	`{box,in}` `{box,out}`
9 10 11 12	`{wipe,east}` `{wipe,west}` `{wipe,north}` `{wipe,south}`
13	`dissolve`
14 15	`{glitter,east}` `{glitter,south}`

The next settings are all valid:

```
\setuppagetransitions
\setuppagetransitions[1]
\setuppagetransitions[3,5,8,random]
```

Valid setups are:

```
\setuppagetransitions [...*]

*  reset auto start random NUMBER
```

15 Importing

This is a very short chapter that deals with external figures. Normally an image is a graphic with possible some text. There are however workflows where one includes pages from other documents. Such documents can contain cross references, bookmarks, comments and/or fields. Normally annotations of any kind are ignored and for good reason: they assume the whole document to be the, not just one or a few pages. Merging references for instance is a source for clashes, not only for named ones but also for page references.

But when you *know* what you're doing, as for instance Taco (who requested this feature) does, there is a way to merge annotations. This is controlled by the interaction keys in `externalfigure`:

```
\externalfigure[somedoc][page=1,interaction=yes]
\externalfigure[somedoc][page=2,interaction={reference,bookmark}]
```

However, only references and bookmarks are officially supported! The other annotations are possible but the code is experimental and will be finished when we find a good reason for it.

reference	named and page references and urls
comment	comments if possible with relevant icon
bookmark	text bookmarks that refer to pages
field	widgets but only within reason
layer	viewer layers
yes	named and page references, urls and bookmarks
all	all annotations

If things don't work out well, imagine for a while what is involved in supporting this: analyzing a page from a document, remapping the annotations onto some ConTEXt mechanism, making sure that we don't get clashes, keeping overhead acceptable.

Because this is a somewhat tricky feature, tracing can help you to identify problems: `figures.merging`, `figures.links`, `figures.comments`, `figures.fields` and `figures.outlines`.

Another complication when including pages can be the presence of so called marked content in the page stream. There is experimental support for removing those but right now (2018) you need to explicitly enable this explicitly:

```
\enabledirectives[graphics.pdf.uselua]
\enabledirectives[graphics.pdf.stripmarked]
%enabledirectives[graphics.pdf.recompress]
```

This will delegate inclusion from the backend to Lua. This might become the default as it is just as efficient as using the backend. That way we can filter the content stream.[3]

---

[3] We might add a callback to LuaTEX for filtering the content stream (no hard todo but post version 1.10).

16 Tagging

In a tagged pdf document the page stream is enriched (or polluted) by marks that indicate what kind of content is involved.

```
\setuptagging[state=start]
```

Only the `state` parameters is of general use.

```
\setuptagging [..,..=..,..]
                    *
*  state   =  start stop
   method  =  auto
```

The TEX end of this mechanism overlaps with the export related tagging so when you add your own elements that will be reflected in the tagging. And indeed: the keyword here is structure. The worse the structure, the worse the tagging.