

Why our HTML Docs Don't Just Print and What to Do About It



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“

*The principal task of a conductor is not to put himself
in evidence but to disappear behind his functions*

– Liszt Ferenc

Why our HTML Docs Don't
Just Print and What to Do
About It



Print, Export to Word, Export to PDF are very often just a trap

What to do with a long line in a listing?

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Print, Export to Word, Export to PDF are very often just a trap

What to do with a long line in a listing?

- We may scale



Print, Export to Word, Export to PDF are very often just a trap

What to do with a long line in a listing?

- We may scale
- Or use landscape orientation



Print, Export to Word, Export to PDF are very often just a trap

What to do with a long line in a listing?

- We may scale
- Or use landscape orientation
- Or both, but would it be enough?



Print, Export to Word, Export to PDF are very often just a trap

What to do with a long line in a listing?

- We may scale
- Or use landscape orientation
- Or both, but would it be enough?
- If not, we may fire error for long lines or wrap them



Print, Export to Word, Export to PDF are very often just a trap

What to do with a long line in a listing?

- We may scale
- Or use landscape orientation
- Or both, but would it be enough?
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- With linefeed and spaces? And how to copy?



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- With indents? Still impossible to copy from PDF



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- With linefeed and spaces? And how to copy?
- With indents? Still impossible to copy from PDF
- And on the web we can just add horizontal scroll bar.



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There is a core mismatch: semantic markup meets the rigid world of print



Iterations in converting simple text markup to print formats

- <https://github.com/CourseOrchestra/course-doc>: XSL-FO templates for Asciidoctor → DocBook backend
- <https://github.com/CourseOrchestra/asciidoc-open-document>: Open Document Converter for Asciidoc
- <https://github.com/fiddlededee/unidoc-publisher>: UniDoc Publisher – any markup to any printing rendering engine



Main formats for printing

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About It



Main formats for printing

1. PDF

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Just Print and What to Do
About It



Main formats for printing

1. PDF
2. Text processing formats (Open XML – MS Office, Open Document – LibreOffice)

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About It



Main formats for printing

1. PDF
2. Text processing formats (Open XML – MS Office, Open Document – LibreOffice)
3. HTML?

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Just Print and What to Do
About It



Main formats for printing

1. PDF
 2. Text processing formats (Open XML – MS Office, Open Document – LibreOffice)
 3. HTML?
-



CSS Paged Media – CSS extension, defining style specific for printing



Most widespread rendering approaches

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Most widespread rendering approaches

- PDF ← native PDF-generating libraries

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Just Print and What to Do
About It



Most widespread rendering approaches

- PDF ← native PDF-generating libraries
- PDF ← XSL-FO with FOP-processors

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Just Print and What to Do
About It



Most widespread rendering approaches

- PDF ← native PDF-generating libraries
- PDF ← XSL-FO with FOP-processors
- PDF ← via TeX



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- PDF ← HTML + Paged Media CSS



Most widespread rendering approaches

- PDF ← native PDF-generating libraries
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- PDF ← via TeX
- PDF ← HTML + Paged Media CSS
- DOCX/ODT, PDF ← +/- text processors (MS Word, LO Writer)



Most widespread rendering approaches

- PDF ← native PDF-generating libraries
 - PDF ← XSL-FO with FOP-processors
 - PDF ← via TeX
 - PDF ← HTML + Paged Media CSS
 - DOCX/ODT, PDF ← +/- text processors (MS Word, LO Writer)
-

These technologies are not aligned in a great number of details like:



- Apache FOP has problems with Leader alignment (dots in a table of contents)
 - LO Writer doesn't support typography (like keep with next) within table cells
 - Microsoft doesn't recommend running automation tasks (like saving PDF) on a server
-



Some brief conclusions

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Just Print and What to Do
About It



Some brief conclusions



Feel like speleologist?

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About It



Some brief conclusions



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About It



Some brief conclusions



Feel like speleologist?

- The world of printing is the world of constraints

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Just Print and What to Do
About It



Some brief conclusions



Feel like speleologist?

- The world of printing is the world of constraints
- And those constraints differ for each technology, you often need to support several chains (exquisitely looking PDF with TeX and LibreOffice for coordination)



Some brief conclusions



Feel like speleologist?

- The world of printing is the world of constraints
- And those constraints differ for each technology, you often need to support several chains (exquisitely looking PDF with TeX and LibreOffice for coordination)
- With no universal solutions



UniDoc Publisher approach suits best if at least one of

- You don't prepare documentation especially for printing purposes
- You are automating documentation generation and hope it will look good, no matter what will be generated
- Your output format is one of the text processing format

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About It



In search for flexibility: Asciidoctor open document

Automation on the writer side

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About It



In search for flexibility: Asciidoctor open document

Automation on the writer side

1. Asciidoctor parses markup into AST (Abstract Syntax Tree)

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Just Print and What to Do
About It



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Automation on the writer side

1. Asciidoctor parses markup into AST (Abstract Syntax Tree)
2. You may transform AST with Asciidoctor AST processing

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About It



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Automation on the writer side

1. Asciidoctor parses markup into AST (Abstract Syntax Tree)
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3. Asciidoctor runs writer template for each AST node recursively



In search for flexibility: Asciidoctor open document

Automation on the writer side

1. Asciidoctor parses markup into AST (Abstract Syntax Tree)
2. You may transform AST with Asciidoctor AST processing
3. Asciidoctor runs writer template for each AST node recursively
4. You may write your code in pure Ruby or with special Slim templates



A simplified processing AST example

```
- !<OrderedList>
  roles:
    - "arabic"
    id: "ol-1"
    captioned_title:
      children:
        - !<Text>
          text: "Automation"
    children:
      - !<ListItem>
        children:
          - !<Paragraph>
            children:
              - !<Text>
                text: "Asciidoctor..."
      - !<ListItem>
    ...
  - list_style = "#{get_basic_style}"
  - if captioned_title?
    text:p text:style-name="#{list_style}"
    text:bookmark text:name="#{id}"
    =captioned_title
  text:list text:style-name="#{list_style}"
    - items.each_with_index do |item, index|
```



Great, but

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About It



Great, but

- You can't override part of a template

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About It



Great, but

- You can't override part of a template
- You should invent styling approach

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Just Print and What to Do
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Styling? But text processors do support styling!



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- `bold, green` – impossible to apply two styles to one element



Great, but

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Styling? But text processors do support styling!



- `bold, green` – impossible to apply two styles to one element
-



- Asciidoctor Open Document introduces some extended Open Document format to preserve Asciidoctor AST contents
 - Each function checks, if style should be applied, and if yes, applies it in a more or less OpenDocument way: doesn't understand styling attributes but forces the style structure
-



And still

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About It



And still

- Unexpectedly transforming this extended Open Document format became one of the most used features of Asciidoctor Open Document

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About It



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- Unexpectedly transforming this extended Open Document format became one of the most used features of Asciidoctor Open Document
- Styling as separate task of writing proved also to be useful

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Just Print and What to Do
About It



And still

- Unexpectedly transforming this extended Open Document format became one of the most used features of Asciidoctor Open Document
- Styling as separate task of writing proved also to be useful
- Gradle was magnificent in gluing all parts together

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About It



Thoughts before the second step

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About It



Thoughts before the second step

- If creating universal converter is impossible...

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About It



Thoughts before the second step

- If creating universal converter is impossible...
- We should create **meta converter** – platform for building converters



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Estimated requirements

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Estimated requirements

- Native converter as a reader



Thoughts before the second step

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Estimated requirements

- Native converter as a reader
- Sound ways of transforming AST



Thoughts before the second step

- If creating universal converter is impossible...
- We should create **meta converter** – platform for building converters

Estimated requirements

- Native converter as a reader
- Sound ways of transforming AST
- A good approach for styling as a separate focus



Thoughts before the second step

- If creating universal converter is impossible...
- We should create **meta converter** – platform for building converters

Estimated requirements

- Native converter as a reader
- Sound ways of transforming AST
- A good approach for styling as a separate focus
- 99% generic writer



Thoughts before the second step

- If creating universal converter is impossible...
- We should create **meta converter** – platform for building converters

Estimated requirements

- Native converter as a reader
- Sound ways of transforming AST
- A good approach for styling as a separate focus
- 99% generic writer
- Good integration with CI/CD with a focus on homogeneity



Native converter as a reader?

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About It



Native converter as a reader?



Each converter outputs HTML. HTML is quite semantic, why shouldn't we use it?

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Let's convert this presentation to LO Writer

The slide has a purple border and a purple gear icon at the top center. The title is in bold black font. Below the title is a quote by Liszt Ferenc. On the left, there's a photo of the speaker and his contact information. A sidebar on the left contains a list of slides and a list of people. The main content area contains the slide title and a bio for the speaker.

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- As a solution architect, I want to share them? Via email?
- [REF] Why this epigraph?
 - It's FOSDEM, and lots of people
 - Value is in the result
 - A conductor should guide us, not distract us, no matter what format, rendering technique

List of slides

- Print, Export to Word, Export
- Iterations in converting simple
- Main formats for printing...
- Most widespread rendering
- Some brief conclusions.....
- UniDoc Publisher approach
- In search for flexibility: Ascii
- A simplified processing A
- Great, but...

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Notes on this demo

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Notes on this demo

- Everything is in a single Gradle script (`build.gradle.kts`)

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Notes on this demo

- Everything is in a single Gradle script (`build.gradle.kts`)
- All Kotlin code examples are just includes from this script



Boilerplate

```
FodtConverter {
    html = AsciiDocHtmlFactory()
        .getHtmlFromFile(File("${project.projectDir}/$presentationFile.adoc"), true)
    template = File("${project.projectDir}/template-1.fodt").readText()
    adaptWith(AsciidocToOdtAdapter)
    unknownTagProcessingRule = unknownTagProcessingRuleRevealJs()
    parse() // Processing AST
    ast2fodt()
}
```

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About It



Processing AST

```
ast().descendant { section ->
    section.sourceTagName == "section" &&
        section.descendant { it is Heading && it.level == 1 }
            .isNotEmpty()
}.first().also { it.insertBefore(makeTitle(it)) }.remove() ❶
```

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About It



Rearranging title (Asciidoc source)

```
| ====
a|
[.title-photo]
image::images/nmp1.jpg[]
a|
[.full-name]
Nikolaj Potashnikov

[.bio]
PhD in Economics, Solution architect, Course-IT
.2+>.>a|{nbsp}
[.logo]
image::images/fosdem-logo.svg[]
2+a|
[.contact]
icon:envelope[] consulting@yandex.ru icon:telegram[]{nbsp}@nmpotashnikoff
| ====

```

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About It



Rearranging title, extracting semantics

```
val title = titleSlideSection.descendant { it is Heading && it.level == 1 }.first()
val notes = titleSlideSection.descendant { it.sourceTagName == "aside" }.first()
val (fullName, bio, photo, contact, logo) =
    arrayOf("full-name", "bio", "title-photo", "contact", "logo")
    .map { role -> titleSlideSection.descendant { it.roles.contains(role) }.first()

logo.descendant { it is Image }.first().let { it as Image }
    .width = Length(1000F, LengthUnit.cmm)
photo.descendant { it is Image }.first().let { it as Image }
    .width = Length(1500F, LengthUnit.cmm)
```



Rearranging title, constructing title

```
appendChild(logo)
appendChild(title)
table {
  col(Length(18F)); col(Length(152F))
  roles("about-me")
  tableRowGroup(TRG.body) {
    tr {
      td { appendChild(photo) }
      td { arrayOf(fullName, bio, contact).forEach { appendChild(it) } }
    }
  }
}
appendChild(notes)
appendChild(Toc(2, "List of slides"))
normalizeImageDimensions()
```

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About It



Let's return to the result



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- Main formats for printing...
- Most widespread rendering engines
- Some brief conclusions.....
- UniDoc Publisher approach
- In search for flexibility: AsciiDoc
- A simplified processing API
- Great, but...

6



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And a little bit of styling

```
OdtStyle { p ->
    if (p !is Paragraph) return@OdtStyle
    if (p.ancestor { it.roles.contains("logo") }.isEmpty()) return@OdtStyle
        attributes("style:master-page-name" to "First_20_Page")
},
OdtStyle { tableCell ->
    if (tableCell !is TableCell) return@OdtStyle
    if (tableCell.ancestor { it.roles.contains("about-me") }.isEmpty()) return@OdtStyle
        tableCellProperties {
            arrayOf("top", "right", "bottom", "left")
                .forEach { attributes("fo:border-$it" to "none") }
        }
},
}
```



Now let's return to processing AST

```
ast().descendant { it.roles.contains("notes") } ❶
    .forEach { it.insertBefore(HorizontalLine()) }
ast().descendant { it is Heading && it.level > 1 }
    .forEach {
        it.insertBefore(
            Paragraph().apply { roles("slide-finish") }
        )
    } ❷
odtStyleList.add(odtStyles())
odtStyleList.add(rougeStyles()) ❸
```



Extending AST

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About It



Extending AST

```
class HorizontalLine() : NoWriterNode() {  
    override val isInline: Boolean get() = false  
}
```

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Just Print and What to Do
About It



Extending AST

```
class HorizontalLine() : NoWriterNode() {  
    override val isInline: Boolean get() = false  
}
```

```
OdtCustomWriter { horizontalLine ->  
    if (horizontalLine !is HorizontalLine) return@OdtCustomWriter  
    preOdNode.apply {  
        "text:p" {  
            attributes("text:style-name" to "Horizontal Line")  
            process(horizontalLine)  
        }  
    }  
},
```

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About It



Testing



Content type	The result
paragraph	Paragraph 1 Paragraph 2
list	1. Item 1 1. Subitem 1. Subitem 1. Subitem 2. Item 2
table	Subtable

Some paragraph after table.
Some paragraph after table.

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About It



Focus and trade-offs

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Focus and trade-offs

- CI friendly – pure Gradle (or an ordinary Kotlin project) to rule them all

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Just Print and What to Do
About It



Focus and trade-offs

- CI friendly – pure Gradle (or an ordinary Kotlin project) to rule them all
- No declarations, everything should be programmed

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Focus and trade-offs

- CI friendly – pure Gradle (or an ordinary Kotlin project) to rule them all
- No declarations, everything should be programmed
- Typed AST – check before run

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About It



Focus and trade-offs

- CI friendly – pure Gradle (or an ordinary Kotlin project) to rule them all
- No declarations, everything should be programmed
- Typed AST – check before run
- Clean and testable code

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Focus and trade-offs

- CI friendly – pure Gradle (or an ordinary Kotlin project) to rule them all
- No declarations, everything should be programmed
- Typed AST – check before run
- Clean and testable code
- One AST and one styling approach, but different styling typed API for each backend



Conclusion

Why our HTML Docs Don't
Just Print and What to Do
About It



Conclusion

- Treat printing as engineering: design it, test it, automate it

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Just Print and What to Do
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Conclusion

- Treat printing as engineering: design it, test it, automate it
- Printing is a lossy transformation – some semantics cannot survive it

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Just Print and What to Do
About It



Conclusion

- Treat printing as engineering: design it, test it, automate it
- Printing is a lossy transformation – some semantics cannot survive it
- Keep rendering logic programmable and under your control

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About It



Questions?

- <https://github.com/fiddlededee/unidoc-publisher>: UniDoc Publisher – any markup to any printing rendering engine
- <https://github.com/fiddlededee/fosdem-printing/tree/main>: this presentation repository

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