

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



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

What to do with a long line in a listing?

Why our HTML Docs Don't
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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?

- 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



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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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- 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/asciidoctor-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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Main formats for printing

1. PDF

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Main formats for printing

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



Main formats for printing

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



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



Most widespread rendering approaches

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



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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
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- 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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Some brief conclusions



Feel like speleologist?

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Some brief conclusions



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Some brief conclusions



Feel like speleologist?

- The world of printing is the world of constraints



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



In search for flexibility: AsciiDoctor open document

Automation on the writer side

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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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Automation on the writer side

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2. You may transform AST with AsciiDoctor AST processing



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Automation on the writer side

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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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Great, but

- You can't override part of a template



Great, but

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



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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
-



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Styling? But text processors do support styling!



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-



- 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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And still

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



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



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



Thoughts before the second step

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Thoughts before the second step

- If creating universal converter is impossible...



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



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Estimated requirements

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



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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

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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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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



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- As a solution architect, I want to share them? Via e-mail
- [REF] Why this epigram?
 - It's FOSDEM, and I met many people
 - Value is in the result, not in the process
 - A conductor should guide, not should we, no matter the format, rendering technique


List of slides

1. Introduction
2. Print, Export to Word, Export to PDF
3. Iterations in converting simple HTML to PDF
4. Main formats for printing...
 - 4.1. Most widespread rendering engines
5. Some brief conclusions.....
6. UniDoc Publisher approach
7. In search for flexibility: AsciiDoc
 - 7.1. A simplified processing of AsciiDoc
 - 7.2. 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`)



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(AsciiDoctorOdAdapter)  
    unknownTagProcessingRule = unknownTagProcessingRuleRevealJs()  
    parse()  
        // Processing AST  
    ast2fodt()  
}
```

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Processing AST

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

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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  
|===
```



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()
```




Let's return to the result



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- As a solution architect, I want to share them? Via e-mail
- [REF] Why this epigram?
 - It's FOSDEM, and I'm a person
 - Value is in the result, not in the process
 - A conductor should guide, not should we, no matter the format, rendering technology


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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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Extending AST

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



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)  
        }  
    }  
},
```



Testing

Content type	The result	
paragraph	Paragraph 1 Paragraph 2	
list	1. Item 1 1. Subitem 1. Subitem 1. Subitem 2. Item 2	
table	<table><tr><td>Subtable</td></tr></table>	Subtable
Subtable		

Some paragraph after table.
Some paragraph after table.

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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



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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- Typed AST – check before run



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- Clean and testable code



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

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Conclusion

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



Conclusion

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



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



