PDFTRON

PDF vs Office

Is Reliable Office Rendering Possible?

Motivation and Overview

- Office is a good format for document creation
- PDF is better for sharing, viewing and archival
  - Will render similarly on different devices
  - Will render similarly now and in the future
  - Makes better use of limited hardware
- Can create workflows that get the best out of both

What is an Office file?

- A document in the Office Open XML (OOXML) format
- Standardized as ECMA-376, and later as ISO/IEC 29500
- Typically produced by Microsoft Office

Roadmap

- Introduction
- Next: Defining the problem
  - Viewing, sharing, archival, editing
- An in depth look
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- Solutions
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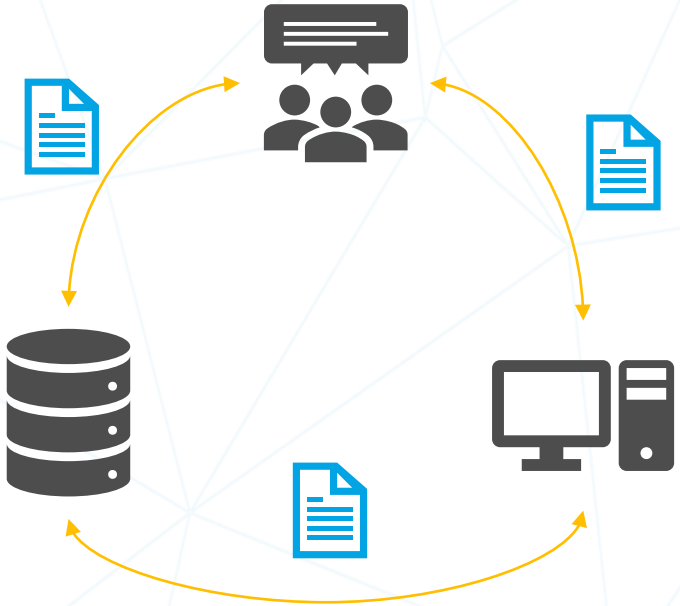
  -
- Conclusion

Office Files Are Important



Internal Processes

Directly from Users

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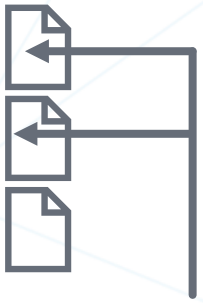
Now For the Main Event!

electronic document CONFERENCE

Compare and Contrast – Layout

PDF	Office
Fixed: • All elements in a specific location 	**Reflowable:** • Elements placed in order • Fill available space 

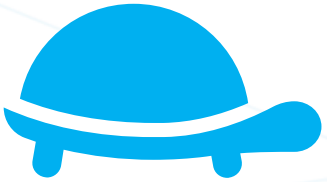
Compare and Contrast – File Structure

PDF	Office
• Flat file with look-up table • Fast per-page access 	• Zip with XML and resources • Not split by page*  <XML>

*Mostly: presentationML documents *are* split by page

A Case for PDF: Interactive Viewing

- Office layout is CPU heavy
- PDF offers faster, more predictable viewing
  - Important for web and mobile environments.



A Case for Office: Content Creation

- Reflow is important for document editing
  - Especially true for word processing!
- Office formats are a good fit for content creation/editing

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Compare and Contrast – Fonts

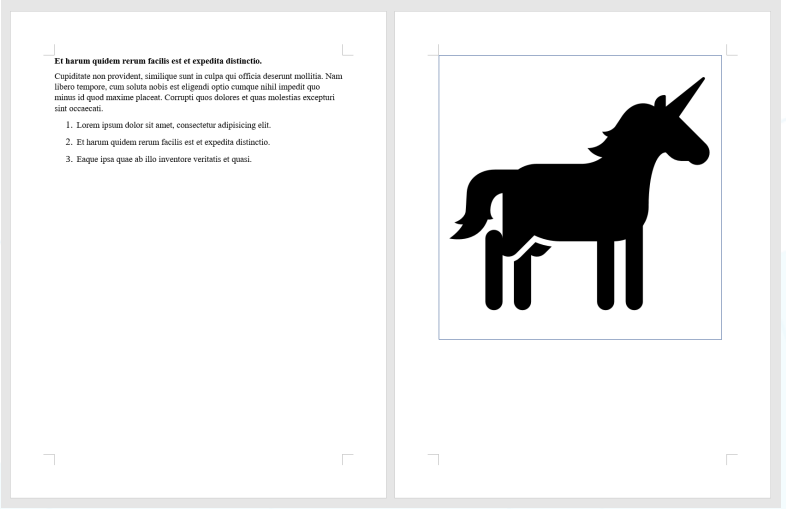
PDF	Office
• Mostly embedded • All fonts retain widths 	• Mostly not embedded • No size information 

Communicating with others

- Everyone needs to see the same thing
- Sometimes this is legally required
- Reflowable layout makes this tough

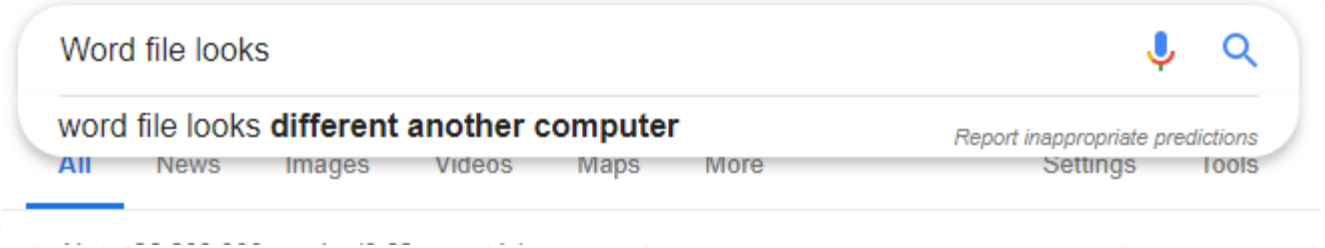
Alice creates a document:

Bob views the document:



A Second Opinion

Google search prediction tells us something similar:



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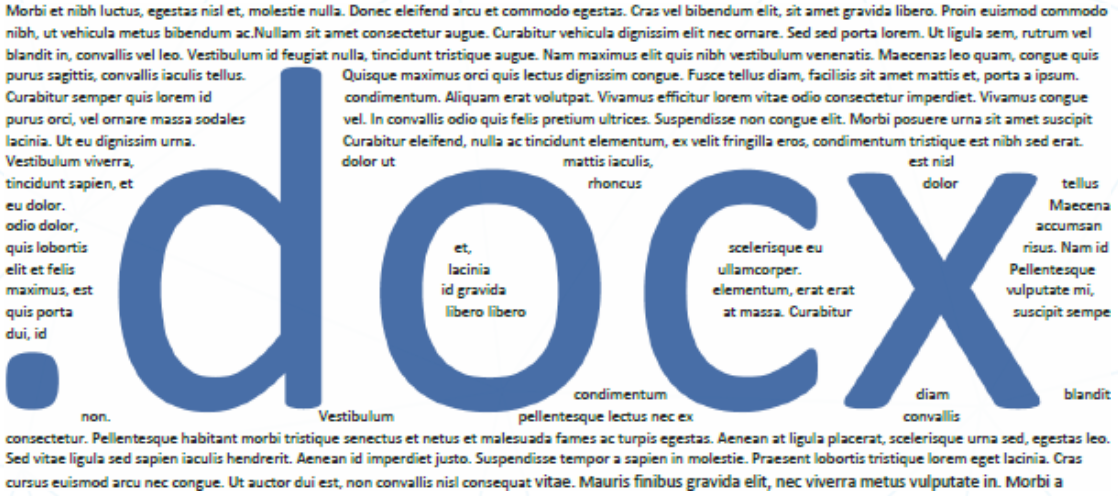
Compare and Contrast – Specification

PDF	Office
• 748 pages (1.7) • 950 pages (2.0) • Complete – could feasibly build a working renderer from the spec alone.	• ~8800 pages (ECMA 376 4th ed.) • Woefully incomplete. • Render behaviour must be reverse-engineering.

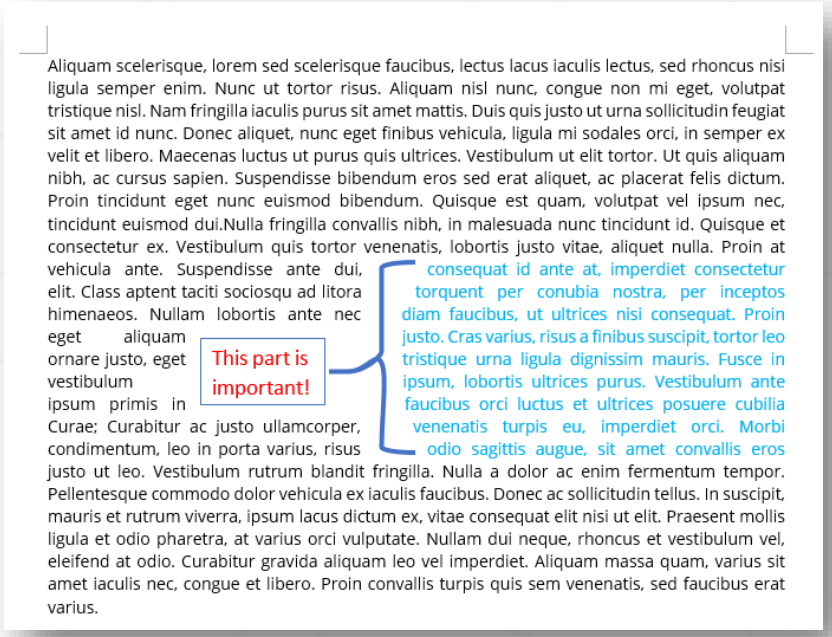
Technical Challenges – Floating Content

OOXML has a very feature-rich floating content model:

- Text can wrap on either or both sides
- Floats can be anchored to any previous inline content
- Much more complex than analogous html feature



Technical Challenges – Floating Content



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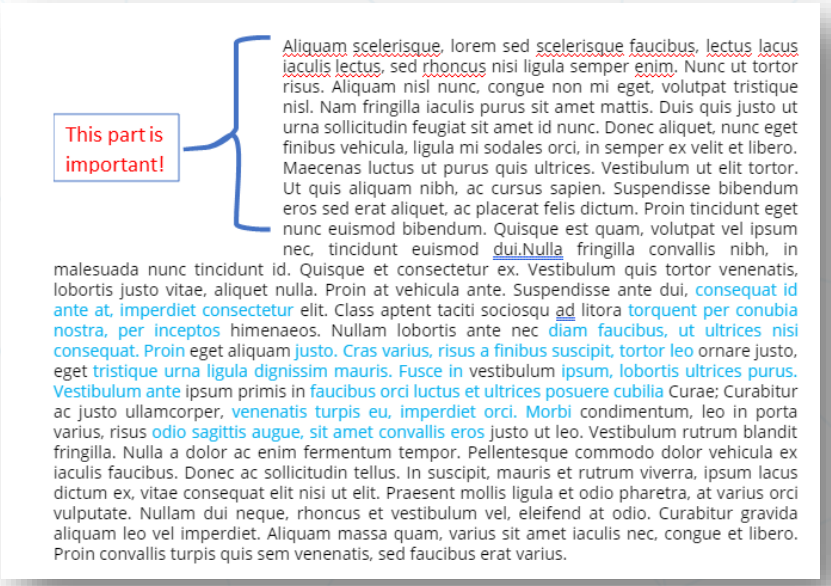
MS Word 365 for Windows



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MS Word 365 Online

PDFTRON

OOXML Undefined Behavior

Small selection of required information missing from the OOXML specification:

- Float placement algorithm
- When do elements overlap?
- Page breaking algorithm
- Text category specification
- XLSX formula definitions
- Chart rendering information
- Small caps implementation
- Embedded html behaviour
- Color tinting and shading formulas
- Tab placement algorithm
- Inter-paragraph spacing algorithm
- Table cell border drawing algorithm
- Paragraph border drawing algorithm
- Overlarge item placement behaviour
- Line spacing algorithm

A Story About Animations

```
<p:timing>
    <p:tnLst>
        <p:par>
            <p:cTn id="1" dur="indefinite" restart="never" nodeType="tmRoot">
                <p:childTnLst>
                    <p:seq concurrent="1" nextAc="seek">
                        <p:cTn id="2" dur="indefinite" nodeType="mainSeq">
                            <p:childTnLst>
                                <p:par>
                                    <p:cTn id="3" fill="hold">
                                        <p:stCondLst>
                                            <p:cond delay="indefinite"/>
                                        </p:stCondLst>
                                        <p:childTnLst>
                                            <p:par>
                                                <p:cTn id="4" fill="hold">
                                                    <p:stCondLst>
                                                        <p:cond delay="0"/>
                                                    </p:stCondLst>
                                                    <p:childTnLst>
                                                        <p:par>
                                                            <p:cTn id="5" presetID="10" presetClass="entr"
                                                        presetSubtype="0" fill="hold" grpId="0" nodeType="clickEffect">
                                                                <p:stCondLst>
                                                                    <p:cond delay="0"/>
                                                                </p:stCondLst>
                                                                <p:childTnLst>
                                                                    <p:animEffect transition="in" filter="fade">
                                                                        <p:cBhvr>
                                                                            <p:cTn id="7" dur="500"/>
                                                                            <p:tgtEl>
                                                                                <p:spTgt spid="2"/>
                                                                            </p:tgtEl>
                                                                        </p:cBhvr>
                                                                    </p:animEffect>
                                                                </p:childTnLst>
```

A Story About Animations

According to ECMA 376:

fill: This attribute describes the fill type for the time node.

Not helpful.... But references `ST_TLTimeNodeFillType`.

This looks better!

This simple type specifies what modifications the effect leaves on the target element's properties when the effect ends.

Enumeration Value	Description
freeze (Freeze)	Freeze
hold (Hold)	Hold
remove (Remove)	Remove
transition (Transition)	Transition

...that's it?

Standards Don’t Guarantee Interoperability

- Office renderers will not converge towards “correct” behaviour
- Risk of different rendering will always be there

- Use PDF for reliable communication!

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- Next: Solutions
  - Combine the strengths of both formats
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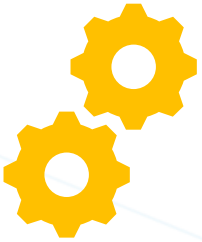
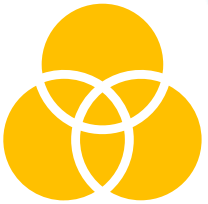
Is Reliable Office Rendering Possible?

- No, but…
- PDF is good at the things that office is not
- We can create workflows that use the best of each format





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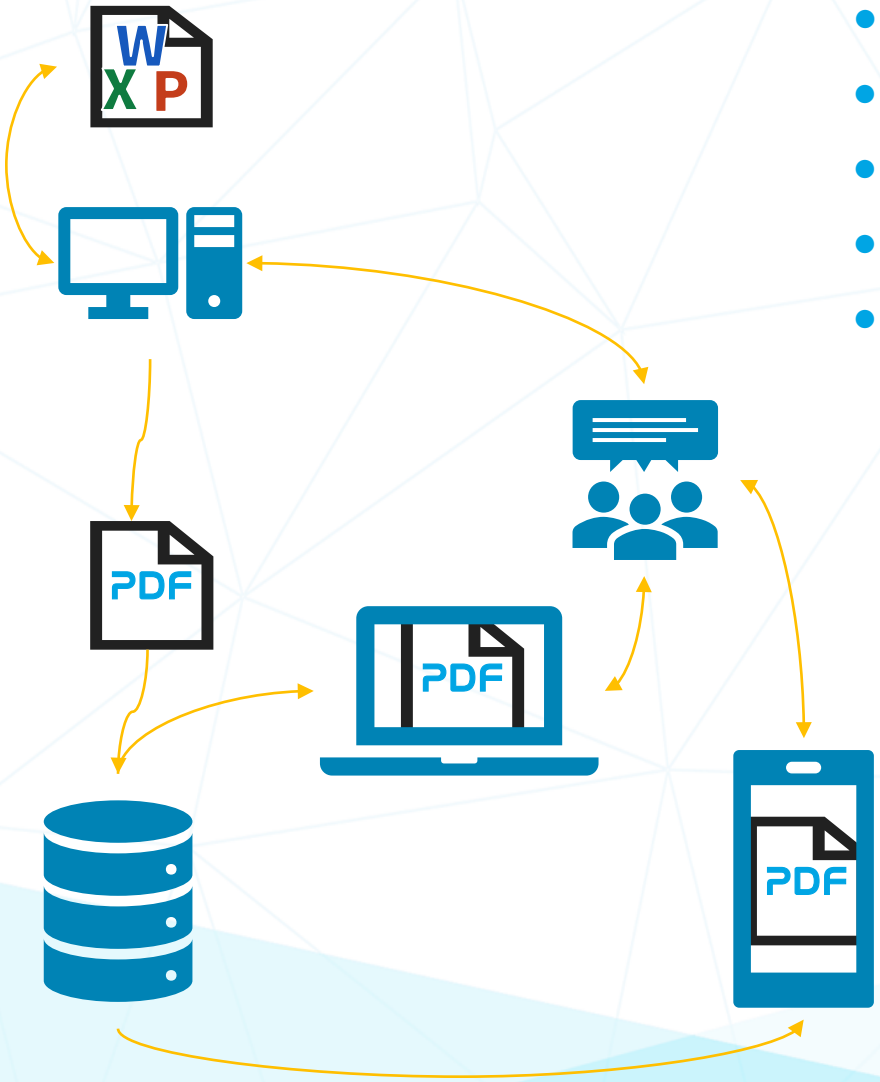
Workflow A: Users Convert to PDF



- Relies on policy rather than technology
- Conversion likely performed by MS Office
- Don’t know what version
- Don’t know what settings
- Inefficient

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  - Workflow A: users convert to PDF
  - Workflow B: central conversion
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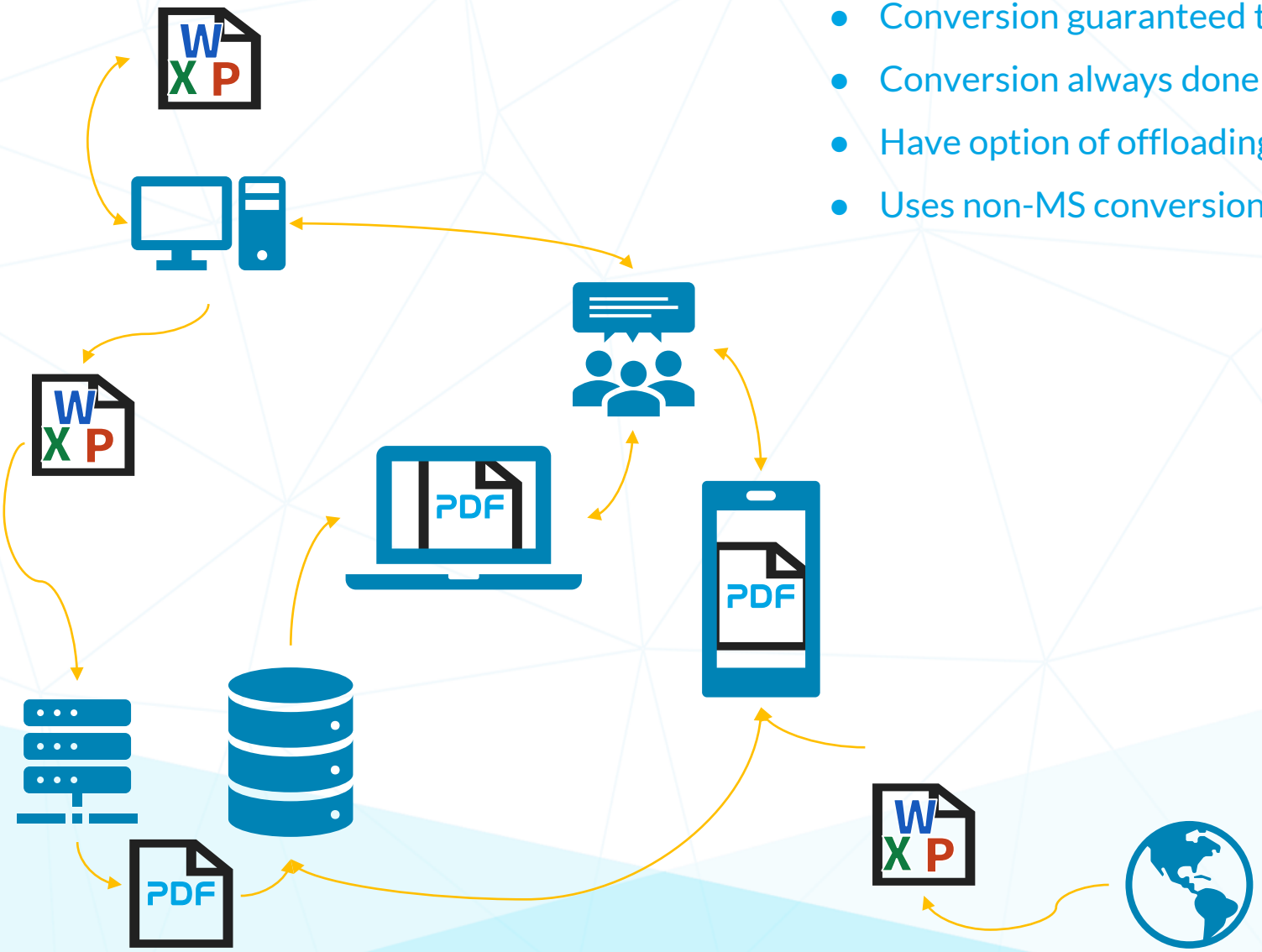
Why Not Use MS Office?

MS Office has a number of limitations:

- Cannot run on Linux servers
- Unreliable in Windows server environments
- Legally questionable in Windows server environments
- Can’t be embedded

Workflow B: Central Conversion



- Conversion guaranteed to happen
- Conversion always done the same way
- Have option of offloading work to clients
- Uses non-MS conversion software

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  - OOXML/A ?

Thank You!

www.pdftron.com
info@pdftron.com