Device-Independence with UIML
(User Interface Markup Language)

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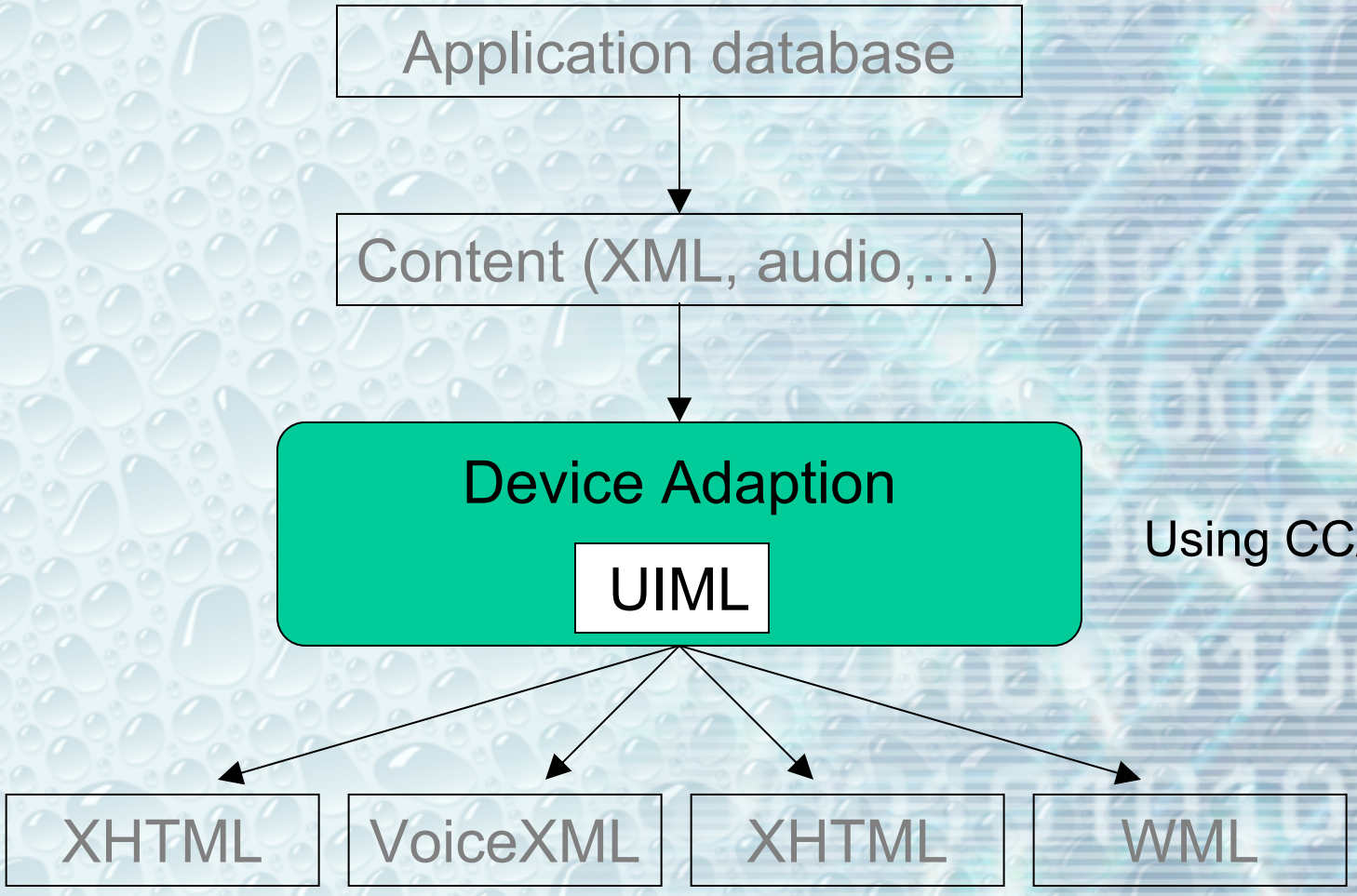
Quotes from Position Papers

- New XML language should
  - Allow author-once-deploy many scenarios
  - Achieve clean separation between behavior, content, presentation [Ruud Siebelink]
- Issue is *interaction* not *presentation* [Paul Smethers, WAP]
- Ideal solution: write *well-formed code* once [Jansen]
- Semantics [meaning of Web content] must be made clear at primary design level [William Loughborough]
- Must adapt to new devices not envisioned [Ralph Case, Stephane Maes]

Where UIML Fits In*



** Diagram from Dave Raggett's talk*

UIML… One Part of a Solution

- One canonical representation of UI for any device, language, OS, UI-metaphor
- 3+ years in development at Harmonia, Center for HCI at Virginia Tech
- Tools downloaded in 40+ countries
- Can be compiled to lots of things
- Anyone can freely implement UIML
- Objective is open standard

Problem with Existing Approaches

- Suggested way to annotate existing markup:

~~<card>~~

<select class="DISPLAY_SMALL">

…

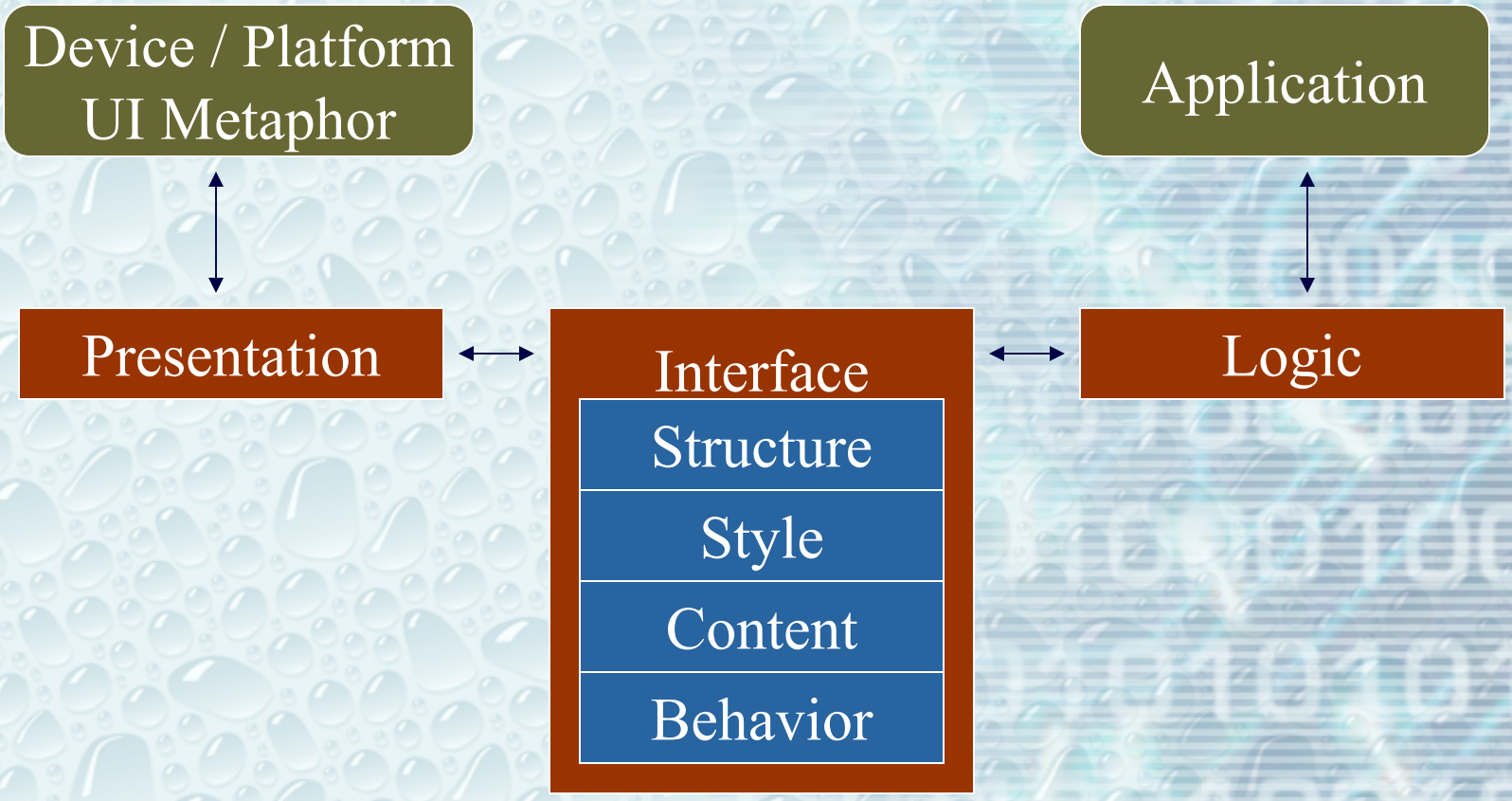
~~</card>~~

Key Concept: UIML is a "Meta" Language

- XML
  - Doesn't define tags (<P>,…)
  - Must add doc type definition to make it useful
  - No need to change XML as new tag sets invented
- UIML
  - Doesn't define tool-kit specific tags (<Menu>,…)
  - Uses a few powerful tags (<part>, <property>,…)
  - Must add toolkit vocabulary to make it useful
  - No need to change UIML as new devices invented

UIML Model

Underlying principle of single authoring is MVC [to separate content/structure] [Ralph Case, Stephane Maes]



6-way separation of UI description (vs. 3-way MVC)

UIML Skeleton – Part 1

```
<?xml version="1.0" ... ?>
<uiml version="2.0">

  <interface>
    <structure>
      <part class="Button"> … </part>
      ...
    </structure>

  </interface>

</uiml>
```

What parts comprise the UI & what's their relationship?

UIML Skeleton – Part 2

```
<?xml version="1.0" ... ?>
<uiml version="2.0">

  <interface>
    <structure>…</structure>
      <style>…</style>

  </interface>

</uiml>
```

What presentation style for each part?

UIML Skeleton – Part 3

```
<?xml version="1.0" ... ?>
<uiml version="2.0">

  <interface>
    <structure>…</structure>
      <style>…</style>
      <content>…</content>

  </interface>

</uiml>
```

What content for each part?
(text, sounds, image, …)

UIML Skeleton – Part 4

```
<?xml version="1.0" ... ?>
<uiml version="2.0">

  <interface>
    <structure>…</structure>
      <style>…</style>
      <content>…</content>
      <behavior>…</behavior>

  </interface>

</uiml>
```

What behavior do parts have?

UIML Skeleton – Part 5

```
<?xml version="1.0" ... ?>
<uiml version="2.0">

  <interface>
    <structure>…</structure>
      <style>…</style>
      <content>…</content>
      <behavior>…</behavior>

  </interface>
    <peers>...</peers>
</uiml>
```

How to connect to outside world?

(business logic, UI toolkit object)

<peers> Maps Classes to Targets

```
<d-class name="JButton" … maps-to="javax.swing.JButton">
   …
</d-class>
```

Versus

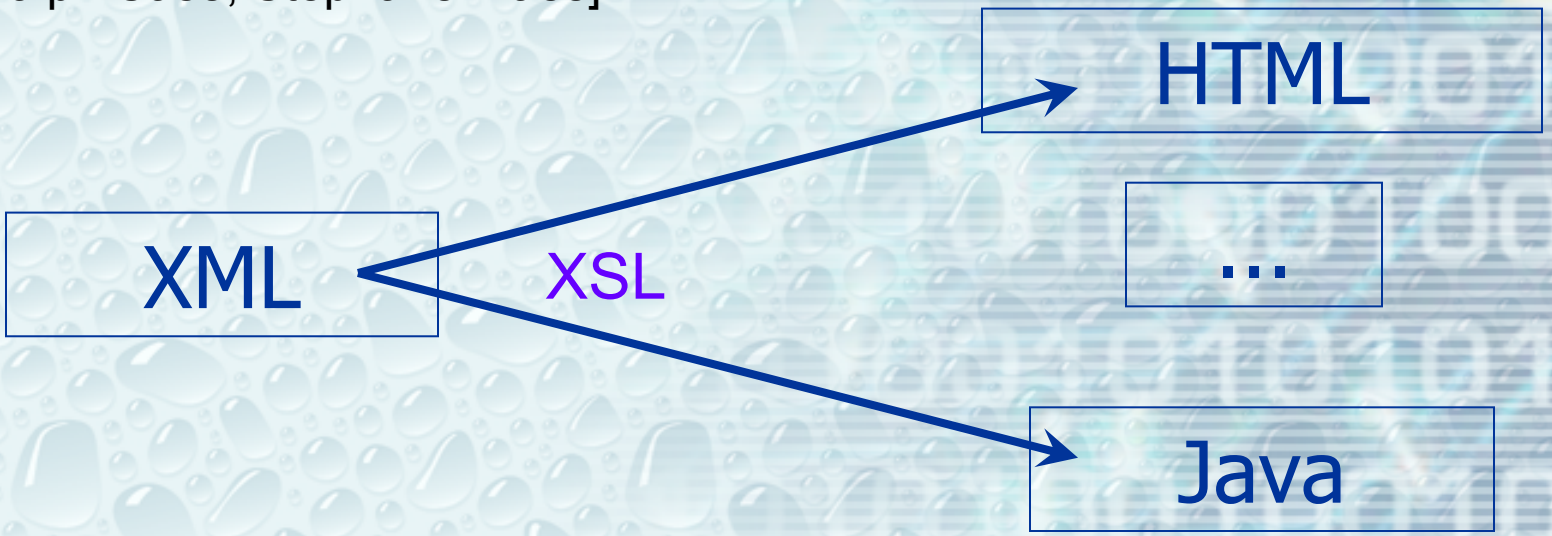
```
<d-class name="JButton" … maps-to="html:input">
   …
</d-class>
```

This part is written once, like a device driver for an OS.
Events and calls to outside world handled similarly.

NxM Problem (Old Way)

- App composed on
  - *M* “pages”
  - accessed via *N* devices
  - requires *NxM* authoring steps

[Ralph Case, Stephane Maes]



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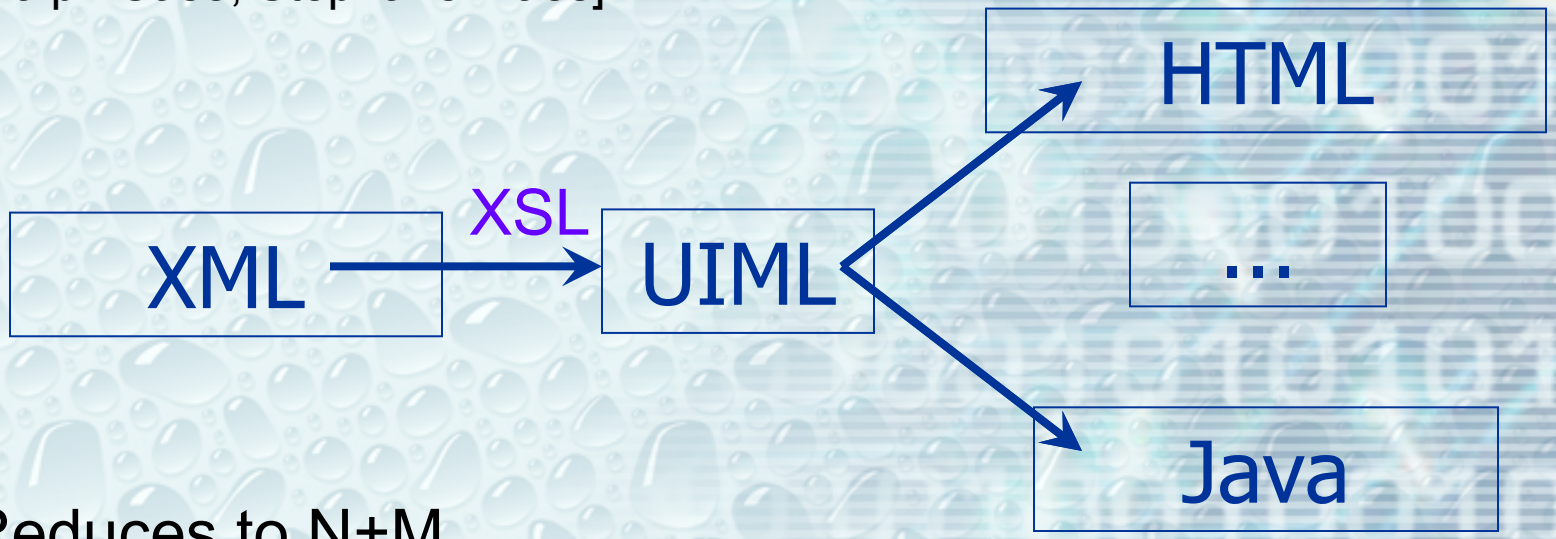
[Ralph Case, Stephane Maes]



Reduces to N+M

UIML Permits Development Continuum

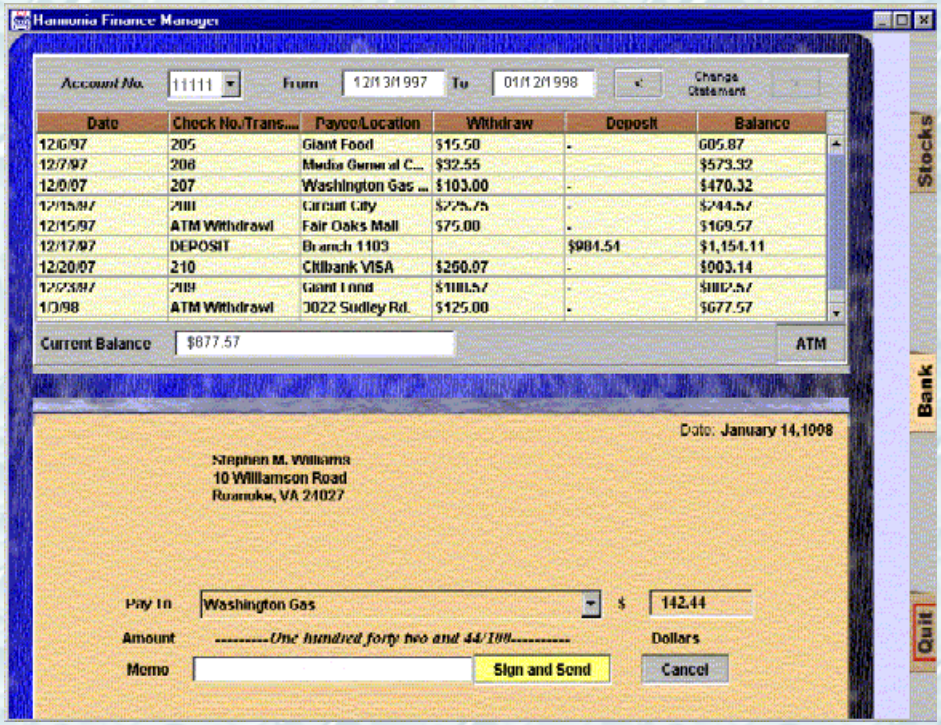
Use device-specific vocabulary:

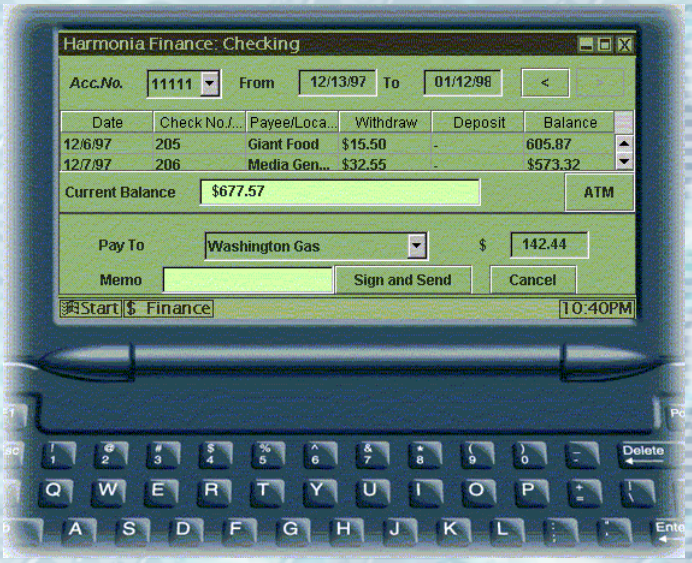
<part Class="JPopupMenu">
versus
<part Class="Select">

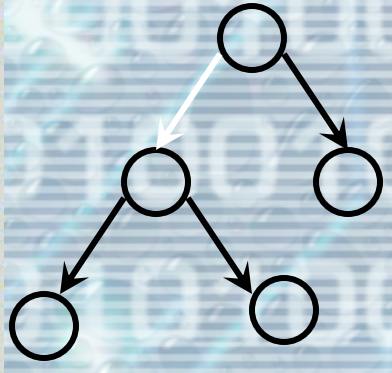
Use generic vocabulary:

<part Class="Menu" >

UIML Permits Families of UIs







Another Perspective…

Device-independent markup

Device-dependent markup

Scripting languages

"High-level" language (C++, Java)

Assembly language

Machine language

Still…
UIML is Not a Silver Bullet…

Some open problems:

- Aid/enforce accessibility guidelines [Jon Wu]
- Support auto adaptation/personalization [Ruud Siebelink]
- *Reorganizing UI:*
  - Many apps will need to be re-designed entirely [Guido Grassel]
  - 1 page in a desktop Web browser might be split into 2 screens for TV [Peter Ferne]

For More Info

Visit uiml.org

Upcoming: European Workshop on UIML – January 2001 in Paris