Introducing the Rappture Toolkit

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What is Rappture?

- Rapid Application Infrastructure
- Created by NCN in Nov 2004
- Open Source (rappture.org)
- Create standard desktop apps
- Works with your favorite programming language
Create tools like this

Demo at http://hubzero.org/tour >>
Used to Create/Deploy Hundreds of Tools
90,275 users worldwide

>5,000,000 hits/month
All Top 50 US Engr Schools
14% of all .edu domains
333 International Ed Institutions
233 US K-12 schools
How does it work?

description of tool, including inputs and outputs

<XML>

produces the user interface automatically!

tool.xml
executable

Rappture GUI

PURDUE UNIVERSITY

ITaP
Focus on tool.xml

The objects act as inputs or outputs. *Not always true, but should be.*

Rappture produces the user interface automatically!

**tool.xml**

```xml
<?xml version="1.0"?>
<run>
  <tool>
    <about>This is my tool.</about>...
  </tool>
  <input>
  </input>
  <output>
  </output>
</run>
```
Tour the zoo

Zoo of Examples

- **Complete catalog** of data objects online
- See screen shots
- Copy xml code
All objects have an `<about>` section with `<label>` and `<description>`.

- **Ambient temperature**: This is the temperature in the environment around the device.

- **Multiple curves**: This is an example that has multiple curves.
Real number with optional units

Voltage Sweep +/-: \[4V\]

Optional base-64 (mime) encoded GIF image for icon

Optional color is used if min/max values are set

Optional system of units

Constrain input values

Start with this by default

```xml
<number id="vsweep">
  <about>
    <label>Voltage Sweep +/-</label>
    <description>This determines the voltage sweep used to obtain results from the model.</description>
    <icon>
      R0lGODlhGgASAKEBAAAAAP///////////yH+FUNyZWF0ZWQgd2l0aCBUaGUgR0lNUAAh+QQBCgABACwAAAAAGgASAAACLoyPqcvtD8CRj8VZrYw8h/tRn2eA4Eiaosa1qttC1EnW81qrtbYvdG8DCodEREQEAOw==
    </icon>
    <units>V</units>
    <min>0V</min>
    <max>10V</max>
    <color>purple</color>
    <default>4V</default>
  </about>
</number>
```
Real number with optional units

Ambient temperature: 300K

Temperature gauge appears if units are for temperature

Presets create a little drop-down menu of common choices

```xml
<number id="temperature">
  <about>
    <label>Ambient temperature</label>
    <description>This is the temperature in the environment around the device.</description>
  </about>
  <units>K</units>
  <min>50K</min>
  <max>1000K</max>
  <default>300K</default>
  <preset>
    <value>300K</value>
    <label>300K (room temperature)</label>
  </preset>
  <preset>
    <value>77K</value>
    <label>77K (liquid nitrogen)</label>
  </preset>
</number>
```
Like a `<number>`, but accepts only integer values

```xml
<integer id="points">
  <about>
    <label>Grid points</label>
    <description>Number of nodes used in the simulation mesh.</description>
  </about>
  <min>10</min>
  <max>1000</max>
  <default>100</default>
</integer>
```

Buttons to adjust value up/down

Constrain input values
Start with this by default
Simple on/off value

Impact Ionization Model: yes

```xml
<boolean id="iimodel">
  <about>
    <label>Impact Ionization Model</label>
    <description>Used to enable/disable the effects of impact ionization on the mobility model.</description>
  </about>
  <default>yes</default>
</boolean>
```

Start with this by default
Set of mutually exclusive options

Carrier Statistics:
- Fermi
- Boltzmann
- Fermi
- 2D Gas

```
<choice id="stats">
  <about>
    <label>Carrier Statistics</label>
    <description>Determines the model.</description>
  </about>
  <option>
    <about>
      <label>Boltzmann</label>
      <description>From the Boltzmann transport equation</description>
    </about>
    <value>bte</value>
  </option>
  ...
  <default>Boltzmann</default>
</choice>
```

Optional. If specified, then report this value when this option is selected

This by default
Quick line of text, or even a whole file! Binary files too.

Title: 

<about>
  <label>Title</label>
  <description>Title for all plots.</description>
</about>
<default>untitled</default>
</string>

Input: Enter your SPICE commands

Enter your SPICE commands in this area. Right-click for a menu of editing options.

EXAMPLE: .print ac vn(11)
Data for image processing

Can use as a decoration on the input side, but there are better ways to do that now.
Better User Interfaces

- Temperature gauge
- Validation of inputs
- Units conversion
- Adjust knob to compare simulations
- Zoom in/out
http://rappture.org

- What is Rappture?
- Getting Started
- Documentation
- Downloads

Examples:
/apps/rappture/current/examples

In your workspace, type:

```
/ apps/ r appt u re/ copy_rappture_examples
cd rappture_examples
ls
```

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