Creating Customized Webpages in the OrionLX

August 22, 2012

11:30am - 1:00pm EDT
• WEBserver Introduction

• Online Examples
  • Standard Webpages in OrionLX
  • Pre-Formatted Webpages in OrionLX
  • Customized OrionLX Webpages

• Getting Started
  • Loading Inkscape Webpage Drawing Tool
  • Loading Inscape Plug-in for Animation
  • Ordering Required Options on the OrionLX

• Creating Pages
  • Selection of Points in Orion
  • Drawing Pages
  • Copy and Paste
  • Animating Pages
  • Loading into Orion

• Adding Controllable Elements to OrionLX Webpages

• Adding Optional Blinking and Tagging

• Use of Indirect Addressing “Wildcards” to Reduce Configuration Effort

• Making OrionLX Webpages Secure

• Viewing Webpages
What is WEBserver?

**Definition:** Web pages served from OrionLX

Three types of webpages:

1) **Standard webpages** that come with every OrionLX
2) **Pre-formatted webpages** that come with optional features
3) **Customized webpages** designed by users

Two ways to view webpages:

1) **From a PC**, using a web browser
2) **Directly from the OrionLX** using a VGA monitor
Data Flow in OrionLX

Orion reads data from Slave IEDs

Applications in OrionLX use these data

Slave Ports to SCADA
Math and Logic
Email
Webpages

OrionLX
Data Transfer between Orion and Webpages

OrionLX

Data to animate screens

XML

Control commands to control devices

Custom Webpage development environment (svg editor)
• **Software you will need:**
  - Inkscape .svg graphics editor must be loaded on your PC [http://inkscape.org/](http://inkscape.org/)
  - Orion must have WEBserver “XML Slave” Protocol
  - NCD3 and OrionLX should be updated to the latest firmware
  - NCD3 loads a “plug-in” to simplify animated of webpages

• **First, configure NCD**
  - Points to be read from IEDs
  - Logic points
  - Points and files to be made available to the webpages (“XML Slave” used for this)

• **...now online with NCD**
• Drawing pages
Open “New Document” in Inkscape
Set Background and Border Colors
Select “Grid”
Enter Values into “XML Editor”

- Refresh Time
- Retries
- Timeout
- XML data file
Drawing Tools

- Pointing / Selecting Tool
- Draw Rectangles, Circles, Curves, Lines, etc
- Zoom
- Create and Edit Text
- Spray, Erase, Fill
- Connectors

NovaTech can provide a library of images and oneline diagrams

www.novatechweb.com
Draw Line and Select “Stroke Style”
Select Stroke Color
Draw Shape and Select Stroke Style and Color...
...and Shape Fill Color and Opacity
Animate Image

Select “HMI” under “Extensions”
Animate Image

Select NCD file, XML file, point

Select On-Off colors
..or select “hide” properties
Select from any Orion Point Configured on “XML Slave” Port
\textbf{Ph A Amps} = \textbf{Ph B Amps} = \textbf{Ph C Amps} =
Enter Text to be Animated

Ph A Amps = ####
Ph B Amps = ####
Ph C Amps = ####
Animate Text (Tie to Point in Orion Database)
Ph A Amps = ####
Ph B Amps = ####
Ph C Amps = ####

Ph A Amps = ####
Ph B Amps = ####
Ph C Amps = ####

Ph A Amps = ####
Ph B Amps = ####
Ph C Amps = ####
Right Click to bring up link properties
Animate Images

Enter Value

Control Type: None

XML File: File1.xml

Point: Input08 @ DDIQ_Enet

Color display: None

Hide: le - when less than or equal to

NCD File: WEBserver_and_AAR_DemoR1

HyGI working, please wait...

OK Cancel
Controls Through Webpages

• Any output point in Orion database - mapped to XML Slave - can be controlled through the Orion .svg webpage

• Required Steps
  • Output Points to be controlled must first be mapped to OrionLX in Master Port, or set up in Logic
  • Outputs must then be mapped to XML Slave with dialog properties
  • Graphic elements on webpages must be associated with control output points
Final Steps

- Save page
- Administrator sets up Orion web user and web security settings
- Transfer .svg and .ncd files to Orion
OrionLX WEBserver
Blinking and Tagging
New Extensions in Recent Firmware

Dashboard Features:
- **Alarm Configuration**
- **Tagging Configuration**

User Interface Parameters:
- **NCD File**: SVGdemo
- **Orion**: Master
- **XML File**: oneline.xml

Input/Output Configuration:
- **Point**: Comm Fail @M650
- **Text display**: XML String
- **Color display**: Binary

Binary Colors:
- **On Color**: red
- **Off Color**: lime

Hide: disabled

Control Type: None

www.novatechweb.com
Active, unacknowledged alarms will blink.

Output points mapped to the selected XML file.
Tagging Configuration

Any output points mapped to the selected XML file can be tagged.

Number corresponds to configured User Groups with permission to install or remove tags.
Three Standard Tags Available

- Out of Service Tag
- Do Not Operate Tag
- Information Tag
- Custom Tags Can be Developed
Applying Indirect Addressing ("Wildcards") in OrionLX Webpage Design
**Objective:** Reduce the effort to configure displayed points on pages that must be replicated many times.

**Example:** In the plant one-line diagram below, 33 of the breakers (shown in green) are protected by an SEL-351S protective relay.

Note that over 80 real-time points must be configured from each relay.
The normal process for configuring these 80+ points:

1) create a graphic screen offline, typing in “placeholders” wherever a real-time value will be displayed.

2) Highlight placeholder, one by one (shown by “XXXX”), and populate with points selected from the drop-down master XML point pick list.

Following this procedure for the 33 identical zoom screens in this example (over 2500 points to configure total) would be time-consuming and tedious.

The Orion WEBserver “indirect addressing” feature greatly simplifies the effort.
Replacing the source of the points from “Feeder 312” to an indirect address (shown here by [%Feeder%]) a standard screen can be developed *one time* to accommodate all of the 33 SEL-351S relays.

Any place where “Feeder” is enclosed in the [% and %] symbols it will be replaced with the Feeder’s value when the page is loaded in the browser (“Feeder 311”, “Feeder 310”, “Feeder 309”, etc).
The variable to be passed into the indirect address appears appended to the page URL.

In this example, a link is established from the one-line diagram to the IED zoom screen.

The link above means: When you click on this element on the one-line diagram, go to a page called “zoom.svg” and everywhere the word “Feeder” appears, replace with “Feeder 312”
Other Uses of the Indirect Address

1) The title of the page can be dynamically changed by using an indirect address.

2) The XML data file (preconfigured from the OrionLX) that animates a page can also dynamically changed based on page selection, e.g. replacing /pointdata.xml with the indirect address /[%MyXML%].xml.
1) Encryption
   - Use secure protocol (HTTPS) between Orion WEBserver and browsing PC

2) Firewall
   - Restrict access to Orion to specific IP addresses and TCPs

3) Specific User “Privileges” for Viewing Pages and for Control
   - Privileges to be able to use the HTTPS web page protocol
   - Privileges to control substation devices
   - Privileges to acknowledge alarms
   - Privileges to apply and remove tags

4) IP Address Lockout
   - Page Lockout - Critical web pages only be viewable by pre-specified IP addresses
   - Control Lockout - Control actions only possible from pre-specified IP addresses

5) Browse pages internally and send pages to a monitor as video
Viewing OrionLX Webpages
1) View OrionLX webpages with PC
2) View OrionLX webpages with VGA Monitor
1) View OrionLX webpages with PC
2) View OrionLX webpages with VGA Monitor

Remote clients can also view pages

To SCADA
To Engineering

OrionLX serves out webpages

Industrial PC running browser only

Substation
Viewing .svg Webpages Served from Orion

- All modern web browsers, except IE, natively support the SVG format.

- An SVG plug-in is available for Internet Explorer: Adobe SVG Viewer.
  - A few visual shortcomings compared to other web browsers.

- The new Direct Video option does not require a PC with a browser
1) View OrionLX webpages with PC
2) View OrionLX webpages with VGA Monitor
OrionLX Direct Video

VGA Monitor attached to VGA port on OrionLX Multimedia Board

New Multimedia Board

Keyboard and mouse attached to USB ports on OrionLX Multimedia Board
New OrionLX Multimedia Board

USB Ports
- USB4 and USB5 for Keyboard and Mouse

VGA Monitor Port
- Supports SXGA resolution of 1280 x 1024 or XGA resolution 1024 x 768.

Third Ethernet Port
- ETH2, independent of ETH0 and ETH1
- Separate Network Interface Controller
- Copper 100MB

Audio Out
- 3.50mm “headphone-style” connector
- Drives most standard powered PC speaker sets.
Multimedia Board Installed in OrionLX
Orion Page Viewing Flexibility

The same page viewed on the Substation VGA monitor can be viewed by any browsing PC.

Any page served from the OrionLX can be viewed on the attached VGA monitor.

To SCADA

To Engineering

Substation
Webpages from other substation IEDs can be viewed on the VGA monitor.
Substation VGA Monitor and Keyboard Also for Sale

- 19” rack mount or panel mount
- 48V dc or 125V dc
- Resolution: 1280 x 1024
- Brightness: 300 cd/m²
- Contrast ratio: 700:1
- Viewing angle: V/H 80°/75°

Ordering Information

**Standard Model:**
Rack Mount 125V dc: TR-LCD1900-RM-TOUCH-125V dc

**Special Order Models:**
Rack Mount 48V dc: TR-LCD1900-RM-TOUCH-48V dc
Panel Mount 125V dc: TR-LCD1900-PM-TOUCH-125V dc
Panel Mount 48V dc: TR-LCD1900-PM-TOUCH-48V dc
## Summary of Offerings

### Utility Product Courses

<table>
<thead>
<tr>
<th>Course Description</th>
<th>Page</th>
<th>Duration</th>
<th>Required Pre-requisite Course or Experience</th>
</tr>
</thead>
<tbody>
<tr>
<td>Orion/G Orion5r Automation Platform</td>
<td>3</td>
<td>1 1/2 days</td>
<td>None</td>
</tr>
<tr>
<td>OrionX Automation Platform (Full Course)</td>
<td>3</td>
<td>1 1/2 days</td>
<td>None</td>
</tr>
<tr>
<td>OrionX (Short Course)</td>
<td>4</td>
<td>4 hours</td>
<td>OrionX Full Course or equivalent experience.</td>
</tr>
<tr>
<td>Distributed Discrete I/O Module (DDIO)</td>
<td>4</td>
<td>4 hours</td>
<td>None</td>
</tr>
<tr>
<td>ADAM 4017+ Analog Input Module</td>
<td>5</td>
<td>4 hours</td>
<td>None</td>
</tr>
</tbody>
</table>

### Utility Application Operation Courses

<table>
<thead>
<tr>
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<th>Duration</th>
<th>Required Pre-requisite Course or Experience</th>
</tr>
</thead>
<tbody>
<tr>
<td>Orion DA-Master Design, Operation and Maintenance (Full Course)</td>
<td>5</td>
<td>1 day</td>
<td>Orion Full Course, or equivalent experience.</td>
</tr>
<tr>
<td>Orion DA-Master Design, Operation and Maintenance (Short Course)</td>
<td>6</td>
<td>4 hours</td>
<td>Orion Full Course, or equivalent experience.</td>
</tr>
<tr>
<td>Orion WEBServer/SVG Graphics and Design Application</td>
<td>6</td>
<td>1 day</td>
<td>Orion Full Course, or equivalent experience.</td>
</tr>
<tr>
<td>Orion Math and Logic Design and Application</td>
<td>7</td>
<td>6 hours</td>
<td>Orion Full Course, or equivalent experience.</td>
</tr>
<tr>
<td>Orion Protocols for Relay Integration - Design and Application</td>
<td>7</td>
<td>6 hours</td>
<td>Orion Full Course, or equivalent experience.</td>
</tr>
<tr>
<td>OrionX Cyber-Security Design and Application</td>
<td>8</td>
<td>2 days</td>
<td>OrionX Full Course, or equivalent experience.</td>
</tr>
<tr>
<td>OrionX Alarm-Archive Retentive Configuration and Application (AMC)</td>
<td>8</td>
<td>4 hours</td>
<td>OrionX Full Courses, or equivalent experience.</td>
</tr>
<tr>
<td>OrionX Email Configuration and Application</td>
<td>9</td>
<td>4 hours</td>
<td>OrionX Full Course, or equivalent experience.</td>
</tr>
</tbody>
</table>

### Utility Technology Courses

<table>
<thead>
<tr>
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<th>Page</th>
<th>Duration</th>
<th>Required Pre-requisite Course or Experience</th>
</tr>
</thead>
<tbody>
<tr>
<td>DNP3.0 Protocol Application, including Serial Communication Basics</td>
<td>9</td>
<td>1 1/2 days</td>
<td>None</td>
</tr>
<tr>
<td>Ethernet for the Utility Professional</td>
<td>10</td>
<td>1 day</td>
<td>None</td>
</tr>
<tr>
<td>Orion Network Support (Microsoft Operating System)</td>
<td>10</td>
<td>5 days</td>
<td>Orion Network Support on Windows 2000 or Windows XP/2003 or equivalent.</td>
</tr>
<tr>
<td>Orion Enterprise (Microsoft Operating System)</td>
<td>11</td>
<td>3 days</td>
<td>For maximum benefit of this course, completion of the Windows 2000 or Windows XP/2003 or equivalent.</td>
</tr>
</tbody>
</table>

### Bitronics Courses

<table>
<thead>
<tr>
<th>Course Description</th>
<th>Page</th>
<th>Duration</th>
<th>Required Pre-requisite Course or Experience</th>
</tr>
</thead>
<tbody>
<tr>
<td>Utilities Power Specialist</td>
<td>11</td>
<td>2 days</td>
<td>Electrical substation knowledge and basic knowledge of disturbance records and power quality principles.</td>
</tr>
<tr>
<td>Utilities Communication Specialist</td>
<td>12</td>
<td>1 day</td>
<td>Utilities Power Specialists is optional.</td>
</tr>
</tbody>
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Training Courses Available for WEBserver and Alarm-Archive Retentive
Please send questions to: ray.wright@novatechweb.com