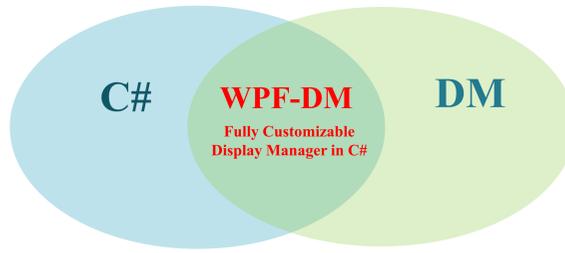# NEW EPICS DISPLAY MANAGER IN WPF*

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We have been developing a new kind of EPICS Display Manager on Windows that we call WPF-DM. It is written in C# using Visual Studio and is based on the new Microsoft XML-based display building technology: Windows Presentation Foundation (WPF). The derivate of XML used by WPF, known as XAML, gives descriptive configuration of the display components. Therefore the GUI construction of an EPICS client display may be created without actual programming. Then, the C# code can be added to extend the functionality of a display. This paper is on the new toolkit WPF-DM with such features.

WPF-DM Components

SCA Component
`<SCA Name="mysca" GroupAccess="False"/>`

Device Manager Component
`<DeviceDB Name="DevDB" XML="Devices.xml"/>`

Device Component
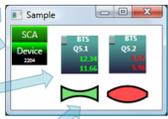```
<MPSControl Name="Q5_1"
    DevDB="DevDB" ScaCon="mysca"
    Caption="BTS;Q5.1"
    DeviceName="BTS_____Q5,1" />
```

**View Component**
`<MagShape Controller="Q5_2" MagType="QF" />`

These components are:
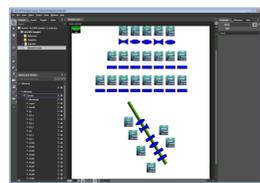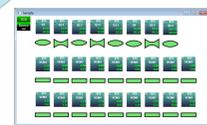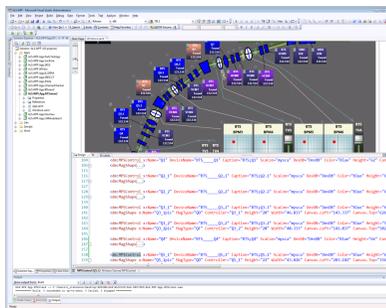* Written in C#.
* Used in XAML.

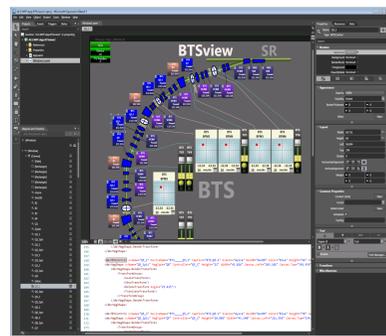*XAML is an XML notation for WPF GUI description.*

**A Simple Example**



**Development**



**Visual Design in Expression Blend**

**C# and XAML Programming in Visual Studio**



**Visual Design in Expression Blend**

**WPF-DM Application**
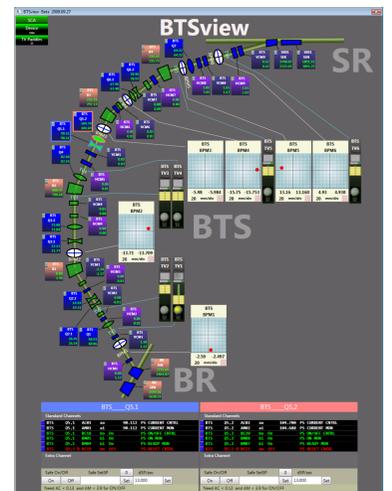


Edit XAML, Compile and Execute from Expression Blend.

## Environment

WPF-DM is written in C# 3.0 on Windows Vista, using the Visual Studio 2008 IDE (using .NET Framework 3.5). Although WPF-DM itself can support both 32-bit and 64-bit modes, it is built in the 32-bit mode to be compatible with the lower layer of the EPICS system at the ALS.

## WPF-DM Examples

These two EPICS clients are fully developed in XAML. No C# programming is explicitly involved.



**The Standard Control Console with a 32" LED.**

**Two USB Rotary Knobs**



**Task Force**

## GUI in XAML

Developing GUI in WPF is similar to designing a web page in HTML. Instead of using HTML, WPF uses an XML-based language that is called Extensible Application Markup Language (XAML). Visual Studio comes with a XAML designer for XAML. We can create a GUI either by editing an XAML file, or visually from within the IDE. The XAML code and its visual representation are always synchronized. We usually create a GUI in WPF by switching back and forth between the XAML text editor and the visual design pane, locating WPF components and modifying their properties. WPF-DM provides a set of WPF GUI components that can be used in the same manner.

There is also an XAML designer called Expression Blend that is separate from Visual Studio. It has much better graphics design capabilities than Visual Studio. Typically, it is used to refine and enhance the GUI that was originally created in Visual Studio. Actually, we can work on the same C# project both by using Visual Studio and Expression Blend simultaneously.

Expression Blend does not provide any direct access to the C# source code embedded in the WPF components. Instead, public component properties and routines are all accessible so a user can design, recompile and run the program in Expression Blend. By preparing the WPF-DM Components properly, it becomes possible to develop EPICS clients directly with Expression Blend. In this case, a user does not program in C# but writes the GUI and the actions among components in XAML in a descriptive manner. Once the fundamental properties of the WPF-DM components, such as device names, are assigned in XAML, the design work can be done in a visual manner. Therefore, it has become possible to develop an EPICS client program with a rich GUI without explicitly using any programming language.