Telematik
Technische Informatik

Freie Universität Berlin

Managing Data Flows with Flow

A Software Factory for Wireless Sensor Networks

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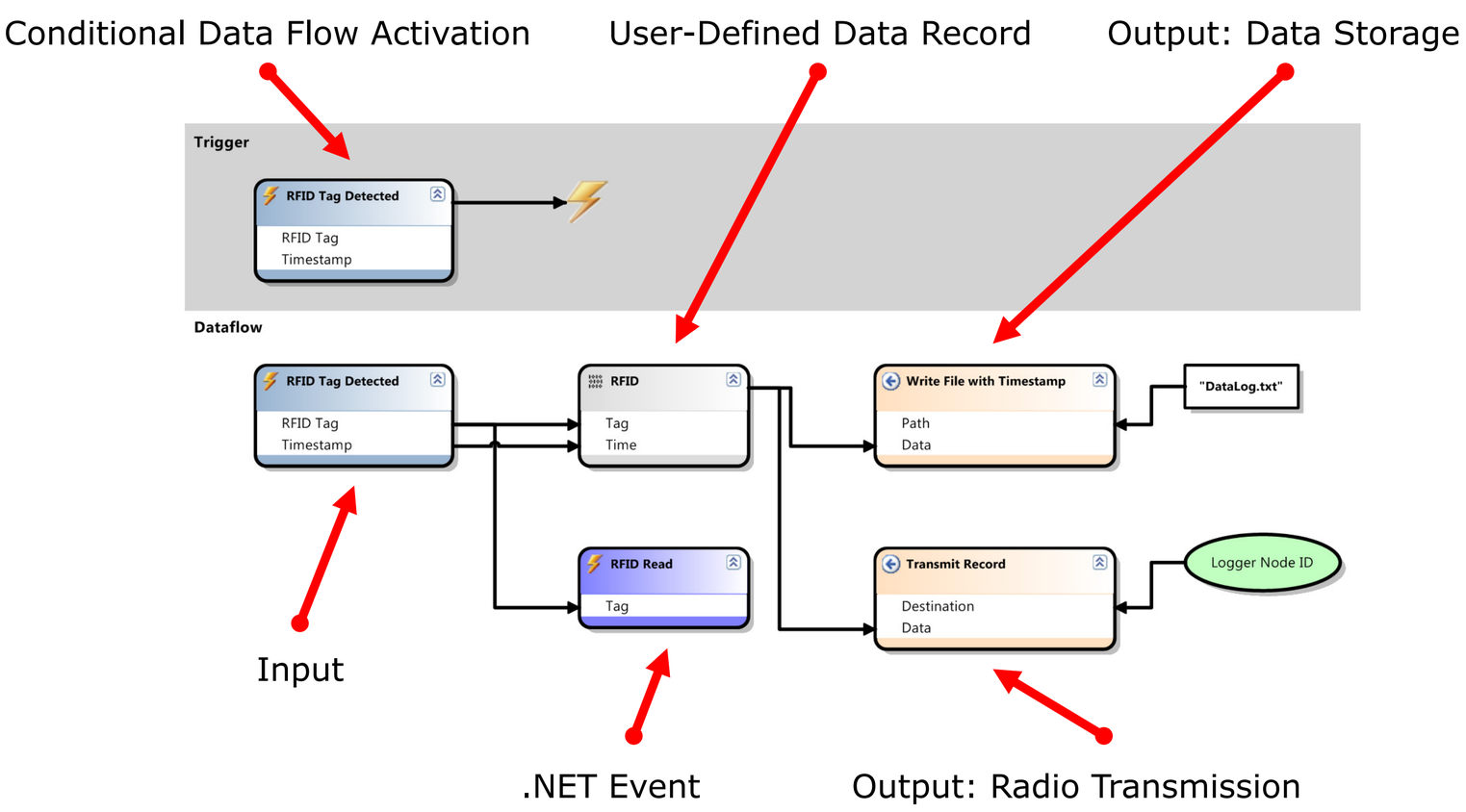
Flow

- ➔ Software Factory for Wireless Sensor Networks (WSNs)
- ➔ Visual Domain-Specific Language to specify behaviour of WSNs
- ➔ Focus on data-centric programming, i.e. flows of data
- ➔ Hiding complexity of software development for embedded systems
- ➔ Making WSNs more attractive as a tool
- ➔ Enabling wider adoption of WSNs in field sciences

Sample Data Flow

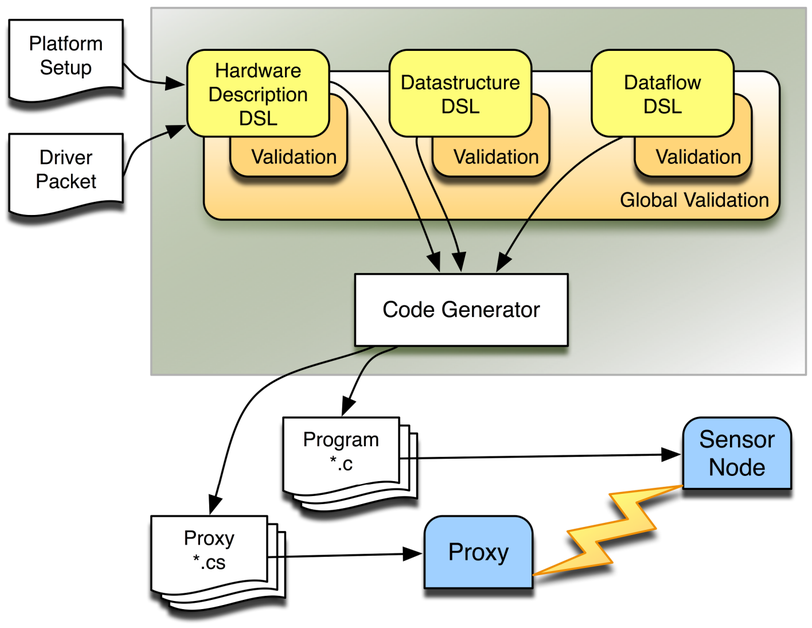


Domain Experts

- ➔ Visual editor for data flows
- ➔ Interactive validation at design time
- ➔ Advanced extensibility of data flows with native code blocks
- ➔ Automated code generation

Hardware Vendors

- ➔ Automated generation of visual hardware description
- ➔ Support for extensibility with custom hardware drivers
- ➔ Automated platform setup generation



Flow for Domain Experts

Background

Wireless Sensor Networks (WSNs) are advertised with high sensing accuracy, long runtimes, and easy deployment.

However, WSNs are still not widely used in environmental research.

Research in the area of WSNs has focused on hardware design, self-organization, or energy saving patterns. The available tools target experienced software developers.

Domain experts such as environmental scientists need extensive support from hardware and software engineers at all times during a WSN deployment.

This makes wide adoption of WSNs in real world scenarios difficult, costly, slow, and error prone.

Requirements:

- ➔ **Seamless integration of development and management tools**
- ➔ **Higher levels of abstraction**

Flow

Flow is a Software Factory for WSNs. Software Factories are model-driven development environments. **Flow** provides a visual editor to model applications for WSNs and a native source code generator. **Flow** is independent of the selected target platform.

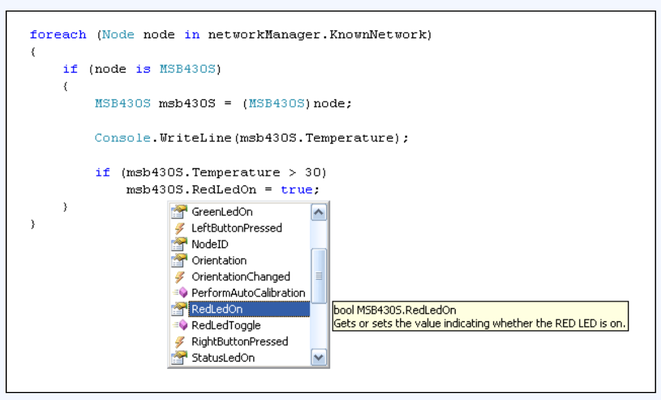
Flow operates on events, inputs, outputs, user defined records, and variables. **Flow** data flows can be extended with formulas and native code blocks.

Flow uses *Microsoft Domain-Specific Language Tools* to provide custom visual designers and *Microsoft Visual Studio 2008* as the Integrated Development Environment. **Flow** uses the ScatterWeb .NET SDK.

ScatterWeb .NET SDK

The ScatterWeb .NET SDK extends the .NET tools and architecture to Wireless Sensor Networks.

- ➔ Seamless integration into Microsoft Visual Studio
- ➔ Well known programming model with events, methods, and properties
- ➔ Support for IntelliSense and dynamic help



Download Flow from http://cst.mi.fu-berlin.de/projects/flow/