



# OptoFidelity

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NIDays 2012

# Hello, I'm Mikko

- Mikko Vaarala
- OptoFidelity 3/2012 →
  - Project management, Sales support, Product development, LabVIEW development.
  - 6 years of LabVIEW experience.
  - Lectures at Tampere university of applied sciences.

# Agenda

OptoFidelity Oy – the company

Development case: Plugin Architecture

LabVIEW example: Plugin Architecture

Product example: Side Actuator

# OptoFidelity Company

## Profitable growing expert engineering company

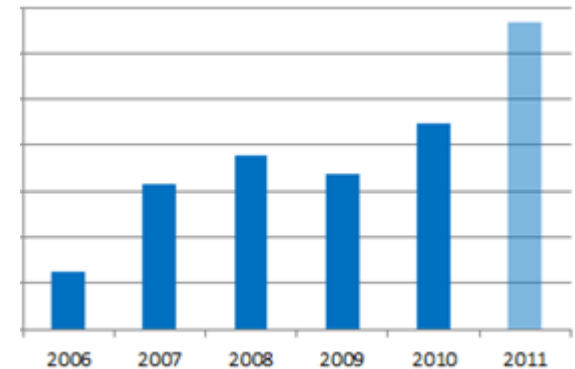
- Ranked 7th Deloitte Technology Fast 50 in Finland
- 40% annual growth, cashflow-positive from the beginning

**Deloitte.**

Technology Fast 50  
Finland 2010

## Business areas:

- Test and Measurement Automation
- Machine Vision Systems
- Engineering Services
- Test Services
- Digital Quality Control Tools



**Patented technology for testing display and touch screen visual image quality and user experience**

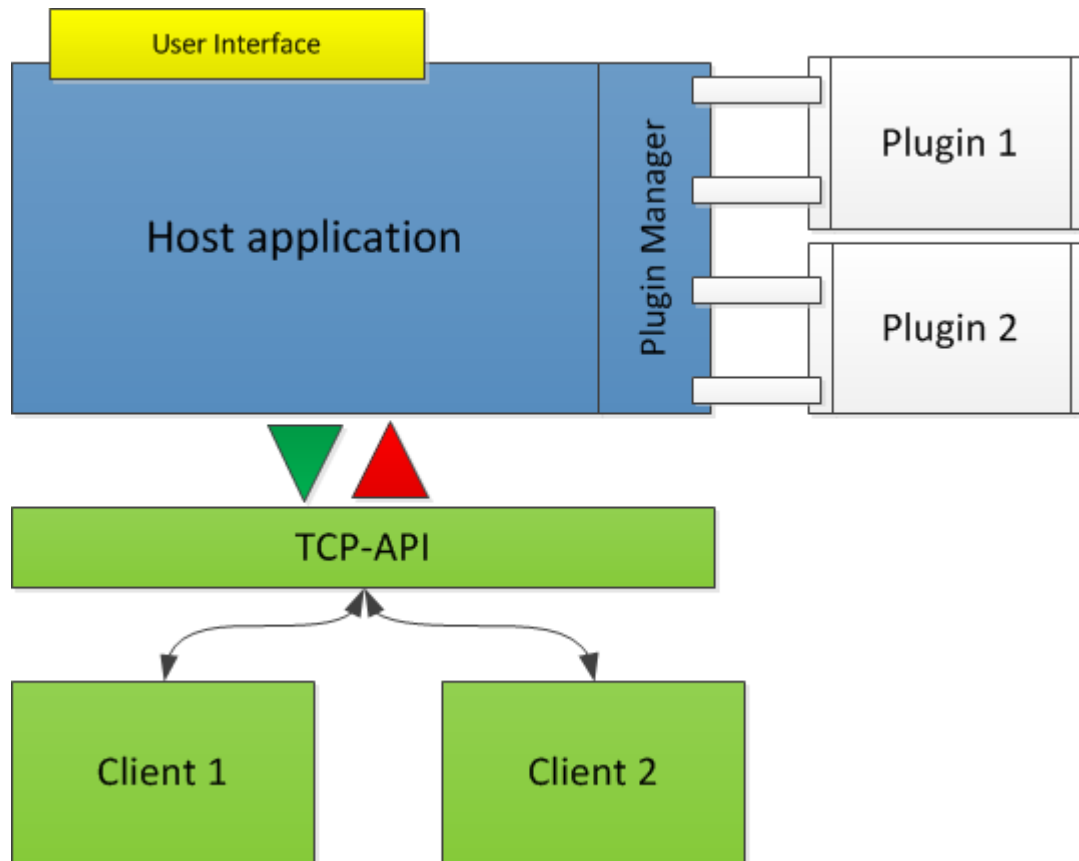
# Global Project Deliveries



# Development case

Plugin-architecture

# Plugin-architecture



- Allows adding features to software without compiling new executable
- Host application can have multiple plugins
- Plugin code resides in single files (.lvlib or .llb)

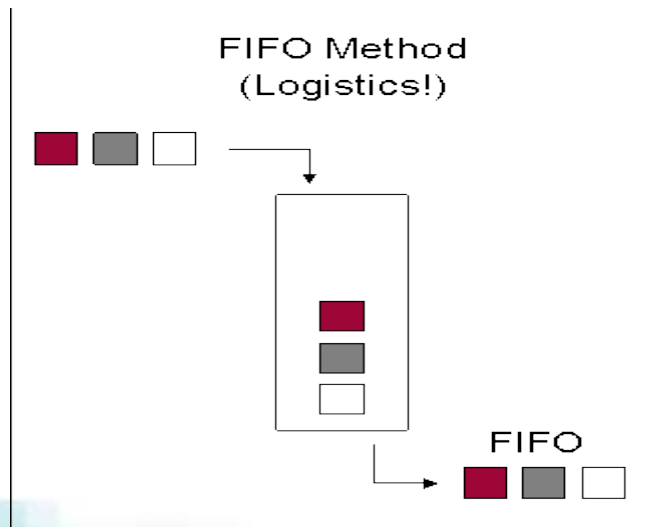


# Plugin Manager

Plugin Manager

Plugin X

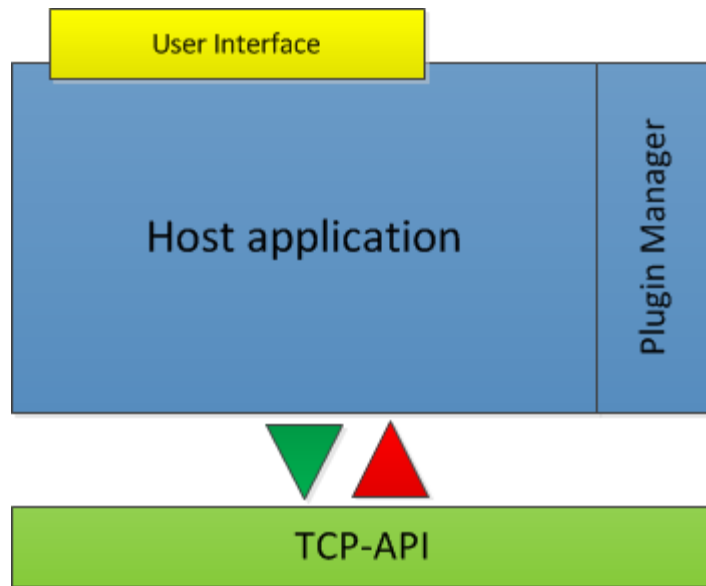
Plugin Y



- Handles two way-communication between host and plugin
- Handles plugin-to-plugin communication  
→ Creates dependency between plugins.
- Uses memory based FIFOs for communication

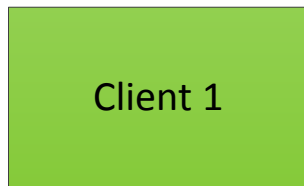


# Host Application



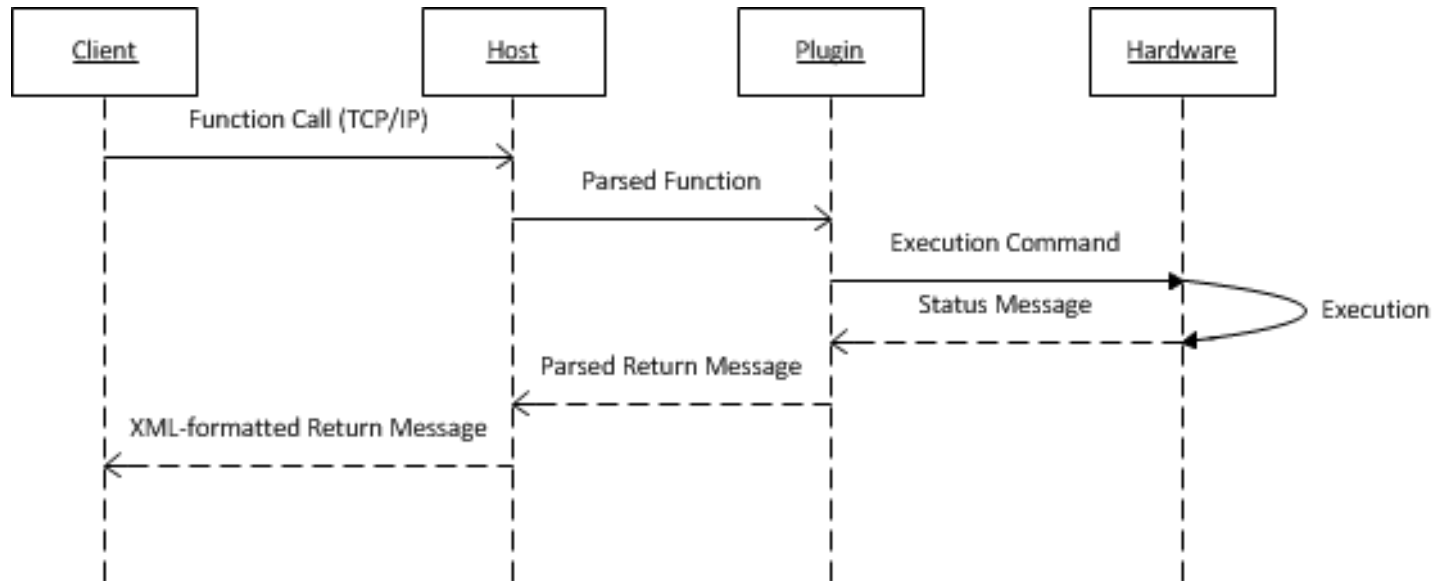
- Provides the knowledge of which plugins to use
- Has user interface for displaying data and controlling execution
- In Server/Client architecture provides the API for network calls

# Client Application



- Communicates with host via pure TCP/IP implementation
- Can be implemented to run on top of different operating systems
- Many programming languages supported (LabVIEW, C#, PHP).

# Communication profile

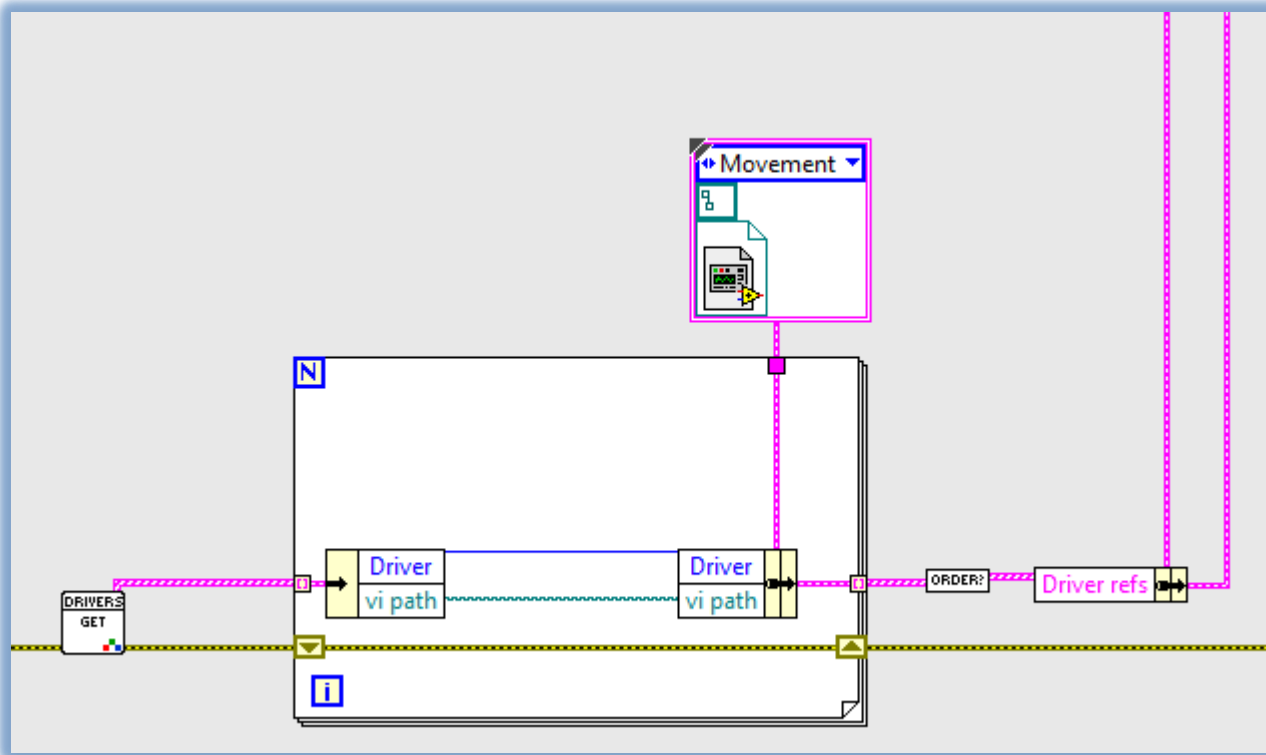


- UML sequence diagram for communication

# LabVIEW

Example

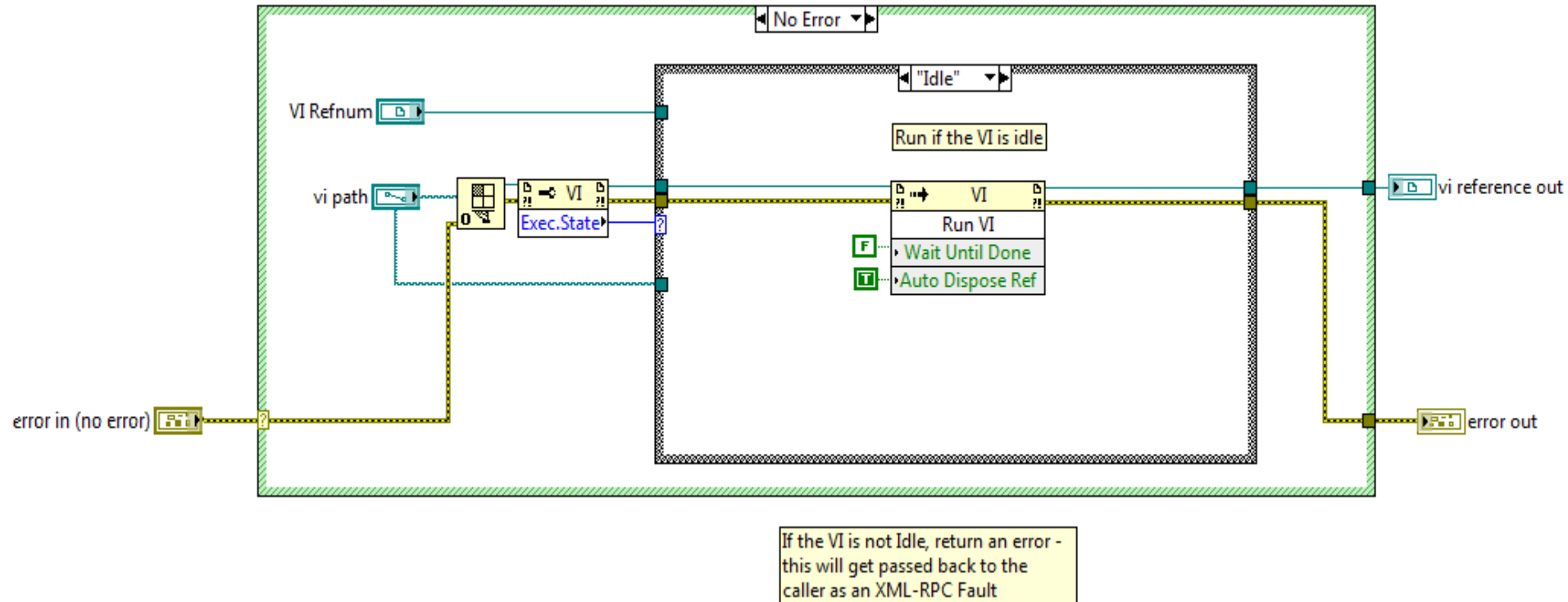
# Fetching plugins



Drivers are retrieved to associative array:

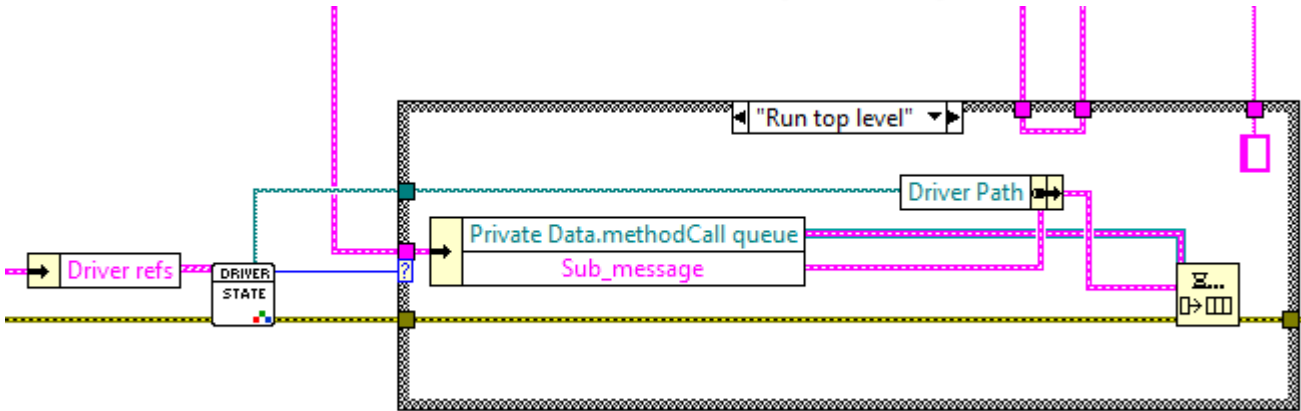
- Type
- Path
- Reference

## Asynchronously launching plugin

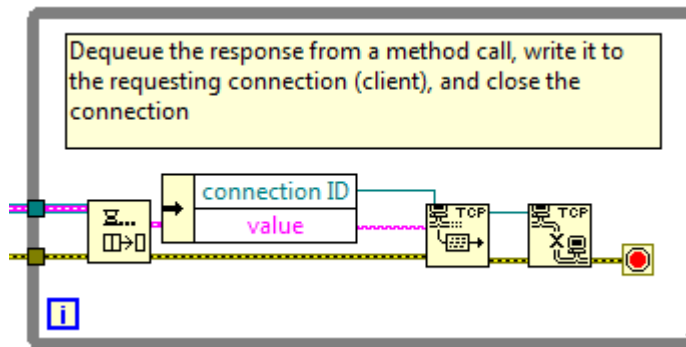


- VI name in the library is referenced and run without waiting it to finish execution → No deadlock in host execution
- Should the plugin be already running, handle re-initialization

# Plugin ↔ Client



- Message is constructed in the host and sent to plugin via FIFO-enqueue function.



- Plugins know who's calling them and host simply acts as hub, distributing return messages to clients.



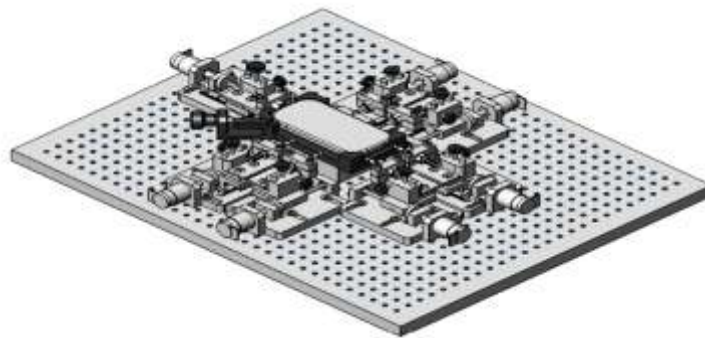
# Product

Side Actuator

Presented at OptoFidelity stand

# Side Actuator

- Allows testing of physical buttons and peripheral plugs on hand held devices.
- Customized mechanics for seven actuators.
- Stand alone control system with XML based TCP interface.
  - Enables operating system independent communication over TCP/IP.



# System break out

- Servo motor driven  $\mu$ m-screw
  - Limit switches
- Embedded drive parameter control with NI cRIO
- NI hardware:
  - NI cRIO
  - 7 x NI9505 DC brushed Servo drive
  - NI 9423 Digital IO module
- NI software:
  - RT: Communication and ramp calculations
  - FPGA:
    - PID-control for drive parameters
    - Safety limit control



# Thank you for your time

For more information:

Visit the codebusters-bar at NIDays 2012

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