New deal in Industrial Process Controlling and Visualization

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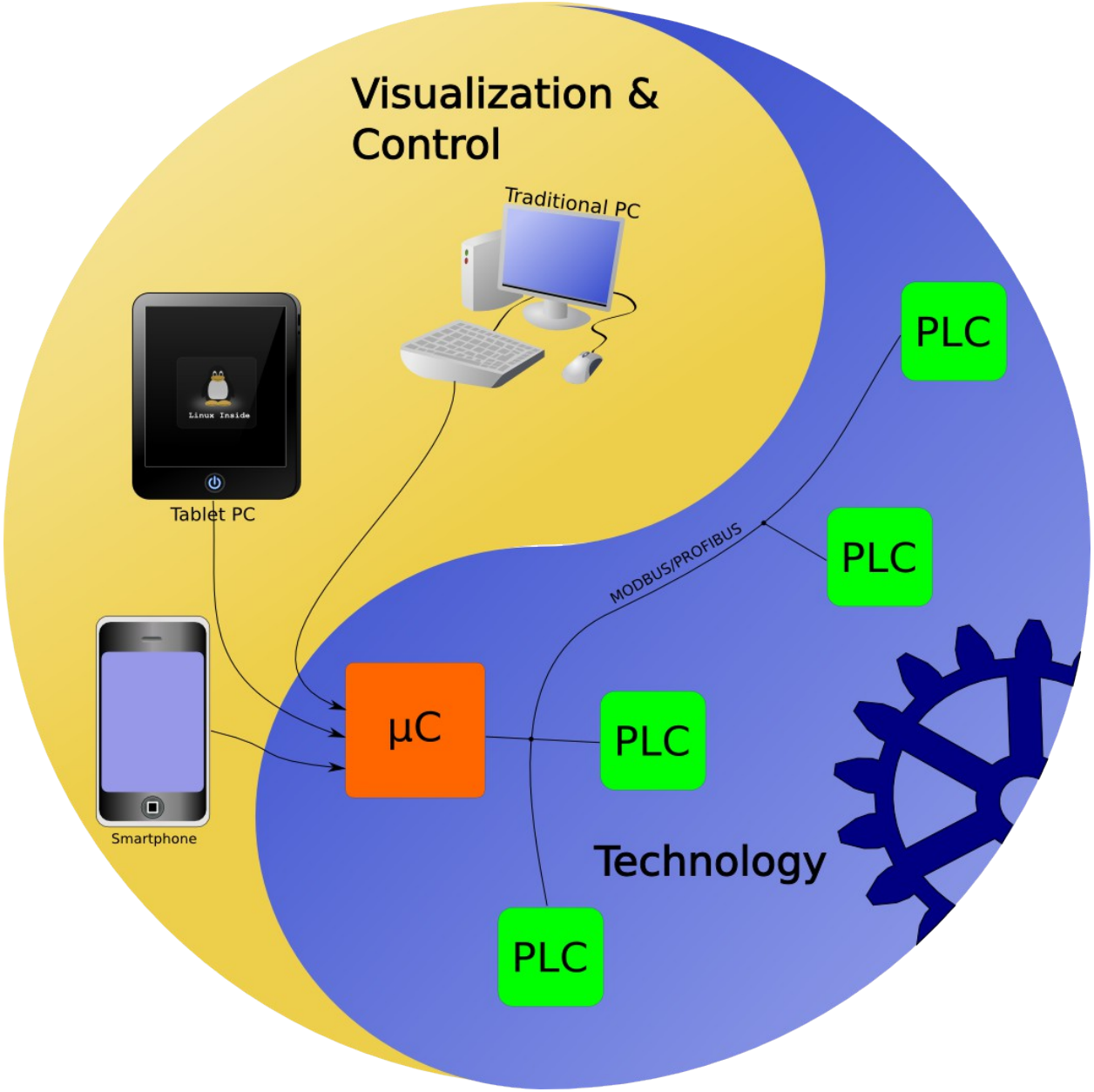
The task


Visualization & Control
Traditional PC
Tablet PC
Linux Inside
Smartphone
µC
MODBUS/PROFIBUS
PLC
PLC
PLC
PLC
Technology

The traditional approach

- Standalone application
- Single workstation
- Bitmaps for visualization
  - different bitmaps for each states
    - on,off,error,disabled,off-line
- Hard to scalability
  - More clients increase network traffic
  - Different screen size
  - Have to be on same operating system
  - More resources on server

Prerequisites

- Multiple workstation
  - Different screen size
  - thin client technology
    - no need special software on clients
- Web frontend
- Security
  - Authentication and authorization
- Server on µC platform
  - less resources
  - working without screen
  - industrial design

Solving

- Server
  - Embedded Linux
  - Java
    - Spring
    - Jetty
- Clients
  - Google's Gwt

Server

- Collects and serving information from technology
- Logging facility
- Handling security
- Controlling the elements of industrial network and technology

Clients

- Visualization of technology
- Controlling of technology

Benefits

- Multiple access
- Multiple platform
  - Tested on Linux, Windows, Android
- Visualization efforts on the clients
- Cheap server
- Less own codes
- No more server resources when increase number of clients
- No increase the traffic on industrial network

Visualization

- SVG
  - can be adapted to the screen of clients on-line
  - No need to cut and export devices to bitmap
  - All layer in single svg
    - gwt software can hide/display elements
  - SVG elements can generates events
    - onClick
  - Native animating facility

SVG

- XML based language for 2D vector graphics with animation facility
- Open standard Defined by W3C
- SVG 1.0 at 2001
- SVG 1.1 at 2003
- Natively supported by browsers
  - Opera since 8.0
  - Firefox since 1.5
  - Chrome since ~2008
  - IE since IE8 (it is very slow and not fully compatible with SVG 1.1.)

Other apps to support SVG

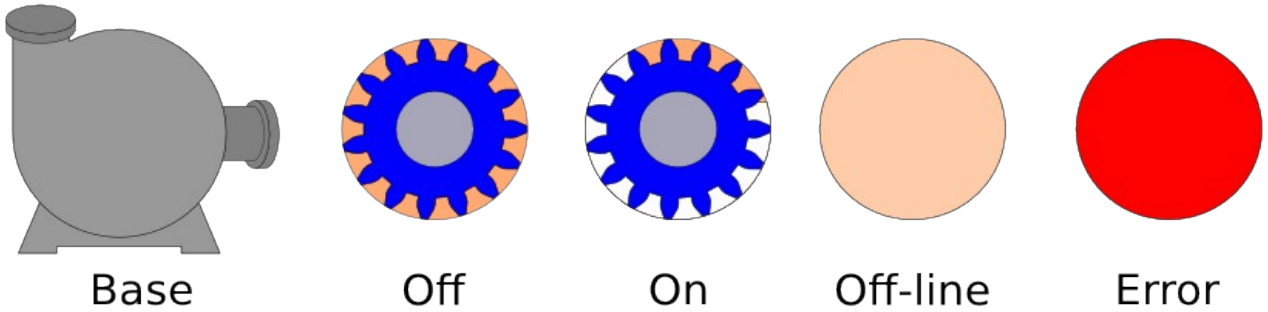
- Inkscape multi platform vector graphic drawing app.
- LibreOffice multi platform office solution
- Dia flowchart drawing app.
- GIMP bitmap editor
- Scribus desktop publishing
- SVGMaker SVG exporter for M$ Office

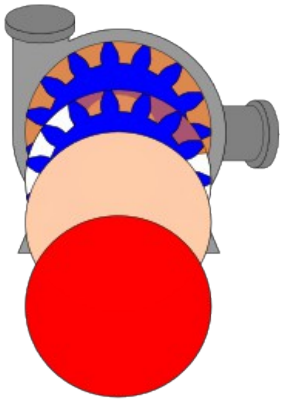
SVG facilities

- http://www.w3schools.com/svg/svg_exam
- http://devfiles.myopera.com/articles/76/Sc

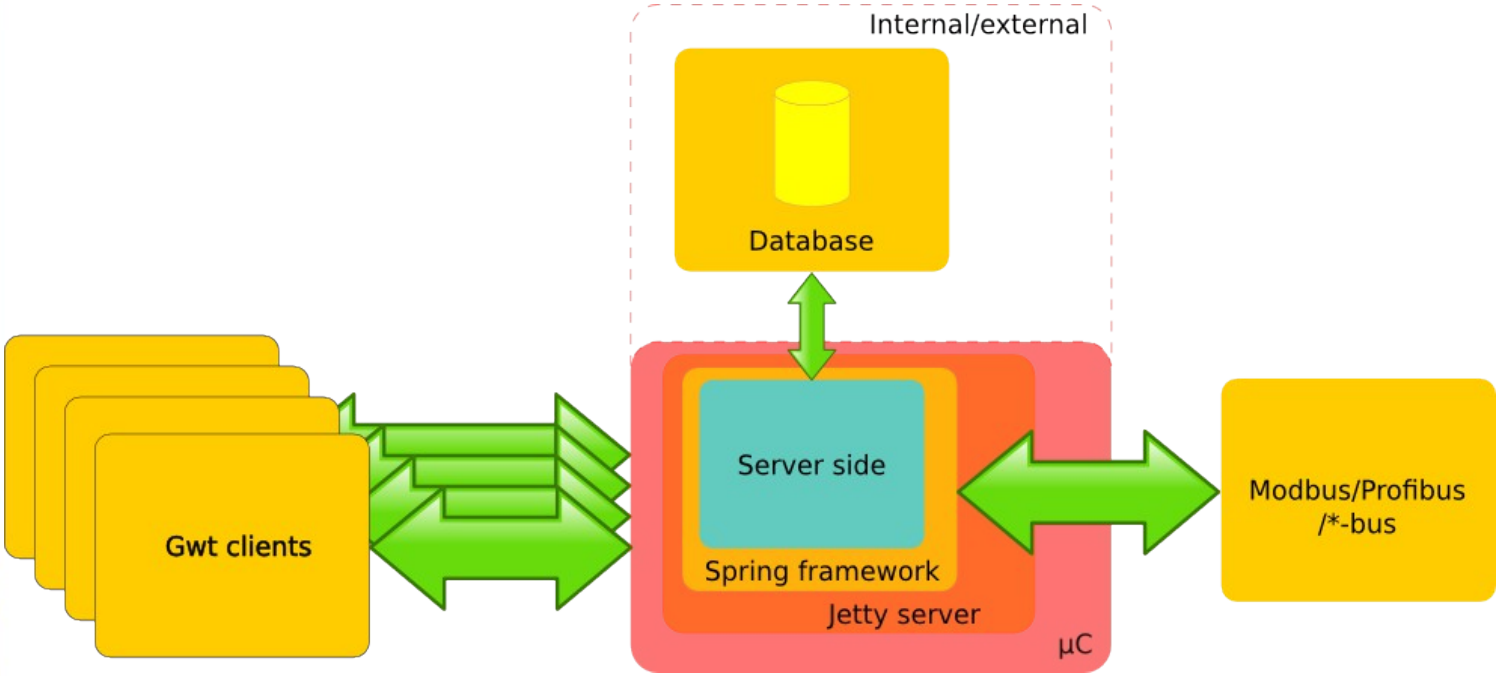
SVG for visualization

- Layers





All together



Security

- GWT handled JS vulnerabilities
  - Leaking data

    prevents JavaScript from sending data to a different server.
    - Cross-site scripting

      Evil code creates a hidden iframe and then adds a <form> to it, constructs a URL with query parameters

      Evil code creates a <script> tag
    - Forging requests

      Force javascript to another server
- Spring
  - Can authenticating a lot of source
    - JDBC,LDAP,PAM etc.

Copyrights and prices

Component	License	Price
Google Gwt	Apache v. 2.0	0
Gwt-svg lib	LGPL	0
Spring framework	Apache v. 2.0	0
OpenJDK	GPL	0
Debian	GPL	0

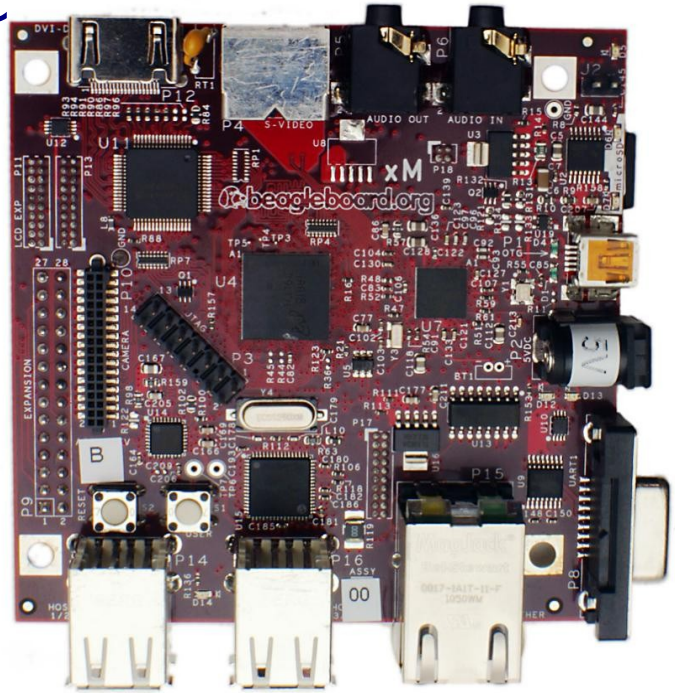
Hardware	Price
Beagleboard XM rev C	$125

Who should interests?

- PLC manufacturers
  - Embedded web server for plc
- Visualization software manufacturers
- Automotive manufacturers
  - user interface for on-board computers
- EIB/KNX manufacturers

Demo

- http://zamek.pmmf.hu:8080/gwt/Argus.html
- Configuration
  - Beagleboard xM Rev C
  - Texas Instruments Cortex A8 1Ghz processor
  - 512Mb RAM
  - 4Gb class 4 SD card
  - Debian Wheezy
  - Java OpenJdk 7
  - Jetty 8
  - Database Postgresql on another site



Questions?

Thank you