

Benefits of Open Source Hardware In Industrial Automation

Scope

The aim of this brief is to make the reader aware of the open source hardware movement and recent developments contained within. The developments discussed can be leveraged for industrial processes control to the benefit of the organization choosing to use them.

Author

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History

Programmable Logic Controllers (PLC)

Since the late 1960's the Programmable Logic Controller or PLC, which was created to speed up changeover of automotive production lines, has been the computational work horse of industrial automation. Most PLC's are proprietary systems created by a single vendor.

http://en.wikipedia.org/wiki/Programmable_logic_controller

Open Source Software (OSS)

The Open Source Software movement began in the 1980's with software engineers using their free time to create useful programs that were then distributed at low or no cost to the user. Additionally, the code used to create these programs is open for anyone to view and improve. The result is sophisticated software at no cost to the user. The poster child of this movement is the web server. Today more than 80% of the worlds web servers are based on open source software (W3Techs.com, 1 July 2014).

http://en.wikipedia.org/wiki/History_of_free_and_open-source_software

Open Source Hardware (OSH)

In the late 1990's an idea started to take hold inspired by the Open Source Software movement but applied to hardware. Hardware, in this case, is typically an electronic circuit or mechanical device. Unlike open source software, to realize the use of an OSH design a physical device has to be fabricated. Fabrication can be done by the individual wishing to use the device or by a third party manufacturer.

<http://www.oshwa.org/research/brief-history-of-open-source-hardware-organizations-and-definitions/>

Today

New software and hardware are now starting to appear that have a PLC form factor. Nonetheless these products utilize the ideas of OSS and OSH which in turn enables the creation of industrial processes based on open solutions.

<http://quick240.com/quickstart>

<http://startingelectronics.com/projects/large-open-source-PLC/>

<http://www.openapc.com/>

Conclusion

Utilizing open technologies for industrial processes provides both short and long term benefits to users in the following ways.

Immediate Benefits

- Lower equipment costs: Since organizations selling open hardware participated in a larger group of volunteers the cost to create a new product is lower and savings are passed on.
- No hidden features or bugs: If a problem is found with the equipment and the manufacture does not wish to fix the issue the organization is not tied to a specific vendor to solve the problem.
- Second sourcing: No need for second sourcing since the designs are open.
- Community: A community of corporations and users provide extended support beyond what a traditional closed systems can offer.
- Talent: A larger community of individuals concentrated around a common set of open standards means there is a larger pool of possible talent familiar with the technology choice. This makes it easier for a manager to find the talent capable of building equipment today and repairing or maintaining equipment in the future.
- Flexibility: Open systems are flexible and can be easily expanded in way that closed systems are not by either directly by the user or by third parties. Both hardware and software can grow with business needs. In contrast it is usually difficult to extend capability or add new, highly custom features to a closed proprietary system.

Long Term Benefits

- Extended Life: When a proprietary PLC is discontinued by the manufacture it means that old equipment cannot be maintained. Open systems when discontinued by a specific manufacture have all documentation open, so much so that it can even be reproduced by a third party.
- Reuse: When equipment is decommissioned, usable hardware that may have previously been discarded can more easily be reused due to a reduction in the barrier of finding adequate documentation.