



The future of software development

**A White paper prepared by
Proven Software Solutions Ltd**

Introduction

Proven Software Solutions is the industry's first independent broker for proven embedded software. We enable OEMs and other Device Manufacturers (DMs) use embedded software more efficiently, which leads to lower development costs, lower risk, faster time to market and ultimately higher profits.

The trend in the embedded market sees software complexity rising, along with the cost and risk of developing it. Whenever this happens in any industry, market forces take over to create an alternative solution. That alternative is software reuse. Hardware design reuse is a tried and tested solution to tackling complexity and, frankly, the sheer effort involved in developing new products. Reusing hardware is commonplace today and consequently the cost of hardware design is falling in relative terms. Proven Software Solutions is enabling the same concept for embedded software reuse.

Like hard Intellectual Property (IP), software is a commodity that can be traded. It already happens with new software, in the form of Independent Software Vendors (ISVs), Value Added Resellers (VARs), Systems Integrators and Consultants – who all trade on their skills in creating embedded software and software development tools. In the case of System Integrators and Consultants, any IP they create will often belong to the OEM or DM who commissioned the job. Additional to that is the wealth of embedded software that has been developed in-house, by OEMs and DMs, for specific projects. All of this software may already be reused in-house by the OEM/DM, but it could also be reused externally, by other manufacturers.

All embedded software is effectively tailored to an end application, because it's written to run on a specific processor within a family, or interface to specific off-chip devices, but this isn't a stumbling block when it comes to software reuse. The fact it had to be developed in the first place indicates it isn't available anywhere else, such as from a silicon supplier or OS vendor. This means if another OEM or DM using a similar platform needs a similar function, they will have to develop the software too. Clearly this isn't an efficient use of resources, but Proven Software Solutions is changing that, by providing a cost effective and resource-friendly framework for software reuse.

Identifying software for reuse

Proven Software Solutions (PSS) classifies embedded software as either differentiating or enabling. Differentiating software is your ‘secret sauce’, the bit that sets you apart from the rest of your competition. Releasing this to the embedded community, some of whom may be in competition with you, is obviously not a good idea! Because of this, PSS concentrates on *enabling* software, the stuff that needs to be there to support your product – such as a communications protocol, device driver or peripheral interface – but on its own doesn’t really add that much value to your end product. Enabling software can represent the vast majority of your embedded code, costing just as much to develop as your differentiating software but adding much less value to the end product. It is this software that PSS targets for reuse, where the benefits far outweigh any downside. In fact, reusing enabling software is a win-win situation for all involved.

The proliferation of freely available source code today is dwarfed by the amount owned by OEM/DMs. The ‘value’ of free code is only as good as its traceability. Our philosophy is to supply *proven* software, the definition of which is covered by four scenarios. The software must be fully developed, debugged and deployed, and the first two scenarios relate to this; the number of units or family variants produced and deployed without reported failure goes a long way towards classifying software as proven. The third scenario relates to production runs of lower volumes, but where the longevity of service without reported failure demonstrates reliability, in this case we document the number of active hours. The last scenario is relevant to code that has been developed in accordance to an industry recognised quality standard, here the actual volumes involved are less important. We have a supplementary definition for software that has been fully developed and debugged but for whatever reason has failed to reach deployment – this code is referred to as proof of concept and can also be supplied for reuse.

The value of proven software is clear, but as it isn’t open source, it isn’t protected by the likes of a General Public Licence (in fact, the implication of a GPL would preclude its distribution and protection under our licence agreements). To enable the distribution of proprietary software and protect the rights of the owner, the PSS Licence Agreements were created. They comprise a licence for software suppliers and a licence for software users. Coupled with each is a schedule, which details the actual software being supplied under the relevant licence. This way, both the owner and the licensee are protected. For more information about our licence agreements please contact us or visit our website at www.proven-software.com

So much software...

The amount of software available for reuse is only limited by the number of OEM/DMs developing products, while the 'shelf life' of enabling software is only limited by the availability of the architecture it runs on. For instance, the 68HC08 family of 8bit microcontrollers from Freescale has been around for tens of years and is still available. However, the pace at which end product features move means the useful shelf life of embedded software is more realistically around five years.

Europe's 4000 or so DMs collectively develop around 1Billion lines of enabling software every year. That means there's around 5Billion lines of code that could be reused instead of (re)developed at any given time! Releasing even a fraction of this software in to the Embedded Systems market will rapidly lead to lower development costs, shorter development cycles and a higher return on investment.

Processing that much code represents Proven Software Solutions' investment in the concept, but we can't do it without your help. If you have enabling software – and if you're an OEM or DM then you undoubtedly do – PSS can help you turn it into a reusable commodity, which other developers like you are ready to license.

By following our guidelines you could submit your code for reuse today, meaning it could be working harder for you tomorrow. And the more software we have to offer, the more chance of us having the software you're looking for, for your next project.

Although we make it as simple as possible for you to submit your software for reuse, the fact remains that nobody knows your software like you. Initially we ask you to complete a Software Submission Form, from this our own software engineers evaluate your software for reuse, at which point we will advise you of how much a licence fee would generate. We then produce long- and short-form datasheets, and once a Licence Agreement is entered in to between you and PSS, the short-form datasheet is added to our online repository, where it is free to be viewed or downloaded. At this time, we would ask you to supply us with the deliverables (typically the source code and any accompanying support files) which we store securely, for distribution to licensees. For further details of how the licence agreements operate, please contact us.

Support

It is PSS policy to only accept software that meets our definition of proven, but even proven software may need to be supported when being integrated in to a larger system. It is also our policy not to require software suppliers – namely, you – to provide this support, because we recognise that your primary business is developing end products, not supporting software. To overcome this problem we have implemented localised Support Networks, typically comprising Systems Integrators, whose business *is* supporting Third Party software. Under a Non Disclosure Agreement, and only with your permission, this support network will familiarise itself with the software and offer to support it on your behalf. This lifts the burden of support from your shoulders, making it even easier to submit software to PSS for reuse.

Of course, we also acknowledge that supporting software can be a lucrative diversion and if you feel at any time that you would like to support a licensee, we are more than happy for you do this, under a separate commercial agreement between you and the licensee. This may be done on an ad-hoc basis, depending on your available man power at any given time.

Copyright

If you choose not to support your code and PSS handles this on your behalf through the Support Network, you may also choose to maintain a level of anonymity as a supplier. To this end, we will need to remove any comments in the software that reference you, the supplier, directly. Typically this will include removing any copyright inserted by you. Copyright in the United Kingdom is automatic, however there is no register of copyrights and it can be hard to enforce. Because PSS holds Golden copies of your software – which cannot be changed once filed – by adding our own Copyright by Proxy (example below), we ensure both your copyright and anonymity are protected.

Example Copyright by Proxy:

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Copyright 2005 Proven Software Solutions Ltd
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The copyright for this software is held by Proven Software Solutions Ltd on behalf of its customer,  
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Summary

Software reuse represents an evolutionary step in the embedded electronics industry. Software complexity is doubling every two years and software development is rapidly becoming the primary cost in R&D, as well as the biggest threat to missed product launches and feature deficiencies. Reusing enabling software is the only viable solution to this challenge. Proven Software Solutions is dedicated to promoting embedded software reuse to the benefit of the electronics industry worldwide.

Contact Details:

Proven Software Solutions is a UK Registered Company based in Maidstone, Kent, UK.

Mailing address:

Proven Software Solutions Ltd
5 Weill Road
Aylesbury
Buckinghamshire
HP21 9RH
UK

Telephone: +44(0)870 950 3048

Web: www.proven-software.com

Email: info@proven-software.com