



# Certified Open<sup>®</sup> - Product and Services Framework

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**Version: 1.13**

**Published by**

Certified Open Ltd  
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London SE1 3LE  
UK

# Table of Contents

1 Introduction.....	3
2 Mission Statement.....	3
2.1 Preamble.....	3
2.2 Mission .....	3
3 Summary.....	3
4 Defining Terms.....	6
What is a product?.....	6
What is a device?.....	6
What is cost?.....	6
What is lock-in?.....	6
What is substitutability?.....	6
What is meant by restriction?.....	6
What is meant by extension?.....	6
What is meant by loss of functionality?.....	7
What is meant by documented examples of substitutability?.....	7
What is an open standard?.....	7
What is an industry standard?.....	7
What does strictly conforming mean?.....	7
What is an applicable standard?.....	8
What is meant by proprietary?.....	8
What is meant by documented?.....	8
What is meant by firmware?.....	8
What is meant by other components?.....	8
5 The Weighting System.....	9
6 Explanatory Notes to Questions.....	10
Client View.....	10
Software View.....	11
Hardware View.....	12
Data View.....	13
Business View.....	13
7 Evaluation Framework .....	15
Client View.....	15
Software View.....	16
Hardware View.....	18
Data View.....	20
Business View.....	21

# 1 Introduction

This document, “Products and Services Framework” describes both the approach and evaluation process for the Certified Open® programme associated with products and services. A separate document “Competency Framework” describes the Certified Open programme associated with skills.

Both documents are to be read alongside the “Operating Principles” which documents all aspects of governance and the overall structure of Certified Open.

## 2 Mission Statement

### 2.1 Preamble

It is a widely accepted principle that open, fair and free competition is desirable in most markets.

Certified Open® is designed to help measure and encourage competition through the provision of a framework for evaluating technical and commercial lock-in where that may reduce the ability of suppliers to compete in the provision of software, hardware and services.

Lock-in to a single vendor or single architecture is a long-standing feature of the computing industry. Whether it is good or bad for the customer is for that customer to decide. Certified Open provides a means to detect and measure the lock-in that the customer may incur through the use of particular products. It is then for the customer to decide whether that is a factor to use in making deployment decisions.

### 2.2 Mission

“To provide a framework for the measurement of freedom of competition when making IT purchasing decisions”

## 3 Summary

Certified Open® provides a self-certified framework within which products can be evaluated in terms of the amount of lock-in that they incur when deployed by users. The framework is intended to be consistent across a range of products and is designed from the users' not the suppliers' point of view. Within the context of Certified Open, the term 'open' can be taken to mean

- Freedom from vendor lock-in
- Openness to substitution by competing products

The questions below are necessarily broad in scope. Whilst it would be possible to certify a product by adhering 'to the letter' of the questions, the intent of this framework is to provide a broad guide to the practical degree of lock-in that is likely to occur when a product is used in the ways envisaged by its designers and suppliers. It is therefore important to understand the spirit as well as the letter

of the framework when responding.

Lock-in to a product can occur in many ways. This framework sets out to clarify the obvious forms of lock-in that occur via technical issues such as for example:

- Dependence on undocumented or proprietary protocols
- Dependence on undocumented or proprietary data formats
- Licensing terms that preclude the use of alternative products
- Reliance on extensions to standards whereby users are obliged to use those extensions to obtain good performance
- The use of 'standards' that are based on patents or other forms of restrictions that constrain others from providing compatible competing implementations

Not all forms of lock-in are necessarily bad; the framework should be used to ascertain the degree of lock-in implied by the use of a product and then users may make their own decisions based on their requirements.

The framework takes into account commercial practices such as licensing or marketing agreements to the extent where they may result in reduced substitutability as far as the user is concerned. It does not address customer retention through such practices as the provision of better support or lower prices than competitors unless those are on discriminatory grounds.

This framework attempts to provide a consistent way to evaluate the cost and difficulty of substituting one product with another that performs equivalent functionality as far as its user is concerned. Most industries have the concept of plug-compatible parts where a component supplied by one vendor can be substituted by components supplied by others. The IT industry can demonstrate partial success in these areas. Examples of generally low lock-in include:

- PCI cards for purposes such as network connectivity, graphics displays and similar tasks
- SMTP mail exchangers such as Postfix, Sendmail, Exim providing broadly compatible services
- The IP networking stack (TCP, UDP, ICMP etc.) which has been reimplemented many times
- MIME email clients using SMTP, POP and IMAP
- Video and sound editing software using recognised standard formats for data interchange
- Database technology based on standards, capable of use in a range of environments (those environments sometimes known as 'platforms')

For the user, lock-in to a single product may well be acceptable if that product does not also involve consequential lock-in. Examples of consequential lock-in are where for instance: a product implies the use of another such as the operating environment e.g. software that only runs on one vendor's operating system; a product is dependent on services from a proprietary server architecture that is not itself substitutable; a product depends on data formats that can only be accessed via a proprietary tool set; and of course many others.

In many cases substitutability is achieved through the use of well-specified open standards. Open Standards come in various forms ranging from *de jure* standards approved by international bodies e.g. ISO to *de facto* standards which come about through informal industry agreement. To meet the requirements of this framework those standards must conform to the following criteria:

- The standards must be under the control of an independent body drawn from all interested parties and specifically not only from the supplier side
- The standards must be freely re-implementable by anyone wishing to do so; in particular

standards which incorporate licensed or patented technology are less desirable than those which do not. Those which do should be the subject of an irrevocable license of that technology for use. If a fee is payable or other restrictions are placed on the use of the technology the standard is considered substantially less open in that case

## **4 Defining Terms**

### ***What is a product?***

The Certified Open concept of a product covers data, goods and services that are the subject of a purchasing decision by a consumer.

### ***What is a device?***

A device encompasses the software and hardware used to provide interaction. Another term for 'device' is 'information appliance'. Examples of devices include PDAs, desktop computers, televisions and mobile phones.

### ***What is cost?***

Certified Open uses the term cost to include financial, time, resource and other costs that a purchaser may incur as a result of choosing to use a product or to replace with an alternative. Certified Open does not try directly to measure costs but typically speaks of “reasonable” or “undue” costs. It is the responsibility of the purchaser to determine the impact of those costs on a case-by-case basis.

### ***What is lock-in?***

Lock-in refers to the situation where current or future purchasing decisions are constrained by restrictions imposed by past choices. Lock-in is generally considered to be bad when those constraints lead to higher costs or the inability to meet business requirements.

### ***What is substitutability?***

Substitutability refers to products that can replace or substitute one another without undue cost. The electronics and other industries sometimes use the term “plug compatible” for products that are functionally identical to one another. The wider computing industry rarely achieves full substitutability to that extent, nonetheless substitutability lies at the heart of a strategy to avoid lock-in.

### ***What is meant by restriction?***

Restrictions refers to the concept of having license, patent, contractual or other encumbrances that limit the users' rights or abilities to do what they wish with the product. Depending on context those restrictions might apply to deployment, modification, extension or other activities involving the product.

### ***What is meant by extension?***

This is in the context of “extension to standards” and refers to products that take existing open or industry standards and then provide enhancements or extensions to those standards. A wish to improve upon standards is understandable since most standards tend to represent industry consensus and usually lag behind what technology makes possible. Unfortunately enhancements or extensions are a common cause of technical lock-in.

## ***What is meant by loss of functionality?***

Loss of functionality is subjective since it is rarely possible to achieve total substitutability. If substitution causes trivial alterations to the behaviour or performance when compared to the alternative, this does not count as loss of functionality. If, however, important features omitted or are rendered inaccessible or less accessible, that must count as loss of functionality. What is considered important by one user may be trivial to another, hence the subjectivity. “No loss of functionality” means no loss of functionality that is important to the user.

## ***What is meant by documented examples of substitutability?***

Where an answer to a question claims that substitutability is possible, the respondent to the question should be able to provide information about the devices or services that the product is claimed to work with. Within the limits of practicality those alternatives must be equally well supported and neither the subject of significantly different pricing regimes for the supply of the product, support or training, nor subject to significantly different schedules for upgrades and enhancements to the product. Any alternative sources of devices or services that are claimed as examples must be capable of being sourced from independent competing points of supply with no single point of control (i.e. independently competitive).

## ***What is an open standard?***

An Open Standard refers to a format or protocol that is a) subject to full public assessment and use without constraints in a manner equally available to all parties; b) without any components or extensions that have dependencies on formats or protocols that do not meet the definition of an Open Standard themselves; c) free from legal or technical clauses that limit its utilisation by any party or in any business model; d) managed and further developed independently of any single vendor in a process open to the equal participation of competitors and third parties; e) available in multiple complete implementations by competing vendors, or as a complete implementation equally available to all parties.

## ***What is an industry standard?***

An Industry Standard is one formally recognised by an independent international standards body such as ISO. A body is not independent if it is under the control of an identifiable group of interested parties. Examples of industry standards are the IETF RFC (request for comment) documents.

## ***What does strictly conforming mean?***

Strictly conforming means conforming to an applicable standard in such a way that no extensions or enhancements are used or that any enhancements or extensions have no material effect. Although Certified Open would prefer to see no extensions or enhancements of any kind, an acceptable example of no material effect might be where comment strings are used to provide software version numbers indicating which version of the software produced the data.

## ***What is an applicable standard?***

Applicable standards are those that apply to externally visible properties of the product such as its data storage formats or use of network protocols (for example). If the product is the first of its kind and has to do things for which no standards exist, then in that area there are clearly no applicable standards. In some cases the product may consist of a number of components which communicate with each other: provided that the communication or file formats used for that purpose are not

intended for long-term storage or external data interchange it may be argued that standard formats are not applicable in those cases.

### ***What is meant by proprietary?***

Proprietary technology is technology that is covered by patents, licences or other restrictions that limit the ability of suppliers or end users to copy and compete with it. It is usually considered to be the opposite of open technology, which is not limited by patents, licenses or other restrictions for suppliers or end users.

### ***What is meant by documented?***

Documented means described in such a way as to allow a trained engineer to fully understand the function of the hardware on all levels applicable to the use the hardware is intended for. All possible functionality is clearly described along with the methodology used to obtain such functionality. An example would be the documentation of a network card in such a way as to ensure that any third party could create drivers for the card.

### ***What is meant by firmware?***

Firmware means software used to activate and/or operate the hardware. Such firmware might also be referred to as drivers or BIOS. Examples include the code required to allow initial hardware access and the drivers required to allow graphic card functionality.

### ***What is meant by other components?***

Other components may include an operating system, database management system, network agents, user interfaces or physical devices. Components that are that have limited available alternatives but present no barrier to the creation of such alternatives should be regarded as substitutable.

## 5 The Weighting System

The weighting system is based on percentages for each view (**Hardware View**, **Business View** etc) and for the framework as a whole. Each of the answers to a question is weighted according to its relative value. The final certification calculation is based on the total for each view divided by the number of views used to certify the product (with the exception that the business view is counted as two views). Not every product will use all of the available views, but every product must use the business view.

The grading scheme used for Certified Open is as follows:

- Gold certification is equal to a score of 90% or more
- Silver certification is equal to a score of 70% or more
- Bronze certification is equal to a score of 50% or more

As part of the validation process it is important to make sure that various views are not skipped in order to manipulate the points score. If applicable views are left out the applicant has three options:

- Change the submission to include views that should apply
- Appeal against the inclusion of the additional views
- Withdraw the application

It is important to note that the framework does not currently use multipliers regarding the answering of questions to weigh the outcome. Thus different questions have different numbers of answers; the number of answers is dependent on the context of the question.

### A practical example of Certified Open product validation:

An email client might be put through the client, software, data and business views while skipping the hardware view. The calculation used to certify the email client would be as follows:

$$\frac{\text{Total score from client view} + \text{software view} + \text{data view} + \text{business view}}{3 + 2 \text{ (the business view counts as two sections)}}$$

In our example the score might look something like this:

$$100 + 80 + 100 + 180$$

$$\frac{\quad}{5}$$

The client view scores 100% (gold), the software view scores 80% (silver), the data view 100% (gold) and the business view 90% (180 divided by 2, gold). The email client would therefore score 92% overall, giving it a gold Certified Open classification.

## 6 Explanatory Notes to Questions

These notes are intended to assist those who may be unfamiliar with product evaluation according to the “Evaluation” section of the Certified Open Framework. These notes are informal guidance and do not form part of the formal evaluation criteria. Each note refers to a particular question in the “Evaluation” section.

### ***Client View***

*Q1 “Does the product enable the user to substitute devices?”*

Substitute in this context means the ability to replace the client device with no loss of functionality and without restriction. Apart from standards-conforming web browsers there are few good examples of generic client devices so to claim substitutability for this question respondents must be prepared to give documented examples of substitutability of the devices for which they claim substitutability.

*Q2 “Does the product offer its full user functionality while conforming only to open standards with no restrictions or extensions?”*

User functionality is the behaviour of the product as perceived by a day-to-day user of the system and is not intended to cover administrative or management behaviour. This question requires the full user functionality of the product to be available exclusively through the use of open standards. If the product has a strictly-conforming mode of operation so that it can be used without the extensions then it may answer yes to the “fully conforms” option provided that the restrictions on functionality that result are clearly documented.

*Q3 “Does the product conform to accessibility guidelines?”*

'Accessibility guidelines' can be understood to mean EU endorsed accessibility guidelines. Examples include accessibility guidelines for keyboard design and configuration interfaces, low barriers of entry with regards technical requirements, and accessibility from a linguistic perspective.

*Q4 “Where there is a user interface is it restricted by patents or other methods?”*

This question refers to the ability of suppliers to provide alternative display devices. If the user interface for the system is based on restricted technology, that constrains suppliers who may wish to compete for the supply of display devices. If, for example, the display is based on one of the commonly used window-mouse-keyboard systems, is that system proprietary or open to competition?

## **Software View**

*Q5 “Does the product depend on other components?”*

This question deals with consequential lock-in, i.e. dependence of one product on others that cannot be substituted. Classic examples are dependency on database management systems or operating systems that are not themselves substitutable.

*Q6 “Does the product use or provide extensions to existing applicable standards?”*

Extensions can be understood to refer to non-standard components built on top of an accepted standard. An example would be the Dynamic HTML extensions to HTML, thus creating 'HTML' code that did not conform with the HTML language standard.

*Q7 “Is the product substitutable?”*

Are there competing products which provide functional equivalence at a practical level? Functional equivalence is a subjective measure that is not amenable to narrow measurement. Examples of products that can probably claim functional equivalence include

- Numerous FTP clients
- Numerous POP/IMAP email clients
- Sendmail, Exim and Postfix SMTP mail transfer agents
- The various FORTRAN, C, C++ etc. compilers
- Firewall and virus filtering packages
- ERP

Functional equivalence means doing the same job, not necessarily in identical ways.

Where the answers refer to “at no cost” this means that the product is free of charge (as is the case with some of the examples listed above). In those cases, where the supplier responding offers support services, those should be charged the same for each product. The cost part does not refer to transition and conversion costs that would be incurred by a user as a one-off cost of substituting products.

*Q8 “Can the product be extended by the user?”*

Extended can be understood to refer to extra functionality or improvements to existing functionality may be added by the user without requiring the support of the original creator. Examples would include macro extensions in office productivity suites and communication extensions to email and instant messenger clients. These may be achieved through the use of plug-ins or by modification to the product itself. Many products require additional licence fees to make use of their extensible features and this is noted in the possible responses where reference is made to licences.

*Q9 “Can the product be modified by the user?”*

Does the user have access to source code, specifications or drawings to the extent required to allow the user to extend and or modify the product? This goes beyond the concept of extensible (see above) and includes modifications that are not possible through macros languages, programming interfaces or configuration options.

## **Hardware View**

*Q10 “Are hardware interfaces documented?”*

Hardware interfaces can be understood as the systems used to allow the manipulation, control and use of the hardware. Documentation of the interfaces can be understood to mean accurate and complete instructions of the commands or processes required to use to the hardware to its fullest extent.

*Q11 “Is the firmware distributable?”*

Firmware can be understood as the hardware, software or combination of the two used to provide certain functionality inherently connected with the hardware. An example is telephony firmware distributed with a modem; it provides controls that ensure the hardware correctly executes telephony actions are required by the software on the machine. Distributable firmware can be understood to be relatively unlinked from the distribution of the physical hardware; it might be distributed separately from the hardware with operating systems, on CDs or through other media.

*Q12 “Is the product substitutable?”*

Substitutability in this context can be understood to refer to hardware that can be replaced in the communication chain. An example is a web server that can be replaced by another web server with a similar specification from either the same or an unrelated manufacturer.

*Q13 “Can the product be extended by the user?”*

Extended can be understood to refer to extra functionality or improvements to existing functionality may be added by the user without requiring the support of the original creator. Examples would include upgrading storage components in server systems or changing the processing unit in a workstation.

*Q14 “Can the product be modified by the user?”*

Does the user have access to specifications and other documentation to allow the user to extend and or modify the product? This goes beyond the concept of extensible (see above) and includes modifications that would change the function of a system entirely. An example would be to change a server into a workstation by adding a graphics card, reconfiguring the software loaded on the system, and connecting a printer.

## **Data View**

*Q15 “Does the product offer full functionality while making the data accessible via an open standard?”*

This question refers to data interchange formats. Open standards for these formats ensure that data reading, writing and sharing methods are consistent, recoverable and ultimately substitutable.

*Q16 “Is the data structure substitutable via an open standard?”*

This question refers to metadata and any structure or container that contains data rather than the data itself. It encompasses file formats, database formats and other structures except where the structure can reasonably be understood to constitute software. A data structure is normally accessed by software to obtain data and possibly write new or modified data back to the data structure. Examples of data structure include XML files, SQL database records and ODF files.

## **Business View**

*Q17 “Is a recognisable commercial support framework in place for this product?”*

This question recognises that lock-in can occur through support arrangements as much as for technical reasons. It is specifically intended to discover whether all support and modification requests need the involvement of a single vendor or whether the ability to obtain critical bug-fixes and enhancements is devolved down the supply chain.

*Q18 “Is a recognisable community support framework in place for this product?”*

This question refers to informal channels of support for the product beyond formal supply-chain support mechanisms and encompasses forums, mailing lists and user groups amongst others.

*Q19 “Are there any licenses, contracts or agreements that would limit use or substitutability?”*

This question refers to binding agreements that would limit the ability of anyone to use or substitute clients, software, hardware, data or support where applicable. Examples would include binding support contracts and restrictive End User License Agreements (EULA)s which increase user lock-in.

*Q20 “Are there any licence or patent restrictions on interoperating or sharing data with other systems?”*

Some standards and a greater number non-standardised protocols and data formats are the subject of licences, patents or other restrictions. If these are not freely and irrevocably made available for commercial and private use this constrains the use of those standards and may result in fewer competing implementations.

## 7 Evaluation Framework

This section of the document is the formal evaluation section. For guidance on answering the questions, refer to the 'Explanatory Notes' section.

### ***Client View***

The client view of the product in question describes the way in which the end-user interacts with the product. If there is no end-user interactivity, this section is not relevant to the product.

### **Questions**

Is the user able to substitute the product?

- Fully substitutable
- Limited substitutability
- Not substitutable

Does the product offer its full user functionality while conforming only to open standards with no restrictions or extensions?

- Fully conforms
- Mixes open and closed standards
- Does not meet open standards

Does the product conform to accessibility guidelines?

- Fully conforms
- Can be extended to conform
- Does not conform

Where there is a user interface is it restricted by patents or other methods?

- There are no restrictions
- There are restrictions covered by a royalty-free non-revocable general licence
- There are licence or patent restrictions that require fees or other costs

## Software View

The software view of systems is broad. Some products consist entirely or mostly of software whilst for others it is only a component. Software has historically been a common cause of lock-in to particular vendors or broad application frameworks. The reasons for the lock-in are many, ranging from accidental (because no effort was made to avoid it) through to deliberate decisions to build a locked-in customer base.

Where the questions below refer to substitutability they are not intended to encompass operating procedures, end-user training, monitoring and management of the products unless those features are an integral part of the product's functionality.

In this section, software does not generally refer to firmware that can be considered to be a component of hardware.

### Questions

Does the product depend on other components?

- It does not depend on other components or the components are substitutable.
- It depends on components which have limited substitutability
- It depends on components which are not substitutable

Does the product use or provide extensions to existing applicable standards?

- It neither provides nor uses extensions
- It uses extensions but works without the extensions
- It uses extensions that are fully documented
- It uses extensions that are partially documented
- It uses extensions that are undocumented

Is the product substitutable?

- Fully substitutable
- Partially substitutable
- Not substitutable

Can the product be extended by the user?

- Fully extendible with minimal cost
- Fully extendible with some costs
- Partially extendible with minimal cost
- Partially extendible with some costs
- Not extendible

Can the product be modified by the user?

- Fully modifiable with minimal cost
- Fully modifiable with some costs
- Partially modifiable with minimal cost
- Partially modifiable with some costs
- Not modifiable



## Hardware View

The hardware view describes the physical device(s) associated with the product. In the questions below 'hardware interfaces' can be understood as descriptions of how to activate and control the physical device. 'Firmware' can be understood as software used to initialise and extend the functionality of the device. Examples of hardware devices include (but are not limited to):

- A desktop computer
- A server
- A mobile phone
- A wireless networking point

### Questions

Are hardware interfaces documented?

- Fully and accurately documented with no restrictions
- Fully and accurately documented with restrictions
- Partially documented with no restrictions
- Partially documented with restrictions
- Not documented

Is the firmware distributable?

- Fully distributable with no restrictions
- Fully distributable with restrictions
- Partially distributable with no restrictions
- Partially distributable with restrictions
- Not distributable

Is the product substitutable?

- Fully substitutable
- Partially substitutable
- Not substitutable

Can the product be extended by the user?

- Fully extendible with minimal cost
- Fully extendible with some costs
- Partially extendible with minimal cost
- Partially extendible with some costs
- Not extendible

Can the product be modified by the user?

- Fully modifiable with minimal cost
- Fully modifiable with some costs
- Partially modifiable with minimal cost
- Partially modifiable with some costs
- Not modifiable

## **Data View**

The data view describes the data created, used or stored by the product. 'Data structures' can be understood as any digital container used to contain data created, used or stored by the product. Examples of data structures include (but are not limited to):

- ANSCII Text structures
- XML schema
- SQL databases

## **Questions**

Does the product offer full functionality while making the data accessible via an open standard?

- Fully accessible with no restrictions
- Fully accessible with restrictions
- Partially accessible with restrictions
- Limited accessibility with severe restrictions

Is the data structure substitutable via an open standard?

- Fully substitutable with no restrictions
- Fully substitutable with restrictions
- Partially substitutable with restrictions
- Limited substitutability with severe restrictions

## **Business View**

Lock-in is not only a technical matter. Commercial considerations, especially around support and licensing will typically carry at least as much weight.

Commercial deployment of software will rarely be possible without formal support agreements with qualified support partners. In most industries multiple support partners are available to provide full support for products including enhancements and modifications with guaranteed support levels. This full support is less common in the software / IT industry but should be regarded as critical to avoid product lock-in.

Licenses which limit the use or support of the product are examples of commercial constraints on substitutability.

Is a recognisable commercial support framework in place for this product?

There are multiple top-tier support routes

There is a single existing top-tier support route with no barriers to the formation of alternative support routes

There is a single top-tier support route with barriers to the formation of alternative support routes

There is no commercial support framework

Is a recognisable community support framework in place for this product?

There is a formally constituted user group with regular meetings

Extensive on-line and other community support can be demonstrated

There is no recognisable community support framework

Are there any licenses, contracts or agreements that would limit use or substitutability?

There are no limits to use or substitutability

There are few limits to use or substitutability

There is a strict limit to use or substitutability

Are there license or patent restrictions on interoperating or sharing data with other systems?

There are no restrictions

There are restrictions covered by a royalty-free non-revocable general licence

There are licence or patent restrictions that require fees or other costs