

***GEO Portal* Establishment Process**

Version 0 as of 06/02/08

A *web portal* is a single point of access or gateway to services which are linked through various logically related Internet based applications.

The purpose of this paper is to establish a process leading to the establishment and sustained operation of the Internet based *GEO Portal* and all related elements.

1 *GEO PORTAL* DEFINITION

The *GEO Portal* will, through its single web-based interface, be *the* application for searching and accessing Global Earth Observation System of Systems (GEOSS) services, components, and data catalogues. It will enable users to locate, access, and share data, information, services and applications through a Clearinghouse and Web interface. It will include a number of common functions and solutions, including those specific to search and discover services, as well as provide relevant information. It will also take into account integration and interoperability with non-geospatial portal environments and associated standards.

The *GEO Portal* will present information from diverse sources in a unified way by providing a consistent look and feel in terms of access controls, for multiple applications. All relevant applications will share information through this common Portal, thereby streamlining communication between various types of users.

Figure 1 shows the *GEO Portal* General Architecture. It is comprised of four major elements:

a. Web Interface:

A Web Site that provides access through standard interfaces to the GEOSS Clearinghouse and other Earth Observation related web portals, Community web-sites, and services.

b. GEOSS Clearinghouse:

The component that provides access to a network of Catalogues and Registries, conforming to identified catalogue service and metadata standards. The Clearinghouse supports access to data, documents, services and other resources through the search of descriptive properties (metadata) offered by GEO Members and Participating Organizations

c. GEOSS Component Registry and Service Registry:

A *GEOSS Component* is the part of GEOSS contributed by a GEO Member or Participating Organization. Example types of components include observing systems, data processing systems, dissemination systems, capacity building, or other initiatives. Components may display *service* interfaces to provide access to Earth observation-related functions and/or data. Components are described in the *GEOSS Component Registry*.

A *GEOSS Service* is a functionality provided through component system interfaces (such as a server for web-based mapping). Services are described, along with information about their operating organizations, in the *GEOSS Service Registry*.

d. GEOSS Standards Registry and Special Arrangements Registry:

Standards (governing web interfaces, for example) may be de jure (formally recognized) or de facto (informally adopted) within a community of application. De jure standards are typically

managed by a standards development organization (e.g. ISO, IEEE, OGC). Formal international standards are documented and referenced in the *GEOSS Standards Registry*. Interoperability arrangements that document informal standards are referenced in the *Special Arrangements Registry*.

GEO Members and Participating Organizations are both users and providers, in particular with respect to populating the GEOSS Component and Service Registries, GEOSS Catalogue and Services.

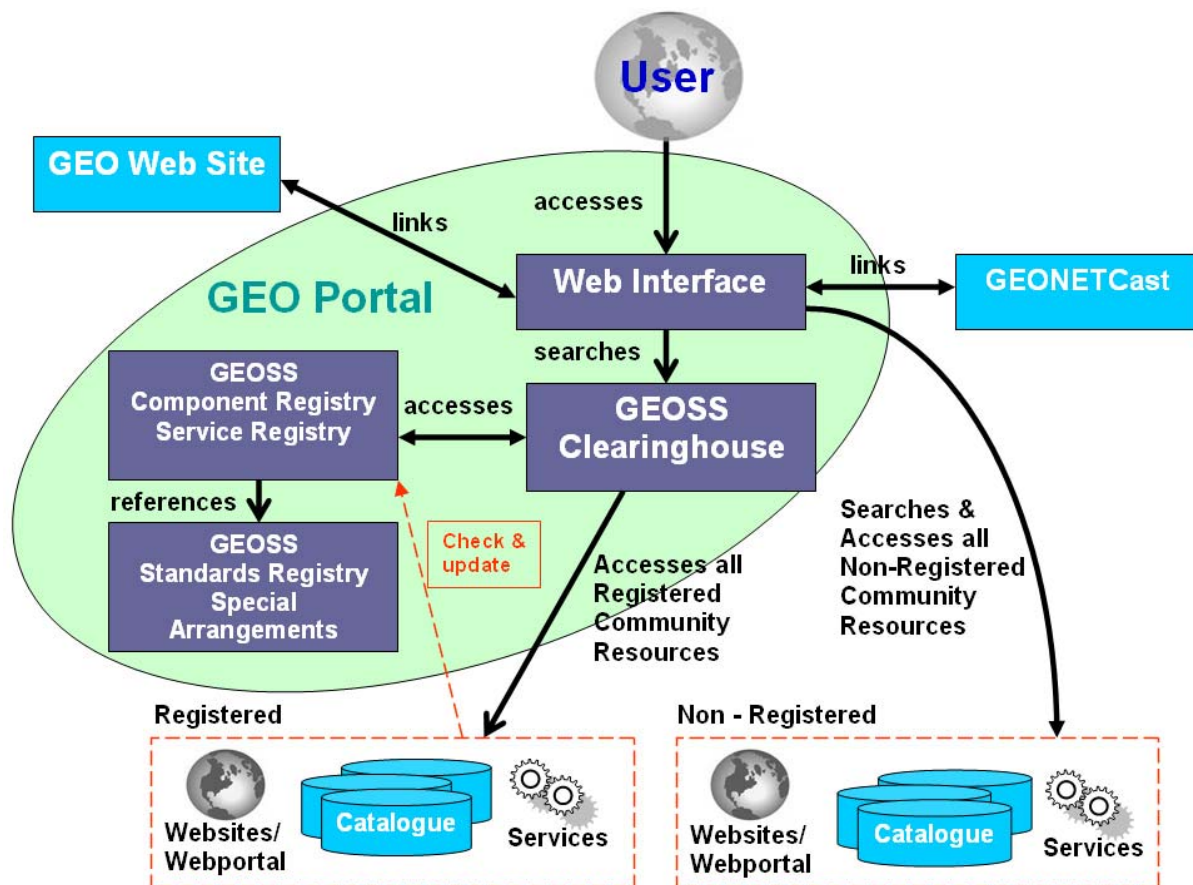


Figure 1. *GEO Portal* and all related elements

The *GEO Portal* shall ensure access to and search of all relevant Community Resources (Databases, Services, Websites/Webportals), including those not (yet) registered to GEOSS. Also, the *GEO Portal* will link with the GEO Web Site and GEONETCast. Indeed, GEONETCast should provide an alternative access capability to the same Community Resources as those provided through the *GEO Portal* for users with limited web access capabilities.

The *GEO Portal* shall contain the list of all resources accessible through the Web Interface and GEOSS Clearinghouse presenting the results of a search or providing access. Moreover, GEO will adopt a proactive approach to favour and promote registration of components which are not yet registered.

2 BASIC PRINCIPLES

The following statements are contained in various GEO documents that have been accepted by GEO Summit and Plenary meetings, and provide the context for establishing the *GEO Portal*.

“We commit ourselves to working together to improve the interoperability of and access to observation and associated prediction and information systems towards the continued strengthening of GEOSS and the full realisation of the 10-Year Implementation Plan.”

(Cape Town Summit Declaration)

“All GEO partners must work together to ensure full, open and timely access to data and relevant products at minimal cost.”

(GEO Report on Progress 2007)

“GEOSS will provide coordination and cost-and-benefit-sharing mechanisms that address several challenges plaguing typical international efforts requiring collaboration.

Shared Infrastructure - GEOSS will promote shared infrastructures for Earth Observation, leading to cost reductions for GEO Members and Participating Organizations, and provide scientific benefits as well. [...]

[...] Multi-Use systems: Efficiency can also be realized by designing Earth Observation systems from a multi-use perspective as envisioned in GEOSS.”

(10-Year Implementation Plan Reference Document, §5.6 – Collaboration mechanism)

“GEOSS will be based on existing observing, data processing, data exchange and dissemination systems, while fostering and accommodating new systems operated by GEO Members and Participating Organizations, as needs and capabilities develop. The technical commitments of a GEO Member and Participating Organization will apply only to those contributions that they have identified.”

(10-Year Implementation Plan Reference Document, §5.7– Initially identified GEOSS systems)

The above Principles constitute the basic reference framework within which the *GEO Portal* will be implemented. This framework has the following implications:

- a. The *GEO Portal* must be accessible to all GEO Members and Participating Organizations and beyond.
- b. The *GEO Portal* must include a mechanism by which all GEO Members and Participating Organizations may contribute to its future development at any time, through an agreed-upon process. Modifications could encompass items such as providing additional functionality to existing applications and services of the core software project and/or new compatible services and applications based on user/community requirements, without incurring any additional copyright/licensing charges.
- c. The *GEO Portal* operation, including maintenance, evaluation and updating, must be sustained through to the end of the GEOSS implementation, with the possibility of extension.
- d. The *GEO Portal* establishment process should encourage cooperation in the identification and selection of candidate portals and/or portal components, as well as ensure adequate sharing of responsibilities. This includes sharing the functions, operation and maintenance of the *GEO Portal* major elements, as well as, possibly, time sharing of responsibility for Portal operation and update.

3 REQUIREMENTS OF THE *GEO PORTAL*

At this date, preparatory work for the development of the *GEO Portal* has been conducted by the GEO community, under the guidance of the Architecture and Data Committee, in two related Architecture and Data Management Tasks and, in particular, under Task AR-07-02: GEOSS Architecture Implementation Pilot. This task has already made an inventory of candidate Providers for Portal components development and evaluated the compliance of these proposals with a series of agreed-upon technical requirements.

The following requirements are based on this work, in particular the definition of the Initial Operating Capability. Additional requirements have been added, in particular to reflect the basic principles of the *GEO Portal* development process described above.

3.1 General and Programmatic Requirements.

The *GEO Portal* should:

- recognize and link to other Earth Observation portals, including capacity building portals.
- have a consistent Look & Feel (unified headers and footers, colour schemes, icons, logos) as defined by the GEO Secretariat in accordance with the graphic identity of GEO, in order to give the user a sense of uniformity and simplified navigation.
- be on a computer (with reliable internet access) hosted by either the Portal Provider or an entity on non-territorial ground (e.g., the UNICC or the GEO Secretariat).
- be freely installable at multiple GEO Participating Organisation locations.
- categorize the information contents pertaining to each GEOSS Societal benefit Area.
- contain a provision for feedback on performance of search operations or user experience.
- prohibit (user-) data mining or harvesting of user information.

3.2 Technical Requirements.

3.2.1 Structural Requirements.

The *GEO Portal* should:

- include an interface to the GEO Secretariat Website
- include an interface with GEONETCast.
- feature an interactive map interface.
- feature a catalogue client interface conformant with OGC CSW 2.0.1 or higher to access the GEOSS Clearinghouse.
- provide a catalogue service interface conformant with OGC CSW 2.0.2.
- contain a helpdesk function.
- provide a registry for the GEOSS Community Catalogue Service and metadata.
- link to capacity building registries and enable context sensitive searching of and linking to capacity building resources.

3.2.2 Functional Requirements.

The *GEO Portal* should:

- allow Web interface, Clearinghouse and Registry access at least 99% of the time (i.e., approximately 7 hours of down time a month).
- have a response capability of up to 10,000 hits/hour performance.
- ensure evolution of clients, interfaces, and system components.
- provide functions and solutions for viewing the results produced by other web services of the Earth Observation community.
- feature personalised access (favourite data sources/platforms/time periods).
- feature quick links for easy access and to facilitate navigation.
- include a validation function for its contents (data consistency, representativeness, copyright).
- record performance statistics (dissemination speed, access trend) for internal data management.
- include a blog/discussion forum. (TBC)

3.3 Upgrade and maintenance requirements.

- maintenance of the *GEO Portal* software and content should be ensured.
- a process for organizing content development and communication with the Portal operations and maintenance team should be established.
- related maintenance and evolution plan should be established.
- regular upgrades of the *GEO Portal* should be produced.

4 *GEO PORTAL* DEVELOPMENT OPTIONS - A PARADIGM FOR GEOSS IMPLEMENTATION

At the onset of the implementation of the *GEO Portal*, a decision has to be made regarding the basic paradigm under which the implementation will be enacted: *Open Source* versus *Proprietary* software development. The text in the box below, which is extracted from the GEOSS 10-Year Implementation Plan Reference Document, reflects the current position of GEO.

Open Standards and Intellectual Property Rights:

GEOSS will not require any commercial or otherwise proprietary standards, following the policy that software components must have open-standards-based interfaces. An ‘open standard’ is a standard specification that is not restricted in its use. This is a matter separate from whether the document that expresses the specifications may be subject to Intellectual Property Rights (IPR) restrictions. (For instance, standards bodies such as ISO rely on sales revenue from standards documents to support their operations.

A goal of GEOSS is that multiple software implementations compliant with the open standards should exist for the most commonly used components. Such software may be subject to IPR restrictions, typically expressed as a licensing agreement.

In light of its capacity building commitments, a further goal of GEOSS is that at least one of the implementations for the most commonly used components should be available to all implementers ‘royalty-free’ (i.e. having no requirement for recurring payment).

GEOSS also encourages the development and verification of software that has no restrictions on being copied, modified or redistributed. Such software is typically distributed in the form used by programmers (‘source code’), and is therefore commonly known as ‘open source.’ Given the lack of restrictions on its use, open source software typically requires payments at roughly the cost of distribution.

It should be noted that distributors may disclaim responsibility to repair defects or otherwise update royalty-free or open source software, relying instead on a network of developers who contribute updated versions on a best-effort basis.

(GEOSS 10-Year Implementation Plan Reference Document).

The purpose of this section is to provide a complete definition of the Open Source and Proprietary software development options, together with a preliminary analysis of their respective pros and cons, in order to support the discussion and decision on this issue.

4.1 Open Source

The Open Source Definition is used by the Open Source Initiative (OSI) to determine whether or not a software license can be considered open source. Under the Open Source Definition, licenses must meet ten conditions in order to be considered open source licenses by OSI. These ten conditions are listed below.

4.1.1 Free Redistribution

The license shall not restrict any party from selling or giving away the software as a component of an aggregate software distribution containing programs from several different sources. The license shall not require a royalty or other fee for such sale.

4.1.2 Source Code

The program must include source code, and must allow distribution in source code as well as compiled form. Where some form of a product is not distributed with source code, there must be a well-publicized means of obtaining the source code for no more than a reasonable reproduction cost preferably, downloading via the Internet without charge. The source code must be the preferred form in which a programmer would modify the program. Deliberately obfuscated source code is not allowed. Intermediate forms such as the output of a preprocessor or translator are not allowed.

4.1.3 Derived Works

The license must allow modifications and derived works, and must allow them to be distributed under the same terms as the license of the original software.

4.1.4 Integrity of The Author's Source Code

The license may restrict source-code from being distributed in modified form only if the license allows the distribution of "patch files" with the source code for the purpose of modifying the program at build time. The license must explicitly permit distribution of software built from modified source code. The license may require derived works to carry a different name or version number from the original software.

4.1.5 No Discrimination Against Persons or Groups

The license must not discriminate against any person or group of persons.

4.1.6 No Discrimination Against Fields of Endeavor

The license must not restrict anyone from making use of the program in a specific field of endeavor. For example, it may not restrict the program from being used in a business, or from being used for genetic research.

4.1.7 Distribution of License

The rights attached to the program must apply to all to whom the program is redistributed without the need for execution of an additional license by those parties.

4.1.8 License Must Not Be Specific to a Product

The rights attached to the program must not depend on the program's being part of a particular software distribution. If the program is extracted from that distribution and used or distributed within the terms of the program's license, all parties to whom the program is redistributed should have the same rights as those that are granted in conjunction with the original software distribution.

4.1.9 License Must Not Restrict Other Software

The license must not place restrictions on other software that is distributed along with the licensed software. For example, the license must not insist that all other programs distributed on the same medium must be open-source software.

4.1.10 License Must Be Technology-Neutral

No provision of the license may be predicated on any individual technology or style of interface.

Pros (not an exhaustive list):

- The project would be aligned with the "spirit of GEO" in that the Project is owned by all Members and Participating Organizations of GEO, while encouraging consensus building through diverse, international collaboration.

- Based on numerous examples to date, the life expectancy of an open source software project would be indefinite (e.g., [Apache Web Server](#) project has been going for over 12 years).
- Having numerous volunteer developers presumably available solves the issue of commitment levels to maintaining various components of the Project.
- The experience of a majority of projects is that software development proceeds *more quickly and efficiently* than under proprietary conditions.
- The Project would enjoy complete independence from unforeseen modifications to its core, driven by proprietary concerns or “lock-in.”
- Project development will benefit from the power of distributed peer review and transparency of process.
- With Project code in public view and under constant scrutiny, reliability and security issues are minimized.
- Cost-effectiveness of open source has been proven by many businesses who have adopted this approach (e.g., [MySQL](#) Database software, [Ernie Ball](#) guitar string manufacturer).

Cons (not an exhaustive list):

- A Core Team would need to be established to oversee the developments, stream of proposed changes and upgrades.
- In the case that none of the current solution Providers identified wishes to pursue open source development of the *GEO Portal*, a call for developers should be issued, possibly using the available resources of entities such as the *Open Source Initiative* or [Ubuntu Linux](#). Ideally, the working prototype from one or several of the current Provider candidates could be converted to open source to provide the initial Project core.
- There is a risk of losing control of the direction the project.

4.2 Proprietary Definition

Under a proprietary arrangement, software would be developed by Providers, commercial or otherwise, which would retain full copyright to its property (developed software). A single Provider is often assumed in proprietary arrangements. However, two or more proprietary Providers could conceivably be involved in the *GEO Portal* development. The following remarks apply in both cases, with an added layer of complexity in dividing up tasks equitably if several Providers are selected. The source code would be confidential and unavailable to the public for modification. This arrangement would not preclude the addition of functionalities by parties external to the proprietary Providers (a process which could be open source). However the Providers of the *GEO Portal* software would retain sole ownership of their core contribution. An implicit requirement of this option is that Providers should commit to maintenance and upgrades of the *GEO Portal* for a specified time, thereby assuring continuity.

Pros (not an exhaustive list):

- GEO would be dealing with identified Providers, thereby reducing the risk of inefficiency, streamlining production, fulfilling requirements, and meeting deadlines.
- Better user interface design is often a reason cited for choosing proprietary over open source development.

- An operating framework can be established that clearly lays out responsibilities of all parties vis-à-vis the Project.
- Dealing with established professionals would lend stability and confidence in the Project.

Cons (not an exhaustive list):

- Dependence on proprietary Providers may be less compatible with the GEO philosophy of open access.
- Reliance on proprietary Providers may discourage timely responsiveness to any modifications and/or upgrades requested by GEO, potentially setting the stage for contention surrounding control of the *GEO Portal*.
- Setting up the appropriate instruments, ways and means, for the Project to guarantee its delivery, compliance, and maintenance will be critical and, presumably, costly.
- The legal implications and consequences of externally-developed functionalities subsequently grafted onto the *GEO Portal* are unclear.
- Legal issues surrounding the free transfer of the software to any interested party, a basic GEO principle, would have to be resolved.
- It is unclear what will happen beyond the expiration of the Provider's commitment for the maintenance of the *GEO Portal*.
- The Provider, having sole ownership of the *GEO Portal* core software, may decide to modify that core for whatever reason. This could create new dependencies, since any prior externally-developed functionalities might be rendered incompatible (e.g., Microsoft).

5 IMPLEMENTATION PROCESS

The following activities and milestones have been identified to progress towards full operation of the *GEO Portal*.

1. Decision regarding choice of development options (open source vs. proprietary).
2. Identification of Providers.
3. Evaluation and validation of initial developments, to formulate recommendations for further development and implementation.
4. Development of instruments, ways and means to ensure long-term, sustainable operations.
5. Formulation of recommendations for operations (hosting, upgrade and maintenance).
6. Establishment of the final framework based on lessons learned from the technical evaluation and validation phases as well as available instruments, ways and means identified and accepted by GEO.

This process will evolve over two years, of which the first year will focus on establishing a *GEO Portal* initial capability, to be tested by GEO Members and Participating Organisations for its concept, structure and functionalities. The second year will provide for refining, completing and validating the *GEO Portal* solution in full, including finalizing the necessary instruments, ways and means to ensure its continued operation.

5.1 Choice of Development Options

The first step will be the choice of a development path to be retained for the *GEO Portal: Open source* or *Proprietary*. The specific format for the management and development structure (e.g., advisory body and/or core development team) for the Portal will depend on the choice of paradigm and commitments made by GEO Members and Participating Organisations. Issues that need to be addressed include:

- Portal source code modification, review, and acceptance
- Portal content and hosting
- Portal software licensing

Following input from the GEO Committees (ADC, CBC, UIC, STC) and C4, the Executive Committee will formalise the decision at its 12th meeting in March.

5.2 Definition of Component Providers

This activity will begin with an evaluation of all candidate Providers, whether for the whole *GEO Portal* or for each of its components which will eventually comprise the *GEO Portal*. Attention shall be paid to the contributor's expertise.

The individual Portal components shall be offered by the Providers either independently, or as result of coordination. A mechanism of cooperation and coordination will be preferred to a competitive arrangement, in line with the spirit of GEOSS implementation.

In case several Providers are selected, an agreement with all Providers concerned to facilitate and guarantee operation of the *GEO Portal* (supported by appropriate tools) will have to be negotiated.

Eventually, a team made of the candidate Providers will have to be set up to coordinate the Portal component developments and ensure their complementarity and compatibility.

This task will be conducted by the Secretariat, in close coordination with Task AR 07-02, and will require the support of the ADC. A proposal will be prepared by the Secretariat for acceptance by the Executive Committee at its 13th meeting in July.

5.3 Evaluation, Validation and Upgrade

Throughout its development and implementation, the Portal and its components need to be evaluated. A *GEO Portal* initial capability (V1) will be available at the end of the first year of implementation and presented at GEO-V Plenary for information. An evaluation of this version will then be carried out under the coordination of the Architecture and Data Committee (ADC) in cooperation with the team of component Providers.

Recommendations for further development and implementation will be formulated. Recommendations shall be made by Portal component Providers or by the ADC on possible further developments of the Portal and the harmonisation of its structure, components and functionalities. Recommendations by GEO Committees, GEO Members and Participating Organisations shall be duly taken into account as part of the process.

In addition, this process, will permit potential gaps to be identified and potential additional components to be defined. This evaluation and its associated set of recommendations will be presented to the Executive Committee at its 15th meeting in March 2009. Subsequently the Portal shall be adapted/upgraded along the findings of the exercise.

5.4 Development of instruments, ways and means

In line with the Cape Town Declaration: "...We commit to explore ways and means for the sustained operations of the shared architectural GEOSS components and related information infrastructure; ...", the GEO Secretariat will develop ways and means to provide the necessary framework to permit the development, hosting, operation, maintenance and upgrade of the Web Interface, Clearinghouse and Registries, as well as all related components of the *GEO Portal*.

This activity will be conducted in parallel with the actions 5.1 to 5.3 described above. A detailed description of the issues to be addressed in this context will be established by the Secretariat and the necessary steps identified and reviewed by the Executive Committee at its 13th meeting. An interim presentation of the main findings and general orientations will be made at GEO-V Plenary for review and acceptance.

5.5 Recommendations for Operations and Establishment of Final Framework

The development of the *GEO Portal* shall be concluded by a validation of the complete Portal, its structure, components and functionalities in a joint validation exercise. This exercise will be conducted by the ADC. Following this and based on the recommendations of the ADC, the operation rules and responsibilities for the Portal shall be defined. This shall include, but not necessarily be limited to, activities such as hosting and maintenance of the Web Interface, Clearinghouse and Registries.

Based on the above evaluation, on requirements emerging from the implementation of contributed components, on the results of preliminary operations as well as on ways and means available, the final framework of the *GEO Portal* shall be established by the Secretariat for acceptance by Plenary at GEO-VI. This final step will also formalise the mechanisms and intervals for checking the content and updating the various components of the *GEO Portal*.

The following Table provides a planning overview, containing the key milestones of the Portal development, starting from the Committees’ discussion on the proposed process and an endorsement of its Principles, through the distribution of the roles among the Providers, to the presentation of the first Portal version at the end of 2008. This is followed in early 2009 by a review of the Portal’s early operation and the concurrent development of the appropriate instruments, ways and means to ensure sustainability and openness, and leads to the final release of a sustainable and operational *GEO Portal* at the end of 2009.








	2008	2009	2010 - Onward
	 ExCom 12	 ExCom 13	 GEO-V
		 ExCom 15	 GEO-VI
Process approval	↔		
Provider(s) definition	↔	V1 	V2 
Portal development	←————→		
Evaluation and Validation		↔	
Instruments, ways and means development	←————→		
Establishment of final framework			↔
Full operation			←————→

Table 1: General milestones of the *GEO Portal* development

6 *GEO PORTAL* TRADEMARK

The provisional official trademark for the Portal will be “*GEO Portal*”. The GEO Secretariat is currently developing guidelines for the branding of GEOSS dedicated components (“GEO products” such as GEONETCast, *GEO Portal*, GEO Bon, etc). The new branding will have to apply.