The Optical Internetworking Forum: Driving Cooperative Innovation

The Need: Collaborative Solutions for Network Interoperability

The communications industry faces a contradictory challenge. Voice, data and video networks are converging. Users are increasingly looking for services that are seamlessly delivered on-demand wherever they may be, on any platform, over any available network. But as the user experience becomes richer, the underlying technologies that enable network convergence are becoming more complex. This complexity is further compounded by the wide variety of carrier models and regulatory climates found in various regions around the world.

If not well planned, the underlying complexity that enables a converged experience can be a threat to the industry—draining budgets, slowing innovation, causing new incompatibilities and leading companies down dead-end paths. The entire industry—from the smallest component designer to the largest carrier—can benefit from collaborative efforts to design, agree upon and implement the building blocks for highly intelligent, reliable, interoperable networks and services that drive down costs while helping to globalize network access.

The Solution: The OIF

The Optical Internetworking Forum (OIF) is a nonprofit, member-driven organization dedicated to collaborative development of public-domain technologies that support optical internetworking for telecommunications and data networks. OIF members work together to develop and promote collaborative agreements that benefit the industry—enabling quicker development of affordable, adaptable and reusable solutions that serve the needs of vendors and users at every level of the industry ecosystem.

OIF collaboration is formalized in Implementation Agreements that specify methods anyone can use to create optical networking products, network processing elements and component technologies that will work seamlessly with other products that comply with the agreement. These Implementation Agreements are developed cooperatively by members throughout the entire industry —from carriers to equipment vendors, component manufacturers, academics, enterprise customers and more.

Implementation Agreements have already been developed to address a wide variety of issues, including external networking and optical interfaces as well as internal hardware and software interfaces. New Implementation Agreements are proposed, developed, tested and ratified in accordance with real industry needs, as identified and confirmed by member organizations. They also take into account existing formal standards and reuse standards whenever possible in order to further the OIF's mission of maximum interoperability.

The OIF's work also feeds into formal standards development organizations, laying technical groundwork that standards bodies can use to accelerate their own work. Some OIF Implementation Agreements have already been adopted in formal standards. Others have served as a springboard for further discussion and refinement within the standards bodies, helping advance the state of the art whether or not the original Implementation Agreement is adopted intact. Implementation Agreements also provide a framework for cooperation and interoperability that benefits the industry even ahead of the adoption of formal standards.

In addition to Implementation Agreements, the OIF also provides benchmarks to enable performance measurement. The OIF also creates its own extensive public Interoperability Demonstrations to help build market awareness, encourage industry cooperation, and accelerate innovation.

In short, the OIF helps drive cooperative innovation to accelerate the pace of progress across the industry. Let's take a closer look at the OIF's mission—including the industry needs it serves, the work it performs to meet those needs, and some of the successful Implementation Agreements it has produced.

An Open Forum for Progress

Network users and carriers alike thrive on continuous progress—more bandwidth, more coverage, more features and more reliability. For users, this progress leads to feature-rich devices that work seamlessly with the network to provide a better user experience. For carriers, continuous progress is the key to offering better services at a lower price—winning the loyalty of existing customers, attracting new subscribers, and competing effectively in a rapidly growing and evolving marketplace.

But certain roadblocks often stand in the way of progress, seriously complicating the goal of seamless interoperability. These roadblocks include:

- **Proprietary solutions.** Competition is still the name of the game, and some vendors hope to get ahead by creating proprietary technologies and products that don't support interoperability with other solutions. Instead, these vendors bet that they can achieve market dominance by offering a clearly differentiated and superior product that will, they hope, dominate the competition and make open solutions irrelevant.

  This approach can work for a time, but the overwhelming historical evidence shows that proprietary solutions, over the long term, tend to lose ground to open

architectures. Even if proprietary vendors offer methods for interfacing with their solutions, each nonstandard interface increases the complexity of the entire ecosystem—slowing progress and increasing expenses compared to standards-based solutions that interoperate by design.

- **Lacking or lagging standards.** Even when companies prefer to develop new products in compliance with standards, the existing standards may lag behind current needs. The process of proposing, developing, debating, refining and ratifying a new standard takes time—and time is money to an enterprise that is competing to be first to market with the next big thing.

  As important as standards are to technology convergence and interoperability, innovative companies realize that they need to make progress ahead of the standards—indeed, that ongoing progress feeds into developing standards and makes them better. In market areas where standards are lagging or completely nonexistent, there needs to be a pre-standard framework for interoperability—or else the industry as a whole lags behind what it could accomplish, and what end-users demand.

- **Lack of opportunities for collaboration.** Innovators in one field rarely have the opportunity to collaborate with those in another. Software engineers tend to talk to other software engineers, IC designers to other IC designers, interconnect experts with other interconnect experts, and so on. Without end-to-end cooperation to sort out the best ideas and verify that they work across networks and devices, progress can only happen through trial and error rather than directed planning and validation. There's no "glue" to connect good ideas from discrete fields together to create an innovative product.

Standards development organizations—such as IEEE, IETF, ITU and others—have been formed at global, regional and national levels to overcome these roadblocks. Their work is critical in bringing together the most important industry players to collaboratively develop, approve and publish standards supporting interoperability. These standards bodies have essentially made it possible to connect and communicate reliably, using a variety of off-the-shelf devices. As a result, they have vastly increased the market potential for these devices since consumers can buy them with confidence that they'll "just work."

But as important as standards bodies are, producing a ratified, published standard is a long process. Competing proposals must be evaluated, technical and political differences between member organizations must be resolved, and implementation differences must be reconciled between subgroups—all before voting can take place and the final standard is made available for use. And then the process has to start all over again as members offer new proposals for extending the standard to accommodate their future product roadmaps.

Of course, standards bodies strive to work as quickly and efficiently as possible in the face of these obstacles, while doing everything they can to ensure that ratified standards fully meet the needs of designers, manufacturers, vendors and carriers at every tier of the

industry. One way to support the efficient development of widely applicable standards is by bringing forth new proposals that have been developed in a non-political, hands-on, forum—complete with working prototypes that have been thoroughly tested, validated and demonstrated.

That is where organizations like the OIF come in. The OIF is not a standards body, and it does not produce standards. Instead, the OIF's mission is to create Implementation Agreements between member organizations for optical networking products, network processing elements, and component technologies. Much of this work ultimately ends up in formal standards, easing the burden of evaluating proposals and significantly accelerating the rate at which innovations can be incorporated in published standards and built into new products.

In addition, much of the OIF's work covers areas that haven't yet been addressed by formal standards bodies, supporting industry cooperation and technical interoperability ahead of any formal mandate. In other words, the OIF is not an alternative or competitor to formal standards bodies, but rather a complementary organization that supports standards bodies, carriers, and individual device designers and manufacturers alike, helping them bring new standards, new services, and new products to market faster—and better.

The Building Blocks of Success

Several features of the OIF support its mission of improving the quality and accelerating the pace of innovation:

- **Broad industry participation.** The OIF engages a broad cross-section of the industry in the decision-making process. Forum members include the carriers who purchase telecom and datacom equipment in order to provide services; the systems providers who manufacture and sell routers, switches and other infrastructure to those carriers; the IC designers, fiber optic device manufacturers and other suppliers who sell components to the systems providers; chip and subsystem manufacturers; electrical interconnect manufacturers; software engineers; and more. By involving all the key players—from the deepest component level up to major carriers—the OIF helps reduce risk for all players by eliminating the false starts and wrong directions that can cost money without ever producing usable results.

- **Accessibility.** The OIF offers multiple membership levels in order to encourage broad industry participation and solicit the wide-ranging input that ensures success across technology tiers and market segments. Principal memberships are for large carriers and manufacturers who stand to benefit the most from highly scalable, cost-effective solutions for interoperability. Small business memberships offer an equal level of participation, but with a discount on membership dues based on company revenues. Auditing memberships allow participants to observe and contribute to OIF proceedings, but without voting privileges. And academic memberships give access to professors and their students, as well as non-profit research organizations, bringing

a research-oriented perspective to the OIF's work while fostering new generations of innovators.

- **Pre-competitive cooperation.** The OIF's work takes place in the pre-competitive environment. The forum creates a level playing field where the best ideas can quickly be identified, tested, and productized—while unworkable ideas are either fixed or rejected before large investments are wasted on them. The OIF helps reduce the time, effort and expense of innovation for all participants. When they're ready to come to market with a new product, OIF participants can actually be in a more competitive position thanks to a solid technical foundation that serves the needs of the industry as a whole. There's no need to gamble on a unilateral solution that may or may not gain wider acceptance.

- **Contribution-driven progress.** The OIF is completely driven by the financial, intellectual and operational contributions of its members. Because it's a member-driven organization, nothing happens until an OIF member steps forward to say "I need this feature or capability"—and until other forum members also recognize the need and vote to create a new project to meet the need. The forum is structured to ensure that its work isn't wasted on concepts that look feasible on paper, but don't have any demonstrated need in the real world. Throughout the process, the advancement of projects is tied directly to the motivation and work of the members who will benefit from its completion.

- **Agility and focus.** In many cases, OIF projects address specific market niches that are more specialized than the areas typically covered by the major standards development organizations. These projects may eventually be considered for incorporation into a standard, or they may be so narrowly focused in terms of technology tiers or specific regulatory environment that they're never taken up by a standards body. In either case, for companies within the relevant niche, the need for a solution is real and urgent. The OIF has the agility to focus on these needs as they arise, ahead of or even in lieu of consideration by formal standards development organizations.

- **Demonstrated success.** The OIF encourages real-world prototyping, testing and public demonstration. Once a concept has been formalized as a project, actual prototypes are typically built, tested, refined and validated. And the OIF sponsors interoperability events, staged at high-profile trade shows around the world, to demonstrate proven solutions to the industry at large. Planning for each interoperability demonstration begins several months ahead of time, giving participants time to work out any issues and present solutions that work reliably and are ready for market adoption.

- **High-quality Implementation Agreements.** The final work product of the OIF is the Implementation Agreement—a specification that ensures interoperability for components and products that adhere to it. A thoughtfully constructed, time-tested development process ensures that only high-quality Implementation Agreements are approved, in accordance with the same ANSI patent guidelines used by formal

standards development organizations. Implementation Agreements are delivered to the public with only a copyright on the document itself. They're freely available on the OIF web site for anyone to use in their own component and product designs.

- **Support for standards development.** Implementation Agreements, either as whole documents or as targeted designs, can be presented as formal proposals for consideration by relevant standards development organizations. In this way, the OIF provides valuable support for the development of formal international standards, acting as a proving ground for new internetworking technologies and for their acceptance by the full ecosystem of industry players. By helping to accelerate the timeline to final ratification of international standards, the OIF can help the industry transform itself, faster.

OIF focuses the cooperative efforts of the entire ecosystem of providers, carriers and customers toward achieving the common good. It delivers specifications that can lower cost, increase bandwidth and improve system availability in an efficient, robust and timely manner. Whatever resources are needed to identify and solve optical internetworking problems, or create new opportunities, the OIF can provide them through the expertise of its wide-ranging membership.

How Does the Process Work?

OIF provides a formal process for presenting new ideas, identifying the ideas most worthy of further exploration and creating formal projects for them, monitoring and managing projects, planning and presenting interoperability demos, drafting and signing Implementation Agreements, and presenting proposals to appropriate standards development organizations based on successful projects.

Two guiding-light organizations within OIF evaluate project ideas, determining whether an idea is justified in terms of technical feasibility and market demand:

- **Carrier Working Group.** Carriers are the ultimate customers for every technology evaluated by the OIF, setting the climate for the entire ecosystem. They may not understand the inner workings of a proposed technology, but they are uniquely positioned to answer the big question, "Does the industry need this capability?" The Carrier Working Group provides input on carrier needs and challenges, helping to create focus and build momentum for projects that are the most useful to the industry.

  The Carrier Working Group develops requirements and guidelines for new services and functions to be supported by the future optical networking products, and provides input and guidance to other OIF working groups as well as other standards bodies and forums. Although the Carrier Working Group is open to participation by all OIF members, only carriers have voting rights within the group.

- **Physical Layer User's Group.** Made up of systems providers, the Physical Layer User's Group plants the seeds—developing requirements and guidelines for components, modules, subsystems and communication links used in networking

equipment. Essentially, this group asks the question, "Can we specify a widget that will help systems providers offer new capabilities their customers will want?" The focus here is on discovering what's technically feasible and how to implement new ideas in the context of existing technologies and specifications.

The Physical Layer User's Group produces project proposals that include value propositions for the specified work; internetworking, interoperability and validation requirements; key performance requirements; operational and manufacturing implications; and implementation issues affecting both existing and new networks. Based on these proposals, the group also provides input to other forums and standards bodies as needed. The work done by the Physical Layer User's Group is a useful complement to that of the Carrier Working Group, because it yields new innovations that systems providers and carriers—lacking physical layer expertise—may never have envisioned.

The Carrier Working Group and the Physical Layer User's Group deliver their work output to other working groups in the OIF, which then forge the details of Implementation Agreements in their respective technical areas. These groups include:

- **Physical and Link Layer Working Group.** This group develops Implementation Agreements related to physical and data link layer interfaces between optical internetworking elements and between their internal components, reusing existing standards when applicable. The group is guided by the requirements developed by the Physical Layer User's Group.

- **Architecture and Signaling Working Group.** Based on carrier requirements, this group develops Implementation Agreements related to architectures and signaling—including the definition of optical internetworking functions, interfaces between functions, and interfaces with other network components. The group also identifies specific physical layer mechanisms for exchanging signaling information among optical elements, as well as signaling and routing protocols to enable connectivity among optical elements.

- **Operations Administration, Maintenance, & Provisioning Working Group.** This group develops requirements, guidelines and Implementation Agreements related to security, planning, engineering and provisioning of network resources; operations, maintenance and administration processes; and support systems and equipment for supporting these management functions. This work helps ensure that networks are manageable and secure.

- **Software Working Group.** This group defines, delivers and promotes software interfaces that permit integration between multiple software applications and network processors. The Software Working Group is tasked with developing APIs for framework, namespace and interface management, as well as an IPv4 unicast top-level command set for validating these lower-level APIs and their connectivity.

In addition to these groups, which develop Implementation Agreements in their respective fields, the OIF includes two groups that gauge and demonstrate the success of these Implementation Agreements. The groups concerned with solution validation include:

- **Benchmarking Working Group.** This group defines, delivers and promotes a standardized set of benchmarks, as well as methods for reporting benchmark results. Performance measurements are established for network application domains—targeting subsystems that enclose network processing elements in a way that complements the IETF's systems-based approach.

- **Interoperability Working Group.** To demonstrate the real-world operation and applicability of OIF solutions, the Interoperability Working Group defines testing methodologies to validate conformance to Implementation Agreements, and contributes the technical leadership needed to stage public Interoperability Demonstrations. The planning for these events gives OIF an opportunity to discover and address any issues up-front, while the events themselves provide a proof-of-concept to standards bodies and to industry enterprises that need the solution.

Under the general guidance of the Carrier Working Group and the Physical Layer User's Group, the OIF's working groups ensure that all the pieces are in place for a complete, workable, verifiable solution, top to bottom.

What is the Output of the OIF?

Implementation Agreements

The most important end product of the OIF's work is the Implementation Agreement. These resemble technical specifications, similar to formal standards as ratified and published by an international standards development organization. Unlike formal standards, however, OIF Implementation Agreements are not industry-wide mandates. Rather, they are agreements between OIF members to adopt a particular technology, with the assurance that their products and systems will interoperate with other equipment that also complies with the agreement.

Implementation Agreements are posted on the OIF web site for free public download. A copyright appears on the document itself, but anyone is free to use the information in it—without fees or restrictions, whether or not they are a member of the OIF—to build their own compliant systems.

Additionally, the OIF presents relevant Implementation Agreements to formal standards bodies for consideration and possible inclusion in future standards drafts. In fact, the most important measure of the OIF's success is whether the specifications in an Implementation Agreement become widely adopted—either through de facto acceptance in the marketplace or through incorporation within a formal standard.

Implementation Agreements can also provide a foundation for standards bodies to build upon, furthering and accelerating progress even when the final, ratified standard evolves beyond the original specifications in an OIF Implementation Agreement. OIF members know they have done their job well when enterprises and standards bodies adopt or build upon Implementation Agreements to bring better technologies to market, faster.

Interoperability Demonstrations

Interoperability Demonstrations are the other major end-product of the OIF's work. These events are staged privately at first, and then presented at major industry trade shows around the world. Interoperability Demonstrations are intended as a learning experience for everyone—members and non-members alike—to show that the specifications in the Implementation Agreements are being implemented, that the implementations are correct, and that compliant products interoperate as intended.

Interoperability Demonstrations also provide an opportunity for participants to clarify and enhance the details of Implementation Agreements—resolving ambiguities, correcting errors and adding improvements based on actual implementation experience. The measure of success for a series of Interoperability Demonstrations—as for Implementation Agreements—is whether industry as a whole takes notice and begins requesting more information or quotes for the demonstrated technology, and whether standards bodies incorporate the results into formal standards.

OIF Success Stories

Several OIF projects have already achieved notable success in the industry. Here are just a few of the projects that have already transformed the field of optical internetworking—with more success stories certain to come in the years ahead.

Industry-Standard Chip-to-Chip Interfaces

It has been said that nearly every packet that traverses the Internet will cross many OIF-defined interfaces along its path. For example, SERDES to Framer Interfaces SFI-4.1 and SFI-4.2, the System Packet Interface SPI-4.2, and the Look Aside Interface LA-1B—originally defined in OIF Implementation Agreements—have become the dominant chip-to-chip interfaces in their markets:

- **SFI-4.1 and SFI-4.2.** The typical line interface of a communications system with 10 Gbps optical links may consist of three separate devices: an optical module containing a SERDES component, a forward error correction (FEC) processor and a framer. SFI-4.1 and SFI-4.2 includes objectives and requirements for the interconnection between the SERDES component, FEC process and framer, which require a parallel electrical bus operating significantly slower than the optical data rate. SFI-4.1 and SFI-4.2 support aggregate data bandwidths of OC-192 for ATM and Packet over SONET/SDH (POS), as well as other applications at the 10 Gbps data rate. Every 300-pin transponder that transports 10 Gbps data optically has an electrical interface that was defined by OIF SFI-4.2.

- **SPI-4.2.** This highly successful Interoperability Agreement defines a channelized interface for packet and cell transfer between the physical layer (PHY) device and a link layer device, for aggregate bandwidths of OC-192 for ATM and Packet over SONET/SDH (POS), as well as 10 Gbps Ethernet applications. SPI-4.2 supports a point-to-point connection with 256 channels, which is enough for STS-1 granularity in SONET/SDH applications (192 ports) and Fast Ethernet granularity in Ethernet applications (100 ports).

- **LA-1B.** Combined with the original LA-1 "Look-Aside" interface, LA-1B, is the market leading interface for content-addressable memories and other network search elements. It standardizes the movement of data between network processor units (NPUs) or application specific integrated circuits (ASICs) and co-processors such as network search engines (NSEs) and high-speed SRAMs. LA-1B enhances the Look-Aside interface while maintaining backward compatibility with the original LA-1 interface. The LA-1B interface allows multiple lookups to be performed at 10 Gbps and a single lookup at 40Gbps. It supports a bandwidth of up to 16 Gbps per direction—which is sufficient for multiple lookups at 10-Gbps packet rates—by effectively doubling the bandwidth of the interface without increasing the clock speed or the bus width.

Faster, Lower-Cost Electrical Interfaces

A faster electrical I/O interface is required to provide higher density and/or lower cost interfaces for payloads of 10Gbps and higher, including SERDES to Framer Interface (SFI), System Packet Interface (SPI), and TDM-Fabric to framer Interface (TFI). The OIF's Implementation Agreements covering Common Electrical I/O (CEI) interfaces specify the serial interconnects needed to support chip-chip and backplane interconnects for high-speed interfaces including SONET/SDH, OTN (G.709) and Ethernet. The latest of these agreements, CEI-02.0, includes specifications for four interfaces:

- **CEI-6G-SR:** 6 Gigabit Short Reach, 4.976 to 6.375 Gbps, 0 to 200 mm of printed circuit board and 1 connector

- **CEI-6G-LR:** 6 Gigabit Long Reach, 4.976 to 6.375 Gbps, 0 to 1 Meter of printed circuit board and up to 2 connectors

- **CEI-11G-SR:** 11 Gigabit Short Reach, 9.95 to 11.1 Gbps, 0 to 200 mm of printed circuit board and 1 connector

- **CEI-11G-LR:** 11 Gigabit Long Reach, 9.95 to 11.1 Gbps, 0 to 1 Meter of printed circuit board and 2 connectors

Elements of the CEI-02.0 Implementation Agreement have been incorporated in the draft IEEE Backplane Ethernet 802.3ap specification. The IEEE 802.3ap task group also developed its own solutions for certain problems, but the work of the OIF was an important springboard that helped enable the 802.3ap group to produce a better draft specification, quicker.

In addition, the OIF held in-depth discussions about the need for a CEI-25 specification a full year before the first call-for-interest issued by the IEEE Higher Speed Study Group (HSSG-CFI). The CEI-25 initiative would define the requirements for up to 25 Gbps serial interfaces—a critical infrastructure element for high rate links. The industry decided that the OIF was the right place to begin these discussions, and the OIF provided fertile ground for developing the ideas that were eventually presented by the same OIF members at the IEEE HSSG-CFI meeting.

Sponsorship of the StatEye Open Source Tool

As part of the CEI specification effort, an OIF member developed an open-source tool for analyzing backplanes and other channels. OIF sponsored an upgrade to the StatEye tool incorporating the channel -compliance portion of the CEI specification, which has proved to be a significant step forward for the industry.

Leadership in Software APIs

The OIF is the leading force in enabling the componentization and disaggregation of functions in the Network Processor and communications ASSP/ASIC marketplace. The OIF has 42 released APIs for functions implemented on Network Processing Elements. These APIs support a wide variety of Network Processor-based solutions and extend the usability and reusability of Network Processing Elements. Developers can use these OIF-built APIs to bring systems to market quicker, reduce costs and improve overall ecosystem robustness.

Paving the Way for ASON/GMPLS

The OIF was an important enabling force for the ITU's ASON and IETF's GMPLS standards. Many essential aspects of ASON and GMPLS were first proposed and validated in the OIF's Architecture and Signaling Working Group, with the OIF User Network Interface (UNI) and Network to Network Interface (NNI) specifications paving the way for ASON and GMPLS. These Implementation Agreements specify signaling and routing protocols that enable and speed service provisioning and transport within and across heterogeneous networks. Feedback resulting from OIF interoperability tests has helped the standards bodies to improve and clarify their specifications.

Securing the Network

The OIF has published important and successful Implementation Agreements that help safeguard transport networks against security threats and attacks:

- **SMI-01.0 and SMI-02.1.** The Security for Management Interfaces Implementation Agreement (SMI-01.1) gives objectives for securing OAM&P interfaces to a Network Element, and specifies ways of using security systems such as IPsec or TLS for securing these interfaces. It also provides guidance on how well each of these security systems, when used as specified, satisfies the stated objectives. The addendum (SMI-02.1) adds new OIF work on UNI, NNI, routing, discovery, and control plane security; new IETF work on IPsec, IKE, TLS, SSH, Kerberos, and

SNMP security; and ongoing work from other standards development organizations on security for network management. It also adds specifications for securing management interfaces based on Web Services and XML.

- **SEP-01.0 and SEP-02.1.** The Security Extensions for UNI/NNI Implementation Agreement (SEP-01.0) defines a common Security Extension for securing the protocols used in UNI 1.0, UNI 2.0, and NNI. It is based on previously agreed upon security requirements for UNI 2.0 and NNI, which call for a complete, unified, and simplified approach to security. The addendum to the agreement (SEP-02.1) incorporates new OIF work on NNI, routing, and discovery; new IETF work on IPsec and IKE; and feedback gained from implementation experience and industry comments on the initial agreement.

A Home for Targeted Specifications

Because of its broad base and well-articulated procedures, the OIF has been the home for several narrowly focused specifications. While formal standards development organizations create standards with wide industry applicability, more specialized developers and vendors still depend on targeted specifications to guide their work—and the OIF helps fill this important niche.

For example, the OIF has been the proving ground for a variety of agreements specifying the architecture and implementation details of tunable laser modules. Another example is the OIF's work on security standards, using a tailored subset of IETF security mechanisms and electronic dispersion compensation (EDC), which complements the broader standards developed by the ITU. Indeed, most of the OIF's work deals with targeted areas that haven't yet been addressed in broader, formal standards—or in some cases that may never be addressed.

Accelerating Industry Progress and Convergence

As users demand all the functionality they need on a single platform, with communications and data delivered seamlessly over any network, the OIF brings together experts from the entire industry ecosystem—from the component to the carrier level—in order to facilitate convergence.

Like a designer's "glue logic," the OIF works to identify and fill the gaps between different technologies, architecture levels, and customer needs. The OIF provides an industry-wide perspective that bonds ideas together to enable new products and services, based on common understanding and cooperation.

At the same time, the OIF focuses its work, and speeds progress, by applying this industry-wide perspective to quickly identify and reject ideas that are already being developed elsewhere, or that are unworkable. This also benefits other forums, standards bodies and enterprises by saving them the effort of sorting through all the options.

The OIF reduces risk for forum members and the industry at large while companies are still in a pre-competitive mode. By enabling people throughout the ecosystem to interact with one another—competitors, partners and customers alike—all in one place, without requiring extensive travel, OIF helps them save the money associated with false starts and wrong directions. And the OIF's Interoperability Demonstrations further reduce risk by providing an opportunity for vendors to work together to prove concepts in the real-world and to drive widespread adoption.

Metcalfe's law states that the more implementations of a specification exist, the more valuable they are. Industry-wide cooperation works in accordance with that law, enabling you to create more things that connect easily with one another.

Where else can you get that kind of cooperative innovation but the OIF?

For more information visit http://www.oiforum.com