VERISIGN®

WHITE PAPER

VERISIGN INNOVATION:

EXCEEDING THE STANDARD FOR REGISTRY OPERATIONS

CONTENTS

EXECUTIVE SUMMARY

To avoid risk and maximize the potential value of their domain name registries, companies, communities of interest, and other organizations require a registry services provider with proven technology and robust processes, as well as a history of successful problem solving and evolutionary innovation in the registry services industry.

Innovation—as reflected in research and development (R&D) activities, intellectual property (IP), and pending and granted patents—is an important indicator of capabilities and leadership. Besides demonstrating technological proficiency, innovation provides insight into a service provider's capability to define and enhance its core competence; understand and respond pragmatically to the needs of customers and the industry; and anticipate and prepare for change so as to minimize disruption from future trends.

Driven by the real-world requirements of operating two of the world's largest registries (.com and .net)[1] and guided by a strategic, systematic approach to innovation and deployment, Verisign has carefully developed an extensive yet coherent portfolio of intellectual property. The technology and service levels represented in this body of work reflect Verisign's high standards for defining registry operations, as evidenced by the fact that Verisign solutions typically exceed commonly mandated operational requirements.

By selecting a leader that sets benchmarks for the industry and has a long history of innovation, organizations can avoid trial-and-error and other risks associated with newcomers or less experienced providers and pursue with confidence the rich business opportunities that domain name registries offer.

AT THE CENTER OF EARLY ADVANCES IN REGISTRY SERVICES

When the U.S. Department of Defense developed ARPANET—an early version of what we now call the Internet—few people could have imagined networking's impact on the world we live in. That was 1969, and it took nearly two decades of further research, development, and use before networking began to remotely resemble what we have today. Inventions such as TCP/IP[2], the Domain Name System (DNS)[3], and Mosaic[4] helped pave the way for today's vast registry infrastructure, and spirited innovation—led by companies such as Verisign—has continued to characterize the industry.

1 The .com registry is the world's largest registry. For more information, please see the Domain Name Industry Brief, April 2013 at http://www.verisigninc.com/en_US/why-verisign/education-resources/domain-name-industry-brief/index.xhtml?loc=en_US

2 Transmission Control Protocol/Internet Protocol – A set of rules that provides a common language for different networks to communicate with each other

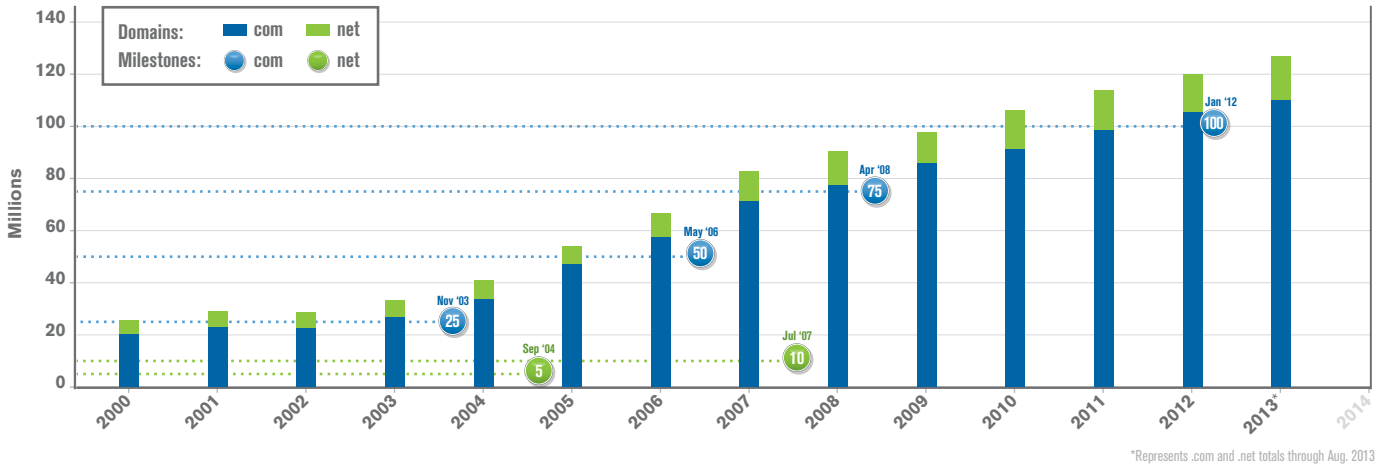
3 Domain Name System (DNS) – The Internet service that translates domain names into numeric addresses

4 Mosaic – One of the first widely distributed web browsers, this software allowed the general public to interact more easily with the worldwide web and the Internet, and helped spur growth in the number of users and websites

In 1993, when Network Solutions, Inc. (acquired by Verisign in 2000) was awarded the National Science Foundation contract to provide domain name registry services for the Internet, the registration rate for new domain names was approximately 400 names per month. Today, the registration rate is nearly three million domain names per month[5], and Verisign's globally distributed network manages more than 124 million domain names in the .com and .net zones alone.

Over the years, Verisign has been the leading presence in registry operations: In addition to operating the world's most recognized generic top-level domains (gTLDs), .com and .net, Verisign also operates the DNS resolution infrastructure for .tv, .edu, .gov, .jobs, .name, and .cc. This infrastructure has maintained uninterrupted availability of the .com and .net TLDs for more than 15 years.

Underpinning Verisign's ability to operate at these extraordinary levels is a culture of innovation that consistently anticipates and exceeds the complex, real-world requirements of large-scale and mission-critical registries, even when they are operating under extremely heavy loads.



Growth of the .com and .net gTLDs under Verisign's stewardship

"We've always been innovative, and we have a depth of knowledge that is hard to match. Some of our key engineers have been here for more than 10 years. When you combine that level of expertise in their field with new talent from across the industry, you can drive a unique level of innovation."

– Jim Gould, Principal Software Engineer, Verisign

5 Verisign. Verisign Reports 12 Percent Year-Over-Year Revenue Growth in Second Quarter 2013. July 25, 2013. http://www.verisigninc.com/en_US/news-events/press-room/articles/index.xhtml?artLink=aHR0cDovL2ZlZWRzLm13bmV3c3Jvb20uY29tL2FydGljbGUvcnNzP2lkPTE3NDQxNTI%3D

LEADERSHIP THROUGH INNOVATION

Operating critical Internet infrastructure such as .com and .net presents challenges of scale, performance, availability, and functionality that off-the-shelf solutions are not designed to address. These challenges have fueled Verisign innovation and driven its development of very high criteria for service levels. The result is a broad portfolio of novel technologies and processes that Verisign can leverage on behalf of enterprises to not only meet technical requirements for registry operation but also take advantage of new business opportunities as they unfold.

Applied Innovation for Highly Scalable, Available, and Secure Domain Name Registries

At its most basic, a domain name registry provides two core services:

- The *registration service* enables registrars to register new domain names, change existing registration data, and obtain other general information about domain names.
- The *resolution service* enables relying parties (i.e., users, applications, and intermediaries) to look up domain name records as part of the process of establishing connections over the Internet.

These services must occur in a secure environment and at high levels of performance, accuracy, availability, and scalability. A myriad of technology, processes, and policies support this functionality, including monitoring, backup, failure recovery, data escrow, reporting, rights protection, and more.

For more than 15 years, Verisign has steadily developed a repertoire of technology and processes that encompasses nearly every aspect of registry operations. In doing so, it has consistently surpassed other registry operators by offering and achieving the most stringent service level agreements (SLAs) of any gTLD registry to date. In addition, it has developed deep expertise in successfully operating multiple large registries on a single infrastructure—a capability that may test the limits of newer, less experienced registry services providers.

The following core registry services and their service levels exemplify the standards of excellence that Verisign sets when developing new solutions.

- **Domain name registration** – The Verisign Shared Registration System (SRS) is a three-tiered architecture for communicating with registrars for the purpose of registering domain names. The SRS database uses a combination of proven off-the-shelf and proprietary technology designed and tested to host a minimum of 250 million active domain name registrations while operating within the strictest performance levels. Verisign databases have a proven history of handling peak volumes of more than 400,000 transactions per minute on a continuous basis, and as a company, Verisign handles approximately 4.1 billion Extensible Provisioning Protocol (EPP) transactions per month. In handling this transaction volume, Verisign's registry consistently out-performs industry-best standards. For a first-hand account of the story behind development of Verisign's SRS, please see the sidebar, "SRS: Innovation Based on Real-World Requirements."

"Good Internet architecture innovation always tries to assume: 1) that today's impossible size is tomorrow's average size, and 2) regardless of the environment that you've conceived your solution in, you're going to end up with an environment that you never thought of. That assumption guides Verisign innovation."

– Allison Mankin, Director, Verisign Labs

Verisign Performance At-A-Glance

- SRS technology that is designed and tested to host a minimum of 250 million active domain name registrations and maintains a database of approximately 500 million unique domain name registrations with respect to current and past registrations
- SRS databases with a proven history of handling peak volumes of more than 400,000 transactions per minute
- Approximately 4.1 billion EPP transactions handled per month
- An average of more than 77 billion name resolution queries performed per day
- 100% availability of the DNS resolution infrastructure for .com and .net for more than 15 years

- **Domain name resolution** – Verisign's domain name resolution infrastructure is built on its patented, proprietary Advanced Transaction Lookup and Signaling (ATLAS) platform. Recognizing that existing off-the-shelf software could not meet its growing needs, Verisign developed ATLAS in the early 2000s to handle the extreme performance and reliability requirements of the various TLDs under its management. It transitioned operations to the ATLAS platform in 2002. On average, the ATLAS technology currently resolves more than 77 billion queries per day and also resolves queries on Verisign's managed DNS platform. This extraordinary capability has enabled Verisign to not only handle DNS traffic, but also apply the ATLAS technology to other solutions that benefit Verisign customers. For example, the ATLAS technology answers Whois requests about domain name registrants and performs Online Certificate Status Protocol (OCSP) real-time verification of SSL certificate status. Using this proven, highly scalable, highly available infrastructure, Verisign has been able to continue to maintain its record of uninterrupted availability for .com and .net for more than 15 years. To read more about the history of ATLAS development, please see the sidebar, "DNS Resolution: Innovation in Response to Growth and Market Changes."

Verisign's global constellation of resolution sites

- **Security** – Most third-party security solutions cannot handle the scale and variety of risks that Verisign encounters in operating large, global registries. As a result, Verisign has developed a range of proprietary solutions to address threats to infrastructure, identity, data, and domain names. In many cases, it has applied the resulting intellectual property to create commercial solutions that address the growing needs of many businesses and enterprises. One such innovation is Verisign's distributed denial of service (DDoS) mitigation platform, called Athena, which has helped mitigate extremely high-volume attacks, as well as complex, multi-vector attacks on the .com and .net infrastructure. This same technology is used today to help

numerous enterprises defend their infrastructure. Other innovations have been applied in the general area related to Domain Name System Security Extensions (DNSSEC), an industry standard for authenticating domain name records. To read how one Verisign inventor has contributed to DNSSEC and real-world solutions for Verisign customers, please see the sidebar, "DNSSEC: Innovation for Internet Security."

DNSSEC: Innovation for Internet Security

Jim Gould, Principal Software Engineer, has been with Verisign for 12 years. "When I was first hired, I was told the expectations are high here and you'll be shocked at how smart some of the people are. It's true. You really have to jump up your game to match and to shine."

Gould is one of many inventors who contributes significantly to the years of cumulative knowledge residing within Verisign. He has been involved in the development of a number of proprietary technologies that help Verisign and its customers to implement DNSSEC in an operationally efficient manner.

In talking about Verisign's innovations around DNSSEC, he says, "Our deployment of DNSSEC across .com and .net was for the community. We did it because it was the right thing to do. However, the sheer size of the .com and .net TLDs required us to employ some very innovative techniques that a smaller registry would simply not have to consider."

In-line signing is one of the innovations that Gould is referring to. "In order to meet ICANN service-level requirements for provisioning, we had to be able to add new DNSSEC-signed material within a very short time frame. Typically, registries DNSSEC-sign a zone (consisting of all the domain names in the zone), and then push the signed zone to DNS servers all at once. With large TLDs such as .com and .net, where you potentially have to sign more than a 100 million domain names, that process would take too long; so we developed a system whereby we can sign the zone incrementally," explains Gould.

With the in-line signing system, Verisign can confidently meet its SLAs. What's more, it can apply the resulting intellectual property to a solution for its larger registry customers. "By solving our own problems," says Gould, "we've also been able to come up with innovations and intellectual property that help solve the problems of our customers. Most registry services providers do not have the need for these kinds of solutions. We do, and that allows us to be prepared with thoughtful solutions to customer problems that other providers may not have even considered yet."

Success Factors

Being the steward of .com and .net has propelled Verisign to the forefront of innovation in the registry industry. In operating these registries, Verisign has "seen it all" in terms of variety and scale of problems and has had to respond accordingly. The following success factors have helped Verisign solidify its position as an innovation leader and set it apart from less mature or less experienced registry services providers:

- **Culture of innovation** – Innovation permeates Verisign culture, starting at the highest levels of the organization and reaching into every area of the business. Verisign values talent and rewards innovation. It has a seasoned team of engineers and researchers with many decades of collective experience in the registry industry.
- **Systematic approach to investments in R&D, IP, and patent activities** – Verisign is disciplined in aligning technology investments with long-term missions and objectives; current market trends; and expectations for the future of technology, the Internet, and the DNS. It creatively leverages intellectual property to develop real-world solutions and maximize IP value, and where appropriate, it selectively pursues patents to protect its investments in R&D and IP.
- **Ability to apply IP in useful and novel ways** – It's one thing to develop forward-thinking technology. It's another to put it to good use. With more than 15 years of hands-on experience in registry operations, Verisign has learned to anticipate need and respond with technology that is applicable in the field.
- **Industry-leading service levels** – Verisign's approach to solution design is to out-perform today's target service levels so that it can proactively and fluidly meet tomorrow's performance requirements. Verisign has the most stringent service levels in the industry and regularly meets and exceeds requirements that have been set by ICANN or recommended by other industry groups.
- **Background in security** – Verisign got its start with Internet security services, and security is ingrained in its culture. Verisign continues to design—from the ground up—with security as a guiding principle.

"It's a very collaborative, open process in terms of the way we share ideas internally. Everybody—at any level—has the opportunity to express new ideas and try them out, and we have good people to bounce ideas off of. Things that don't work out are viewed as learning, not failure. As an inventor, that kind of environment is just really invigorating."

– Scott Hollenbeck, Director of Data Architecture, Verisign

PROOF POINT: VERISIGN'S PATENT PORTFOLIO

The innovations highlighted above provide a window not only into the scope of Verisign's investment in R&D, but also into the impact of its intellectual property on registry operations. When viewed as a whole, the services, processes, and other innovations developed by Verisign present compelling evidence of its capability to respond to and solve many of the technical problems encountered when operating mission-critical registries.

As a driving force behind innovation in the registry industry, Verisign has been highly selective in pursuing patents to protect the technology innovations critical to running registry operations. Although Verisign has a combined total of 231 patents and patent applications in the United States (plus 304 granted and pending applications elsewhere)[6], these patents represent only a fraction of the R&D, intellectual property, innovative services, and industry-leading capabilities that Verisign has cultivated over the years and continues to cultivate with new patent filings.

Collectively, these patents tell the story of Verisign's past, present, and potential future. They represent years of experience and uncountable lessons learned in running a reliable, scalable, and secure global registry. They hint at the tens of thousands of hours and many millions of dollars spent on problem solving, and they attest to the hard work and sheer ingenuity of Verisign's engineering team. Most importantly, they serve as independent validation that Verisign has developed unique, innovative solutions in all areas that are needed to build and run a registry that meets demanding business and operational requirements.

The foresight shown in these patents is noteworthy. To solve technical problems that Verisign confronts or anticipates, Verisign has developed innovations leading to approximately 127 granted or pending U.S. patents and applications[7] that disclose inventions that make feasible our core registry operations and services. In a number of cases, Verisign's technology has been designed to achieve service levels that exceed ICANN requirements, and enable solutions beyond the basic elements of domain registry operations.

Although space does not permit a detailed discussion of Verisign's entire patent portfolio, Table 1 describes some of the methods that Verisign has developed and subsequently patented (or has patents pending for) in the area of registry operations and services. It is organized to reflect some of the key categories of services that domain name registry operators either require (for instance, to meet specifications in the New gTLD Applicant Guidebook[8]) or typically want to consider when choosing a registry services provider. Many of the methods listed here may also be applicable to other products and services.

6 As of September 30, 2013
7 As of September 30, 2013
8 ICANN. Applicant Guidebook. June 4, 2012. http://newgtlds.icann.org/en/applicants/agb

TABLE 1: SUMMARY OF VERISIGN REGISTRY SERVICES-RELATED PATENTS[9]

Standard Registry Operations	**10 patents granted; 17 patents pending**
Verisign inventors have developed a Shared Registration System (SRS) that allows multiple registrars to access a registry through a protocol to register domain names and perform other domain name-related functions. They have developed methods for ensuring integrity of data in a database; detecting the stockpiling of domain names; recovering from operational failure; setting up a new domain name registry; and more.	
Add-On Registry Services	**11 patents granted; 24 patents pending**
To grow their business and meet other objectives more efficiently and effectively, registrants, registrars, and registry operators often require additional, non-core registry services. In support of this requirement, Verisign inventors have developed methods to find and register available domain names in numerous different ccTLDs; suggest alternative domain names to a user; collect and analyze domain name traffic information, including detailed information about DNS queries; exchange a registrant's existing domain name in favor of a new domain name and without affecting the other data fields of the existing domain; estimate the probability of domain name renewal; and more.	
Performance, Scalability, and Availability	**8 patents granted; 18 patents pending**
To ensure that Verisign-managed registries can meet their service level agreements, Verisign inventors have been especially active developing methods to propagate changes to registration data; ensure all queries have been answered; update domain name records while processing queries; improve hardware utilization and efficiency; increase throughput; manage failover; and enable excellent monitoring.	
Security and Stability	**4 patents granted; 14 patents pending**
Internet-connected services must be able to provide service to a potentially large number of legitimate requesters, while protecting themselves from illegitimate ones. To address these issues, Verisign inventors have developed methods to verify that a registrar is authorized to perform an action; improve authentication from the registrant to the registrar and to the registry; detect and mitigate denial-of-service attacks; and analyze and filter network traffic.	
Domain Security Checks	**3 patents granted; 18 patents pending**
Verisign inventors have developed a number of methods to assist in categorizing how a domain name is being used and to help detect anomalous behavior, including methods to collect, format, and store DNS resolution activity for further analysis; collect and analyze website and web page properties; analyze DNS resolution activity; and detect malware.	
Information Management	**9 patents granted; 8 patents pending**
An Internet-connected service uses technologies that manage the protocols and data formats by which participants interact with the service. Verisign inventors have been particularly active in the establishment and improvement of various information management technologies. For example, Verisign inventors have developed methods to make the record-signing for large-scale name servers more scalable; update keys and signatures when a domain is transferred; sign domain name records as part of the registration process; and more. Verisign inventors have also developed methods to address challenges associated with internationalized domain names (IDNs), including methods to convert IDNs during registration and resolution, and to identify and protect access to registration records involving IDN character variants.	

9 Note that the sum of the subtotals listed here is greater than the previously quoted total of unique patents (35 granted and 92 pending for a total of 127) because some patents and patents pending apply to more than one category.

TABLE 1: SUMMARY OF VERISIGN REGISTRY SERVICES-RELATED PATENTS CONTINUED

Reporting	**2 patents granted; 11 patents pending**
To meet requirements for internal and external auditing, a registry operator needs to measure activity across its entire operating environment. To meet this objective in a large global network with high transaction rates, Verisign inventors have developed several methods for collecting statistics and performance data, as well as methods for collecting, caching, and distributing log data in support of monitoring requirements.	
Data Publishing / Whois / Zone File Updates	**2 patents granted; 3 patents pending**
The Whois service provides advanced "metadata" about a domain name, such as registrant contact information, the name of the domain name registrar, and the expiration date of the registration. Verisign inventors have developed methods to update Whois records and propagate changes to data; create a new Whois service for a newly created TLD; and search for Whois records within and across multiple TLDs.	
Pre-Delegation Testing	**1 patent granted; 3 patents pending**
To simplify pre-delegation testing and ensure that it is sufficiently comprehensive, Verisign inventors have developed methods to test registration operations; integrate test scripts in multiple languages into a single test; debug database software components even while database procedures execute; and more easily test resolution operations to ensure that requirements for these operations are being met.	
Anti-Cybersquatting	**3 patents pending**
To support registrants in protecting their domain name(s), Verisign inventors have developed methods to help registry operators verify consistency of sponsorship of related registrations in different registries. Verisign inventors have also developed methods that allow prospective registrants to check for the availability of a domain name without revealing which domain name is being checked.	
Business Continuity	**2 patents pending**
Besides methods that facilitate recovery in the unlikely event of a failure, Verisign inventors have also developed methods for the recovery itself (i.e., for restoring a failed registry), including methods to validate that the information is consistent; archive the information; publish the information into new name servers and Whois services; update the parent name servers to point to the new instances; address the possibility that the operator of the failed registry is uncooperative; and more.	
Abuse Mitigation	**1 patent pending**
When a domain name is associated with malicious activity, the registry operator may need to take preventative actions to limit the impact of the abuse. Verisign inventors have developed methods for blocking the use of a domain name that is associated with malicious activity. These methods can be applied within a single registry as well as across multiple registries.	

MINIMIZING RISK, MAXIMIZING OPPORTUNITY

To avoid risk and maximize the potential value of their domain name registries, companies, communities of interest, and other organizations must carefully consider their selection of a registry services provider. Regardless of their registry's scale or intended use, organizations face multiple risks if their provider does not have the depth and breadth of experience to consistently deliver highly accurate, reliable, scalable, secure, and stable registry functions. In addition to superior operational capabilities, many organizations also require a provider who can offer a range of value-added services in order to maximize the value of their registry—either as a brand or by selling add-on services to customers.

When backed by a registry services provider that invests methodically in innovation and has proven success operating critical registry infrastructure, organizations can reduce the risk inherent in working with a less experienced or less comprehensively developed registry services provider, focus on their core mission, and confidently pursue new opportunities.

Verisign's systematic approach to innovation and its extensive portfolio of intellectual property are models of excellence for registry operations and help ensure that Verisign can reliably meet the operational and business requirements of today's registries while remaining at the forefront of registry services in the years ahead. When viewed collectively, Verisign's innovative technology and intellectual property provide best-in-class solutions for nearly every aspect of registry operations, enabling it to meet the stringent operating requirements of its diverse range of customers.

DNS Resolution: Innovation in Response to Growth and Market Changes

Sanjeev Chauhan, Director, Software Development, has been at Verisign for nearly 16 years. “When I joined Verisign, the number of domain name registrations was just starting to take off. I was part of a project that took registration from an email-based process to a web-based application. We had a celebration when Verisign reached its first million registrations,” he says.

In the late 1990s, domain names were being registered at a blistering pace, growing from 900,000 new registrations per quarter in Q1 1999 to 5.6 million new registrations per quarter in Q2 2000. As new domain names were added and activity increased on the Internet, the number of DNS resolution queries and the load on DNS servers catapulted. To support this increasing load, Verisign had to continually add expensive equipment to scale the service.

During the 2000-2001 downturn, the volume of new domain name registrations plummeted—from 5.6 per quarter to 2.54 million per quarter. Even so, the increasing popularity of the Internet caused the number of DNS resolution queries to increase at a rate of 100 percent every 12 months. Chauhan describes Verisign’s challenge: “We had to look at the architecture in a different light to see how we could more efficiently resolve DNS queries and adjust to changing market trends—while still providing the world-class service for which we are known.”

It soon became clear that a commercial, off-the-shelf solution would not be able to handle the scale and rate of change that Verisign was operating in. In-house innovation was the best path. “Our design goal was to develop an infrastructure that could scale massively to handle increasing volumes of data and escalating query rates without an equivalent increase in cost,” says Chauhan. “We decided to design a new architecture based on machines that were commercially available at the time.”

ATLAS was the result. Initially designed for one particular application, ATLAS is now designed for multiple services, including DNS. Starting in 2009, Verisign re-designed ATLAS to take advantage of technology advances in physical RAM, CPU speed, core counts, and network interface speeds. The redesigned platform is called Next Generation ATLAS, and is built for high reliability and performance. Says Chauhan, “When we first started in this business, we updated the zone file twice a day, which meant you would have to wait up to 12 hours to see your domain name in a web browser. Now it’s updated every 15 seconds, so the name shows up in your browser in less than a minute.”

That’s the kind of accuracy, performance, and availability that customers expect today, and it isn’t always attainable with commercial solutions. Reflecting on Verisign’s industry-leading service levels, Chauhan says, “Innovative solutions, people, and processes are at the core of our offerings, and the concepts of availability and redundancy are ingrained in our engineers. When they think about solutions, they think in terms of supporting critical Internet infrastructure, not developing shrink-wrapped, commercial-grade software. That approach has been very effective for us and has helped us develop a very solid body of intellectual property.”

SRS: Innovation Based on Real-World Requirements

The story of the Verisign Shared Registration System goes back to when Network Solutions (acquired by Verisign in 2000) provided domain name registration services for .com, .net, and .org under a Cooperative Agreement with the U.S. Government. “In those days, there wasn’t a lot of interest in registering domain names. Of course, that all changed with the advent of web browsers and the worldwide web, but at the time, we were the only company doing it. We were both a registry and a registrar,” explains Scott Hollenbeck, Verisign’s Director of Data Architecture.

“As interest in domain names picked up, we could see that the manual processes we used for domain name registration weren’t going to work for much longer,” says Hollenbeck. “Back then, people would register a domain name by filling out a template and submitting it to us via email, web form, or fax. We would process it manually, and then add it to a database. We had to do something about the scaling issue. We also had a mandate from the federal government to build and deploy a shared domain name registration system that would allow additional registrars to provide registration services to the public.”

The team developed an internal registry-registrar protocol to make its registry system available to other registrars, and the Shared Registration System grew out of that work. Although early implementations would not have handled today’s performance requirements, the R&D team designed the system so it could be built upon and expanded over time. “One of our guiding principles has always been to design for growth. We set aggressive targets around things like transaction volume and service levels,” says Hollenbeck, “and we make sure we have plenty of capacity to exceed them.”

When asked what has kept him at Verisign for all these years, he answers, “It’s the fact that we’re the largest registry operator and have the ability to innovate. Many other registry operators don’t have a history of investing in their infrastructure and innovation programs. At Verisign, that’s what we do. We’re always trying to make things better, and that attracts people like me to the company.”

FOR MORE INFORMATION

For more information about Verisign’s leadership in innovation, please visit VerisignInc.com/innovation

ABOUT VERISIGN

As the global leader in domain names, Verisign powers the invisible navigation that takes people to where they want to go on the Internet. For more than 15 years, Verisign has operated the infrastructure for a portfolio of top-level domains that today includes .com, .net, .tv, .edu, .gov, .jobs, .name, and .cc, as well as two of the world’s 13 Internet root servers. Verisign’s product suite also includes Distributed Denial of Service (DDoS) Protection Services, iDefense Security Intelligence Services, and Managed DNS. To learn more about what it means to be Powered by Verisign, please visit VerisignInc.com.

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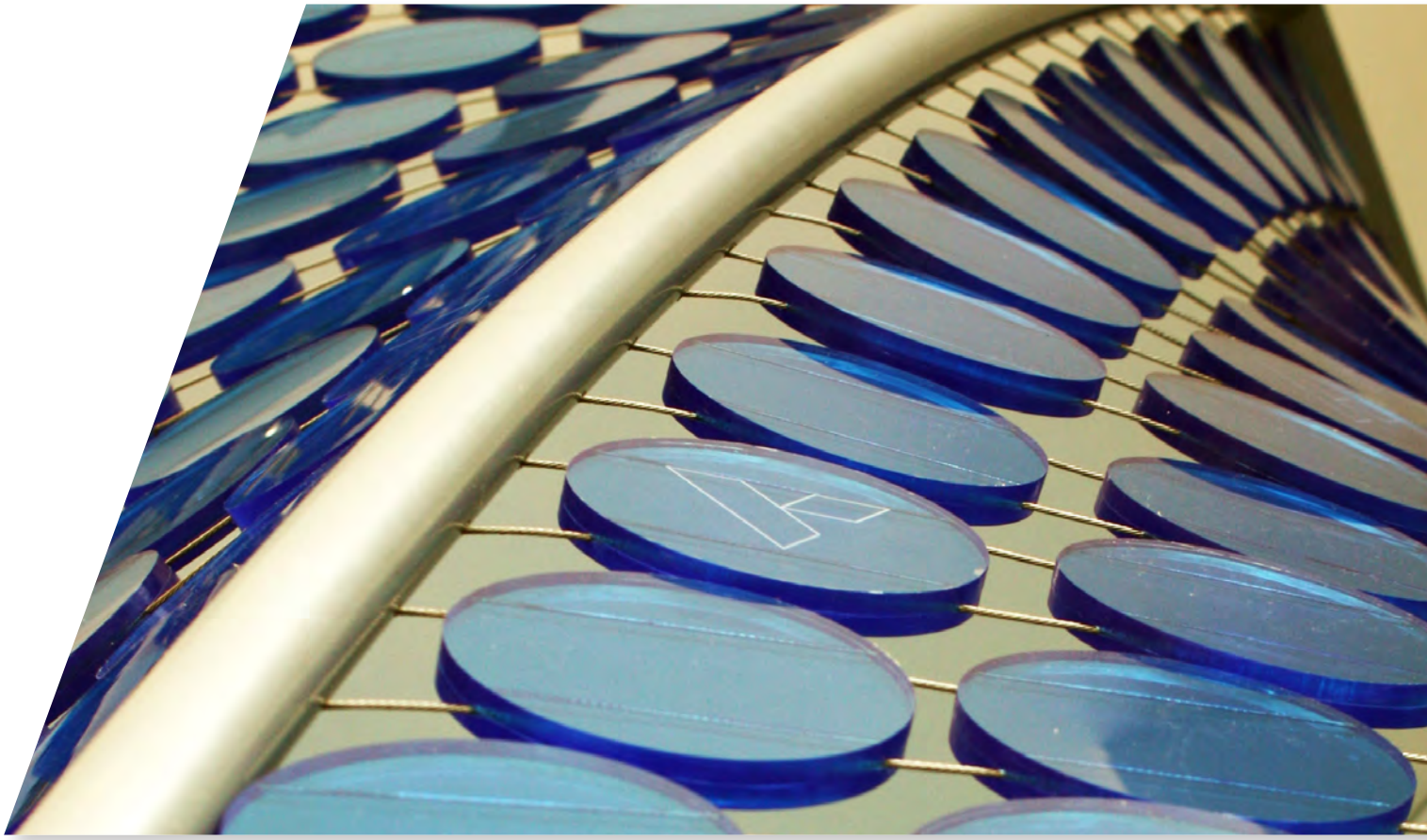

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