Figure 26-1: Whois Service Network Diagram. By distributing Whois service across multiple resolution sites, Whois transactions are highly available and performed with low latency.
<table>
<thead>
<tr>
<th>Component</th>
<th>Implementation/Configuration</th>
</tr>
</thead>
</table>
| **Load Balancers**            | • Deployed as a pair for maximum availability and resilience.  
                                  • Help ensure workload is evenly distributed across all systems within the .party gTLD resolution network.                                                                                       |
| **Layer-3 Switches**          | • Four switches are installed in Verisign’s resolution network environment: two for front-office management, and two for back-office management.  
                                  • Switches provide both routing and switching for the .party gTLD environment across the front-office network.                                                                 |
| **Terminal Servers**          | • Deployed as a pair of terminal servers to enable out-of-band management of all network hardware.  
                                  • Used in the event that primary network access is unavailable at Verisign’s primary resolution sites.                                                                                                                  |
| **Virtual Private Networks (VPN)** | • Pair of VPNs installed at each of Verisign’s primary resolution sites for secure remote access to the installed systems.                                                                                                      |
| **Commodity Servers**         | Supporting Whois data processing needs, each commodity server consists of the following specifications:  
                                  • Two central processing units (CPUs)  
                                  • 2 – 6 gigabytes (GB) random access memory (RAM) (as dictated by the server function)  
                                  • 2x73GB hard drive                                                                                                                                              |
| **Database Servers**          | Supporting Whois data processing needs, each database server consists of the following specifications:  
                                  • 16 cores (4 x quad-core CPUs)  
                                  • 64GB RAM  
                                  • 5x73GB hard drive                                                                                                                                           |

**Figure 26-2: Whois IT and Infrastructure Resources.** Verisign uses a common Whois resolution network architecture at each primary site provisioning the Whois service.
Figure 26-3: Technical Overview. Verisign’s Whois services are co-located at DNS locations.
Domain Name Data

**Query format:** whois EXAMPLE.TLD

**Response format:**
- **Domain Name:** EXAMPLE.TLD
- **Domain ID:** D1234567-TLD
- **Whois Server:** whois.example.tld
- **Referral URL:** http://www.example.tld
- **Updated Date:** 2009-05-29T20:13:00Z
- **Creation Date:** 2000-10-08T00:45:00Z
- **Expiration Registry Expiry Date:** 2010-10-08T00:44:59Z
- **Sponsoring Registrar:** EXAMPLE REGISTRAR LLC
- **Sponsoring Registrar IANA ID:** 5555555
- **Domain Status:** clientDeleteProhibited
- **Domain Status:** clientRenewProhibited
- **Domain Status:** clientTransferProhibited
- **Domain Status:** serverUpdateProhibited
- **Registrant ID:** 5372808
- **Registrant Name:** EXAMPLE REGISTRANT
- **Registrant Organization:** EXAMPLE ORGANIZATION
- **Registrant Street:** 123 EXAMPLE STREET
- **Registrant City:** ANYTOWN
- **Registrant State/Province:** AP
- **Registrant Postal Code:** A1A1A1
- **Registrant Country:** EX
- **Registrant Phone:** +1.5555551212
- **Registrant Phone Ext:** 1234
- **Registrant Fax:** +1.5555551213
- **Registrant Fax Ext:** 4321
- **Registrant Email:** EMAIL@EXAMPLE.TLD
- **Admin ID:** 5372809
- **Admin Name:** EXAMPLE REGISTRANT ADMINISTRATIVE
- **Admin Organization:** EXAMPLE REGISTRANT ORGANIZATION
- **Admin Street:** 123 EXAMPLE STREET
- **Admin City:** ANYTOWN
- **Admin State/Province:** AP
- **Admin Postal Code:** A1A1A1
- **Admin Country:** EX
- **Admin Phone:** +1.5555551212
- **Admin Phone Ext:** 1234
- **Admin Fax:** +1.5555551213
- **Admin Fax Ext:** 4321
- **Admin Email:** EMAIL@EXAMPLE.TLD
- **Tech ID:** 5372811
- **Tech Name:** EXAMPLE REGISTRAR TECHNICAL
- **Tech Organization:** EXAMPLE REGISTRAR LLC
- **Tech Street:** 123 EXAMPLE STREET
- **Tech City:** ANYTOWN
- **Tech State/Province:** AP
- **Tech Postal Code:** A1A1A1
- **Tech Country:** EX
- **Tech Phone:** +1.1235551234
- **Tech Phone Ext:** 1234
- **Tech Fax:** +1.5555551213
- **Tech Fax Ext:** 93
<table>
<thead>
<tr>
<th>Tech Email:</th>
<th><a href="mailto:EMAIL@EXAMPLE.TLD">EMAIL@EXAMPLE.TLD</a></th>
</tr>
</thead>
<tbody>
<tr>
<td>Name Server:</td>
<td>NS01.EXAMPLEREGISTRAR.TLD</td>
</tr>
<tr>
<td>Name Server:</td>
<td>NS02.EXAMPLEREGISTRAR.TLD</td>
</tr>
<tr>
<td>DNSSEC:</td>
<td>signedDelegation</td>
</tr>
<tr>
<td>DNSSEC:</td>
<td>unsigned</td>
</tr>
</tbody>
</table>

>>> Last update of Whois database: 2009-05-29T20:15:00Z <<<

Figure 26-4: Domain Name Data Object
Registrar Data

**Query format:** whois "registrar Example Registrar, Inc."

Response format:
Registrar Name: Example Registrar, Inc.
Street: 1234 Admiralty Way
City: Marina del Rey
State/Province: CA
Postal Code: 90292
Country: USA
Phone Number: +1.3105551212
Fax Number: +1.3105551213
Email: registrar@example.tld
Whois Server: whois.example-registrar.tld
Referral URL: http://www.example-registrar.tld
Admin Contact: Joe Registrar
Phone Number: +1.3105551213
Fax Number: +1.3105551213
Email: joeregistrar@example-registrar.tld
Admin Contact: Jane Registrar
Phone Number: +1.3105551214
Fax Number: +1.3105551213
Email: janeregistrar@example-registrar.tld
Technical Contact: John Tech
Phone Number: +1.3105551215
Fax Number: +1.3105551216
Email: johntech@example-registrar.tld

>>> Last update of Whois database: 2009-05-29T20:15:00Z <<<

**Figure 26-5: Registrar Data Object**
Name Server Data

**Query format:** whois "NS1.EXAMPLE.TLD" or whois "name server (IP address)"

Response format:
Server Name: NS1.EXAMPLE.TLD
IP Address: 192.0.2.123
IP Address: 2001:0DB8::1
Registrar: Example Registrar, Inc.
Whois Server: whois.example-registrar.tld
Referral URL: http://www.example-registrar.tld

>>> Last update of Whois database: 2009-05-29T20:15:00Z <<<

Figure 26-6: Name Server Data Object
<table>
<thead>
<tr>
<th><strong>Potential Abusive Searchable Whois Risks</strong></th>
<th><strong>Verisign Risk Mitigation</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Single Source Data Mining</td>
<td>Access Control Lists (ACL): Implementation of an ACL at the network layer to block the offending IP address for a specified period of time; viable option given a single unique IP address</td>
</tr>
<tr>
<td>The mining of Whois data from a single IP address conducted through manual queries</td>
<td>Application Rate Limiting: Implementation of rate-limiting at the application layer to regulate the number of queries allowed from the source IP address for a specified period of time; viable option given a single unique IP address</td>
</tr>
</tbody>
</table>

| Automated Data Mining                       | ACL and Application Rate Limiting as defined for single source data mining |
| Single Source: The mining of Whois data from a single IP address conducted through the use of automated scripts | Packet Inspection: Implementation of tools that analyze the incoming “get” request to determine whether the source is a valid user or whether the request is coming from an automated script or botnet; viable option based on “get” request signature |
| Distributed: The mining of Whois data from multiple sources/IP addresses conducted through the use of automated scripts, or, “botnets” | Completely Automated Public Turing Test To Tell Computers And Humans Apart (CAPTCHA) Techniques: Implementation of a challenge-response test prior to processing the request; viable option that limits ability to predict challenge-response; almost always requires manual interaction |

**Figure 26-7: Potential Searchable Whois Forms of Abuse and Mitigation.** Verisign leverages its experience supporting the .name registry to build in to the system the safeguards necessary to minimize abusive Whois practices.