Tech Brief

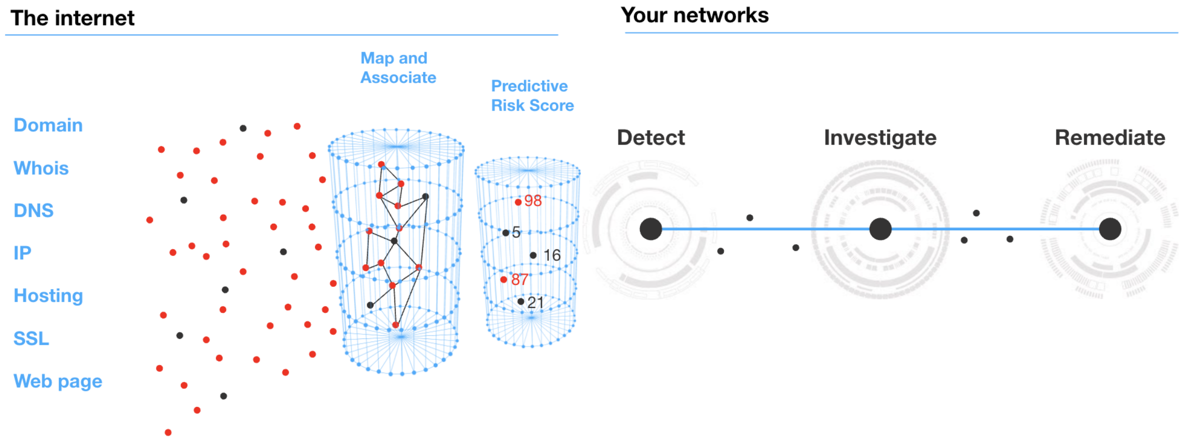
DomainTools

DomainTools Hotlists and Feeds

NOTE: this document refers to products derived from the DomainTools Iris and Domain Risk Score products. It does not cover Farsight DNSDB nor any other Farsight product. Please refer to the data sheets of those products for more information.

Context on Outbound Traffic Flows

When it comes to network defense, a major part of the risk involves traffic from the protected environment to threat-actor-controlled assets. Connections from trusted users to hostile domains or IP addresses enable malware downloads or command and control, data exfiltration, espionage, and other threat activities. Preventing users from reaching dangerous infrastructure, while supporting necessary business functions, is a major component of any network and endpoint defense strategy. Therefore, security teams need reliable inputs on the risk level of the domains and IP addresses seen in their traffic flows, in order to improve situational awareness and to ward off incursions that may be underway.



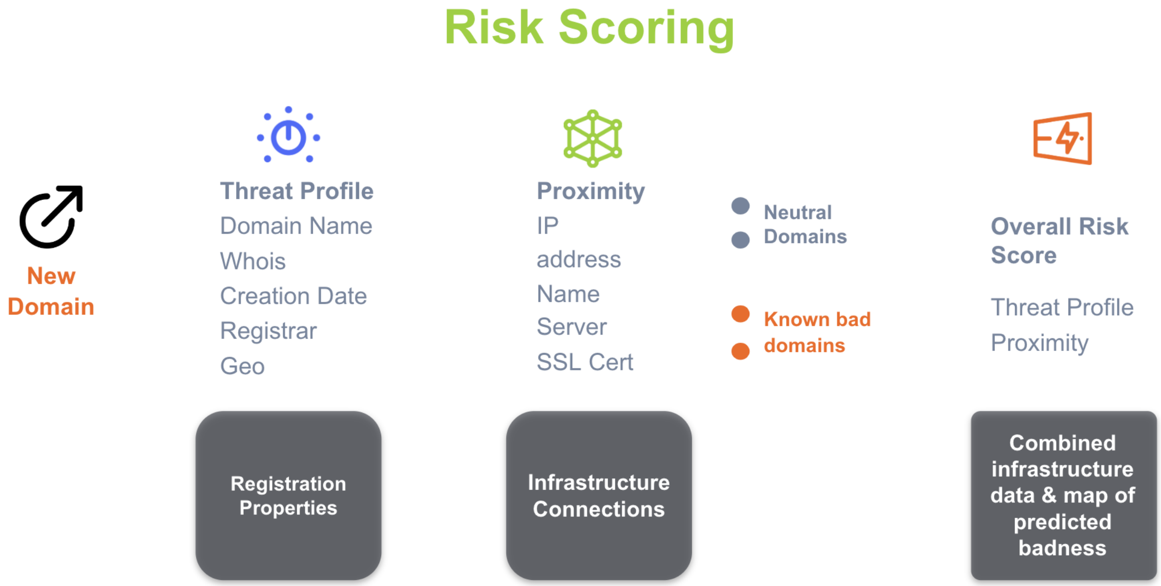
DomainTools offers a variety of feeds, each with a specific area of focus, to help with these needs:

- **Domain Hotlist**: a daily feed of high-risk domains that are observed to be active within a 24 hour time window
- **Domain Risk Feed**: a daily feed of high risk domains, regardless of observed traffic
- **IP Hotlist**: a daily feed of high-risk IP addresses hosting hostile domains that are observed to be active within a 24 hour time window, with risk scores and other enrichment data
- **Hosting IP Risk Feed**: a daily feed of all IP addresses known to be hosting domains, with risk scores and other enrichment data
- **Domain Discovery Feed**: a daily feed of all newly registered and newly observed domains
- **5-Minute Domain Whois Feed:** a feed of the most recently registered or changed domains as processed on a 5-minute basis
- **5-Minute IP Whois Feed:** A feed of the most recently updated IPv4 Whois records as processed on a 5-minute basis

Domain Risk Products

Domain Hotlist

The **Domain Hotlist** is designed to identify the riskiest population of domains, based on a combination of Risk Score and recent activity, as observed in passive DNS (pDNS) records. To qualify for the Hotlist, a domain must have a Proximity score of 70+ or a Threat Profile score of 90+, and must be observed in pDNS to have received traffic within the preceding 24 hours. Typical Hotlist size is ~900,000 domains.



Risk Scoring

New Domain

Threat Profile
Domain Name
Whois
Creation Date
Registrar
Geo

Registration Properties

Proximity
IP address
Name Server
SSL Cert

Infrastructure Connections

● ● Neutral Domains

● ● Known bad domains

Overall Risk Score
Threat Profile
Proximity

Combined infrastructure data & map of predicted badness

Domain Hotlist Specifications:

Updated: Daily

Inclusion Thresholds: Proximity score of 70+ or Threat Profile score of 90+; pDNS activity within 24 hours

File format: gzip-compressed tab separated text file

Data format: one domain per line with component risk scores

Feed size (typical): ~900,000 domains, ~3.5 MB compressed

Field	Description
Domain name	Pinpoint spoof or otherwise suspicious domain names
Phishing	Machine learning classifier prediction for phishing
Malware	Machine learning classifier prediction for malware
Spam	Machine learning classifier prediction for spam
Proximity	Indicates shared registration or infrastructure with known-bad domains
Overall	Equals highest of the component scores

The **Domain Risk Feed** is broader in scope than the Domain Hotlist, and does not include the criterion of pDNS activity. This feed can help identify infrastructure that is in the preparation phases but is not yet operationalized by a threat actor (which is why these domains may not have activity recorded in pDNS). This feed includes all domains with risk scores above 70.

Domain Risk Feed Specifications

Updated: Daily

Inclusion Threshold: Combined Domain Risk Score of 70 or higher

File format: gzip-compressed tab separated text file

Data format: one domain per line with component risk scores

Feed size (typical): ~30 million domains, ~400MB compressed

Field	Description
Domain name	Pinpoint spoof or otherwise suspicious domain names
Phishing	Machine learning classifier prediction for phishing
Malware	Machine learning classifier prediction for malware
Spam	Machine learning classifier prediction for spam
Proximity	Indicates shared registration or infrastructure with known-bad domains
Overall	Equals highest of the component scores

Who Uses The DomainTools Risk Feeds?

As users who demand high-confidence domain risk assessments at scale, the following are all users of the Risk Feeds:

- Online platforms with user communities in the hundreds of millions
- Cyber security technology companies
- Financial services organizations
- National and international-level law enforcement

Domain Discovery Feed

Thousands of malicious domains are registered and used every day for phishing, ransomware, credential harvesting, fraud, and more. As a result, many security teams now use a domain's age as a signal of risk, with brand-new domains standing out for extra scrutiny. The Domain Discovery Feed is a simple text file of domain names. This gives you maximum flexibility for using the new domain information to create alert or block rules for network or host defenses. Security Information Event Management (SIEM) platforms, Threat Intelligence Platforms (TIP), and a variety of other log and event aggregation sources can capture domains accessed from the protected environment; scripts which check these domains against the Domain Discovery Feed can then raise alerts when traffic to matching domains is observed. In some environments, a zero-trust policy toward new domains is employed; in such cases, the Domain Discovery Feed can enable the creation of automatic blocking rules for most traffic, or quarantine/inspection rules for SMTP and other protocols that can accommodate various dispositions.

Domain Discovery Feed Specifications

Updated: Daily

File format: gzip-compressed csv file

Data format: one domain name per line

Feed size (typical): ~375,000 domains, ~2.5GB compressed

Ideal Applications - Domain Risk Products

Whereas lower-volume, ad-hoc lookups can call the DomainTools Risk Score API, many applications operate at scales that demand the immediacy of an on-site database. These include:

- DNS RPZ implementations (also known as DNS Firewalling)
- IDS/IPS

- Fraud detection systems
- Online platforms supporting user-contributed URLs (such as social media platforms)

DomainTools makes it easy to put the power of Domain Risk Score to work in any technology stack. With various ways to access the data (including feed and API services), white-glove customer support, and access to DomainTools engineering and data science experts, any organization requiring high-confidence, Internet scale risk assessment can benefit from the DomainTools Risk Feed.

> ***"This has been a very successful threat source for Quad9. We are very selective and DomainTools quickly established itself as one of our top-producing data sources. [I]t's clearly been a big win for helping to keep our users safe."***
>
> ***-John Todd, Executive Director, Quad9***

IP Risk Products

Illuminating Blind Spots

Existing IP reputation feeds have important limitations in both accuracy and coverage. Many IP addresses host domains that have been registered with malicious intent, but which have not yet been observed on industry blocklists. These IP addresses may represent a risk to the organization, but a blind spot in traditional IP-based defenses or intelligence sources. **Unlike traditional IP reputation lists, the DomainTools IP risk products leverage the fine-grained, predictive assessments of the popular DomainTools Domain Risk Score, for any domains hosted on an IP**. Because the Domain Risk Score reliably predicts how likely a given domain is to be malicious, even before the domain has been weaponized, an aggregate Risk Score of all domains on a given IP address provides a high-confidence view into the risk level of the IP.

IP Hotlist

The **IP Hotlist** is designed to identify the riskiest population of hosting IP addresses. Two main criteria define this list: the average Domain Risk Score of the hosted domains, and the level of traffic the address is receiving, as measured in Internet-wide passive DNS collection. The Hotlist is an ideal database for high-confidence blocklist and detection rule creation.

IP Hotlist Specifications

Updated: Daily

Inclusion Thresholds: More than 50% of domains on the IP have proximity score of 70+ or Threat Profile score of 90+; pDNS activity on malicious domains within 24 hours

File format: gzip-compressed tab separated text file

Data format: one IPv4 per line with percentages of phishing, malware, and spam metrics for domains hosted in the IP

Feed size (typical): 40-50,000 IP addresses, ~1MB compressed

Field	Description
Threat Type	Understand the risk category of domains on the IP
ISP and Geolocation	Confirm geographical attributes and ownership
Domain Stats	Measure the IP's reach and scale
Confirmed Threats	Obtain more granular details on "convicted" domains on the IP
Predicted Threats	Threat predictions for domains not yet found on industry blocklists
pDNS and Zerolisted Metrics	Avoid false positives with allow-listed domains; scope traffic activity as recorded by worldwide passive DNS sensors

Hosting IP Risk Feed

The **Hosting IP Risk Feed** is a daily feed of all IP addresses found to be hosting at least one domain. As with the Hotlist, a risk score is given to the IP address based on the population of domains it hosts. Unlike the Hotlist, however, this feed includes *any* actively-hosting IP, regardless of its risk level, and the **Hosting IP Risk Feed also contains detailed data fields enriching the IP**. This makes it ideal for users who wish to apply their own criteria to evaluate IP addresses for risk or characterize them for other purposes.

Hosting IP Risk Feed Specifications

Updated: Daily

Inclusion Threshold: IP is actively hosting one or more domains (regardless of risk level)

File format: gzip-compressed tab separated text file

Data format: one IPv4 per line with the fields given below

Feed size (typical): 15-20 million IP addresses, ~200MB compressed

Field	Description
Threat Type	Understand the risk categories of domains on the IP
ISP and Geolocation	Confirm geographical attributes and ownership
Domain Stats	Measure the IP's reach and scale
Confirmed Threats	Obtain more granular details on convicted domains in the IP
Predicted Threats	Threat predictions for domains not yet found on industry blocklists
pDNS and Allow-listed Domain Metrics	Scope traffic activity; avoid false positives

Domain and IP Whois Feeds

Increasingly, security teams are enriching the domain names and IP addresses found in log and event sources with relevant metadata to help identify threats to the organization. At smaller scales, this enrichment can be done via API calls, but at large scale, it can be more efficient to query an on-premises file. The feeds listed below provide a variety of data types, updated at intervals ranging from 5 minutes to 24 hours, to enable various enrichment, alerting, and investigative use cases.

5-Minute Whois Feeds

For the most up-to-date data on the newest or most recently-changed infrastructure on the Internet, DomainTools provides domain and IP Whois data, updated on a five minute interval. These feeds are useful for enrichment of infrastructure being rapidly provisioned and "burned" by fast-moving threat actors. Because the data in these feeds comes solely from Whois records, they do not include Risk Scores, nor any of the hosting or content data that are found in the Iris investigation platform and APIs. They do, however, give the analyst the best method of gathering at least preliminary information about the very newest domains in existence.

5-Minute Whois Feed Specifications (Domain and IP Whois)

Updated: Every 5 minutes

Inclusion Threshold: all domains or IPs processed since the previous update

File format: gzip-compressed tab separated or JSON text file

Data format:

- **Parsed** Domain Whois feed: one domain per line followed by each of the Whois data fields
- **Parsed** IP Whois feed: one ASN per entry followed by each of the IP Whois data fields
- **Raw** Whois feeds: unparsed Whois records *(**NOTE**: subscription to the parsed Whois feeds also provides raw records. The raw-records-only feeds are not recommended for most use cases; please contact DomainTools for inquiries)*

Parsed Domain Whois Feed size (typical): ~18,000 domains

.tsv ~8MB compressed

.json ~10MB compressed

Raw (unparsed) Domain Whois Feed size (typical): ~18,000 domains

.gz file ~7MB compressed

Parsed IP Whois Feed size (typical): ~100-250 ASNs

.json ~70-150KB compressed

Raw (unparsed) IP Whois Feed size (typical): ~18,000 domains

.gz file ~40-75KB compressed

Files retained minimum 7 days

Parsed Whois Data Fields

Domain Whois
Domain name
Parse success (y/n)
Server (Whois)
Lookup Date
Lookup Time
Create Date
Updated Date

Expires Date
Registrar Name
Registrar Abuse Contact: Phone
Registrar Abuse Contact: Email
Registrar IANA ID
Registrar URL
Registrar Whois Server
Admin Name
Admin Org
Admin Street
Admin City
Admin State/Province
Admin Postal Code
Admin Country
Admin Phone
Admin Fax
Admin Email
Billing Name
Billing Org
Billing Street
Billing City
Billing State/Province
Billing Postal Code
Billing Country
Billing Phone
Billing Fax
Billing Email

Registrant Name
Registrant Org
Registrant Street
Registrant City
Registrant State/Province
Registrant Postal Code
Registrant Country
Registrant Phone
Registrant Fax
Registrant Email
Technical Name
Technical Org
Technical Street
Technical City
Technical State/Province
Technical Postal Code
Technical Country
Technical Phone
Technical Fax
Technical Email
Name Server
Registrar Status
Raw Whois Data Blob

IP Whois
RIR queried

Net Range
CIDR
Net Name
Net Handle
Parent
Net Type
Origin AS
Organization
RegDate
Updated
Org Name
Org ID
City
State
Postal Code
Country
RegDate
Updated
Ref
Referral Server
OrgAbuseHandle
OrgAbuseName
OrgAbusePhone
OrgAbuseEmail
OrgAbuseRef
OrgTechHandle
OrgTechName

OrgTechPhone
OrgTechEmail
OrgTechRef
OrgNOCHandle
OrgNOCName
OrgNOCPhone
OrgNOCEmail
OrgNOCRef
Comments
Raw IP Whois data blob

About Domain Risk Score

The Risk and Hotlist feeds are informed by the risk perspective of the DomainTools Risk Score. **Unlike traditional IP reputation lists, the DomainTools Hotlists and Risk Feeds reflect the fine-grained, predictive assessments of the DomainTools Domain Risk Score**. The Domain Risk Score reliably predicts how likely a given domain is to be malicious, even before the domain has been weaponized, based on characteristics the domain carries from its inception. Machine learning classifiers score each domain for phishing, malware, and spam profiles, while the Proximity score indicates how closely connected a given domain is to other domains already proven malicious.

Appendix: Provisioning and Access Details

These feeds are provisioned via secure shell protocol (SSH) connections to a DomainTools sFTP server. The connection format is <account>@transfer.domaintools.com. On the server, a directory provides a specific set of files according to the services under contract.

Domain Hotlist

Files:

- `domain_hotlist.gz` = the feed of domains, score components, and pDNS metrics

Files are retained for 1 day.

SCP Syntax:

```
scp -i <identity_file_on_local_system>
<customer_directory_name>\@transfer.domaintools.com:domain_
hotlist.gz <target_directory_on_local_system>
```

This will download the most recent Hotlist compressed file to the user's local file system

Sample Content *(header not included in actual file)*

Domain	Phishing	Malware	Spam	Proximity
000000168.cn	9	8	96	\N
0000010.cn	0	0	98	9
000028522.com	1	3	81	21
00009938.com	4	36	82	5
0000cz.top	42	7	99	13

Domain Risk Feed

Files (specific availability determined by contract):

- `gba_feed` = the feed of Proximity scores
- `threat_profile` = combined Threat Profile and Proximity feed
- `threat_profile_60` = expanded threat profile feed with risk score greater than 60 (threshold for other feeds is a score of 70)
- `combined_risk_score` = combined feed with individual component scores of threat profile and proximity (`threat_profile` gives whichever score is highest, rather than each component score)

Files are retained for 7 days.

SCP Syntax:

```
scp -i <identity_file_on_local_system>
<customer_directory_name>\@transfer.domaintools.com:combined_risk_
score/threat_profile_proximity.gz
<target_directory_on_local_system>
```

This will download the most recent Combined Risk Score compressed file to the user's local file system

Sample Content:

Domain	Phishing	Malware	Spam	Proximity	Overall
000000168.cn	9	8	96	\N	96
0000010.cn	0	0	98	9	98
000028522.com	1	3	81	21	81
00009938.com	4	36	82	5	82
0000cz.top	42	7	99	13	99

Domain Discovery Feed

Files (specific availability determined by contract):

- `NEW_DOMAINS_YYYYMMDD` = the feed of discovered domains

Files are retained for 7 days.

SCP Syntax:

```
scp -i <identity_file_on_local_system>
<customer_directory_name>\@transfer.domaintools.com:new_domains_[Y
YYYMMDD].gz <target_directory_on_local_system>
```

This will download the most recent Domain Discovery Feed compressed file to the user's local file system

Sample Content: *(this feed is simply a flat file of domain names with no additional metadata)*

IP Hotlist

Files (specific availability determined by contract):

- `ip_hotlist.gz` = the IP Hotlist feed

Files are retained for 7 days

SCP Syntax:

```
scp -i <identity_file_on_local_system>
<customer_directory_name>\@transfer.domaintools.com:ip_hotlist.gz
<target_directory_on_local_system>
```

This will download the most recent IP Hotlist compressed file to the user's local file system

Sample Content: INPUT NEEDED

Hosting IP Risk Feed

Files (specific availability determined by contract):

- `ip_fulllist.gz` = the Hosting IP Risk Feed

Files are retained for 1 day.

SCP Syntax:

```
scp -i <identity_file_on_local_system>
<customer_directory_name>\@transfer.domaintools.com:ip_fulllist.gz
<target_directory_on_local_system>
```

This will download the most recent Hosting IP Risk Feed compressed file to the user's local file system

Sample Content: INPUT NEEDED (see comment above)

5-Minute Domain Whois Feed

Files (specific availability determined by contract):

- `[YYYYMMDDTTTT].json.gz` = the parsed feed file
- `[YYYYMMDDTTTT].gz` = the raw/unparsed feed file

Files are retained for 7 days.

SCP Syntax:

```
scp -i <identity_file_on_local_system>
<customer_directory_name>\@transfer.domaintools.com:[YYYYMMDDTTTT]
.json.gz <target_directory_on_local_system>
```

This will download the most recent 5-Minute Domain Whois Feed compressed file to the user's local file system.

Sample Content:

```
Domain Name: domaintools.com
Registry Domain ID: 1697312_DOMAIN_COM-VRSN
Registrar WHOIS Server: WHOIS.ENOM.COM
Registrar URL: WWW.ENOM.COM
Updated Date: 2020-01-09T23:06:29.00Z
Creation Date: 1998-08-02T04:00:00.00Z
Registrar Registration Expiration Date: 2027-08-01T04:00:00.00Z
Registrar: ENOM, INC.
Registrar IANA ID: 48
Domain Status: clientTransferProhibited
https://www.icann.org/epp#clientTransferProhibited
Registrant Name: REDACTED FOR PRIVACY
Registrant Organization: REDACTED FOR PRIVACY
Registrant Street: REDACTED FOR PRIVACY
Registrant Street:
Registrant City: REDACTED FOR PRIVACY
Registrant State/Province: WA
Registrant Postal Code: REDACTED FOR PRIVACY
Registrant Country: US
Registrant Phone: REDACTED FOR PRIVACY
Registrant Phone Ext:
Registrant Fax: REDACTED FOR PRIVACY
Registrant Email: https://tieredaccess.com/contact/81ba0df0-0a5b-46e2-be05-b53ef3107ad4
Admin Name: REDACTED FOR PRIVACY
Admin Organization: REDACTED FOR PRIVACY
Admin Street: REDACTED FOR PRIVACY
Admin Street:
Admin City: REDACTED FOR PRIVACY
Admin State/Province: REDACTED FOR PRIVACY
Admin Postal Code: REDACTED FOR PRIVACY
Admin Country: REDACTED FOR PRIVACY
Admin Phone: REDACTED FOR PRIVACY
Admin Phone Ext:
Admin Fax: REDACTED FOR PRIVACY
Admin Email: REDACTED FOR PRIVACY
Tech Name: REDACTED FOR PRIVACY
Tech Organization: REDACTED FOR PRIVACY
Tech Street: REDACTED FOR PRIVACY
Tech Street:
Tech City: REDACTED FOR PRIVACY
Tech State/Province: REDACTED FOR PRIVACY
Tech Postal Code: REDACTED FOR PRIVACY
Tech Country: REDACTED FOR PRIVACY
Tech Phone: REDACTED FOR PRIVACY
Tech Phone Ext:
Tech Fax: REDACTED FOR PRIVACY
Tech Email: REDACTED FOR PRIVACY
Name Server: DNS1.P04.NSONE.NET.
Name Server: DNS2.P04.NSONE.NET.
Name Server: DNS3.P04.NSONE.NET.
Name Server: DNS4.P04.NSONE.NET.
DNSSEC: unsigned
Registrar Abuse Contact Email: ABUSE@ENOM.COM
Registrar Abuse Contact Phone: +1.4259744689
URL of the ICANN WHOIS Data Problem Reporting System: HTTP://WDPRS.INTERNIC.NET/
```

5-Minute IP Whois Feed

Files (specific availability determined by contract):

- `[YYYYMMDDTTTT].json.gz` = the parsed feed file
- `[YYYYMMDDTTTT].gz` = the raw/unparsed feed file

SCP Syntax:

```
scp -i <identity_file_on_local_system>
<customer_directory_name>\@transfer.domaintools.com:[YYYYMMDDTTTT]
.json.gz <target_directory_on_local_system>
```

This will download the most recent 5-Minute IP Whois Feed compressed file to the user's local file system.

Sample Content:

```
NetRange:       199.30.228.0 - 199.30.231.255
CIDR:           199.30.228.0/22
NetName:        DOMAINTOOLS
NetHandle:      NET-199-30-228-0-1
Parent:         NET199 (NET-199-0-0-0-0)
NetType:        Direct Assignment
OriginAS:
Organization:   DomainTools, LLC (DOMAI-25)
RegDate:        2010-09-17
```

```
Updated:        2017-03-14
Ref:            https://rdap.arin.net/registry/ip/199.30.228.0

OrgName:        DomainTools, LLC
OrgId:          DOMAI-25
Address:        2101 4th Ave, Suite 1150
City:           Seattle
StateProv:      WA
PostalCode:     98121
Country:        US
RegDate:        2010-01-06
Updated:        2017-03-14
Ref:            https://rdap.arin.net/registry/entity/DOMAI-25

OrgNOCHandle: NETWO8122-ARIN
OrgNOCName:   Network Operations
OrgNOCPhone:  +1-206-838-9035
OrgNOCEmail:  noc@domaintools.com
OrgNOCRef:    https://rdap.arin.net/registry/entity/NETWO8122-ARIN

OrgTechHandle: NETWO8122-ARIN
OrgTechName:   Network Operations
OrgTechPhone:  +1-206-838-9035
OrgTechEmail:  noc@domaintools.com
OrgTechRef:    https://rdap.arin.net/registry/entity/NETWO8122-ARIN

OrgAbuseHandle: NETWO4008-ARIN
OrgAbuseName:   Network Abuse
OrgAbusePhone:  +1-206-838-9035
OrgAbuseEmail:  networkabuse@domaintools.com
OrgAbuseRef:    https://rdap.arin.net/registry/entity/NETWO4008-ARIN

RAbuseHandle: NETWO4008-ARIN
RAbuseName:   Network Abuse
RAbusePhone:  +1-206-838-9035
RAbuseEmail:  networkabuse@domaintools.com
RAbuseRef:    https://rdap.arin.net/registry/entity/NETWO4008-ARIN

RNOCHandle: NETWO8122-ARIN
RNOCName:   Network Operations
RNOCPhone:  +1-206-838-9035
RNOCEmail:  noc@domaintools.com
RNOCRef:    https://rdap.arin.net/registry/entity/NETWO8122-ARIN
```

```
RTechHandle: NETWO8122-ARIN
RTechName:   Network Operations
RTechPhone:  +1-206-838-9035
RTechEmail:  noc@domaintools.com
RTechRef:    https://rdap.arin.net/registry/entity/NETWO8122-ARIN
```