Domain Name Service

Service Overview

Issue 01

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Contents

1 What Is DNS?

Domain Name Service (DNS) is a highly available and scalable authoritative Domain Name System (DNS) web service that translates domain names (such as www.example.com) into IP addresses (such as 192.1.2.3) required for network connection. The DNS service allows end users to visit your websites or web applications with domain names.

The DNS service is free and is enabled by default.

Basic Functions

The DNS service provides the following functions:

- **Public domain name resolution**

  Maps domain names to public IP addresses so that end users can access your website or web applications over the Internet.
- **Private domain name resolution**

  Translates private domain names into private IP addresses to facilitate access to cloud resources within VPCs.
- **Reverse resolution**

  Obtains a domain name based on an IP address. Reverse resolution, or reverse DNS lookup, is typically used to affirm the credibility of email servers.
- **Intelligent resolution**

  Returns different IP addresses for the same domain name based on the carrier networks or geographic locations. This significantly reduces network latency for end users from different carrier networks and geographic locations.

Product Advantages

The DNS service has the following advantages:

- High performance

  A single DNS node can handle millions of concurrent queries, allowing end users to access your website or application more quickly.
- Easy access to cloud resources

Your ECSs can communicate with each other and with other resources within VPCs using private domain names. Traffic is kept within your internal network, which reduces network latency and improves security.

For more details, see **Configuring a Private Domain Name for an ECS**.

- Smooth service migration

  You can migrate an in-use website domain name to the Huawei Cloud DNS service. To ensure that your website services are not interrupted during the migration, we will create a public zone and add DNS record sets for your website in advance.

- Isolation of core data

  A private DNS server provides domain name resolution for ECSs carrying core data, enabling secure, controlled access to such data. You do not need to bind EIPs to these ECSs.

Accessing the DNS Service

The cloud platform provides a web-based management console as well as REST APIs through which you can access the DNS service.

- Management console

  A web-based management console enables you to access the DNS service.

  - If you have already registered an account, log in to the management console, hover on the upper left to display **Service List**, and choose **Networking** > **Domain Name Service**.
  - Otherwise, register an account with Huawei Cloud by following the instructions in **Quick Start** and perform the preceding step.

  With a few steps, you can start using the DNS service for domain name resolution.

- APIs

  REST APIs are provided for accessing the DNS service. You can also use the provided APIs to integrate DNS into a third-party system for secondary development. For details, see the **Domain Name Service API Reference**.

2 Public Domain Name Resolution

Public Zone

A public zone contains information about how a domain name and its subdomains are translated into IP addresses for routing traffic over the Internet. Public zones allow end users to access your website or application over the Internet using your domain name.

Accessing a Website Using a Domain Name

To make your website accessible on the Internet through a domain name, perform the following steps:

1. Register your domain name with a domain name registrar so that end users can use the domain name to access your website.
2. Set up your website.

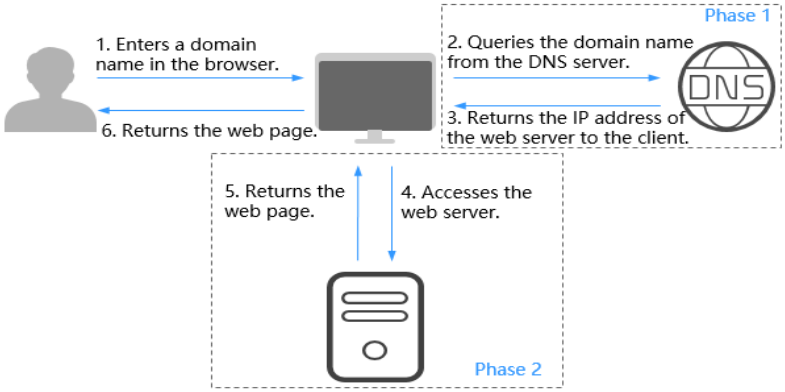
   Purchase cloud resources from Huawei Cloud or other cloud service providers.
3. Configure the DNS service to route Internet traffic for your domain name.

   Create a public zone to host the domain name on the DNS service and add a record set to map the domain name to the EIP of the server where the website is set up.

   For details, see **Routing Internet Traffic to a Website**.

After you finish the above steps, end users will be able to access your website over the Internet with the registered domain name and its subdomains.

Figure 2-1 How DNS routes Internet traffic to a website



- Phase 1 shows how DNS resolves your domain name.
- Phase 2 shows how the web page is returned to the user.

Public domain name resolution depends on the DNS hierarchy. The following describes the hierarchies of domain names and how domain names are resolved.

DNS Hierarchy

Domain names are hierarchical, and domain name resolution is a recursive lookup process. The following uses example.com to describe the hierarchies in domain names.

- Root domain

  A dot (.) is the designation for the root domain.

  A fully qualified domain name (FQDN) ends with a dot (example.com.). When you enter a domain name (example.com) in the browser, the DNS system will automatically add a dot in the end.

  Root domain names are resolved by root DNS servers that hold the addresses of top-level DNS servers.

- Top-level domain

  Below the root domain are top-level domains, which are categorized into two types:

  – Generic top-level domain (gTLD), such as .com, .net, .org, and .top

  – Country code top-level domain (ccTLD), such as .cn, .uk, and .de

  Top-level domains are resolved by top-level DNS servers that hold the addresses of second-level DNS servers. For example, the top-level DNS server of .com saves the addresses of all DNS servers of second-level domain names that end with .com.

- Second-level domain

  Second-level domains (such as example.com) are subdomains of top-level domains and are resolved by second-level DNS servers, which provide authoritative domain name resolution services.

  For example, if you purchase example.com from a domain name registrar and set a DNS server for the domain name, the DNS server will provide

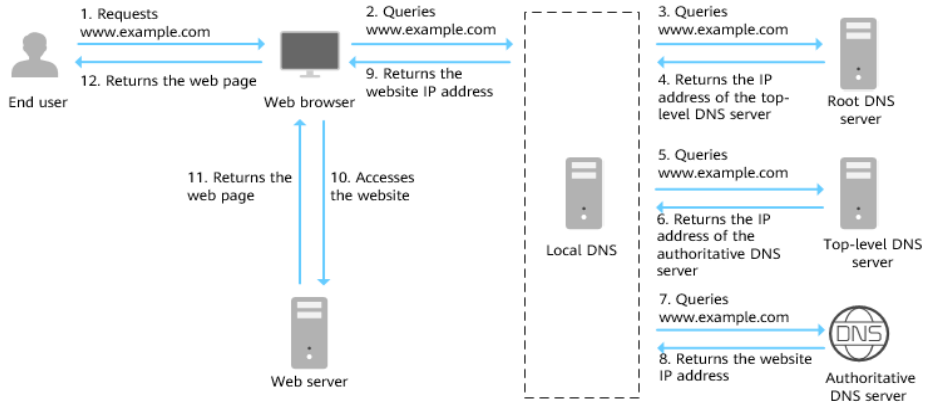
authoritative resolution for example.com, and its address will be recorded by all top-level DNS servers.

If you host domain names on Huawei Cloud DNS, authoritative DNS servers will be provided for the domain names.

Domain Name Resolution

Figure 2-2 shows the process for accessing a website using the domain name www.example.com.

Figure 2-2 Domain name resolution



1. An end user enters **www.example.com** in the address box of a browser.
2. The request for querying domain name www.example.com is routed to the local DNS server.

   Local DNS servers are usually provided by the Internet service provider to cache domain name information and perform recursive lookup.
3. If the local DNS server does not find any records in the cache, it routes the request for www.example.com to the root DNS server.
4. The root DNS server returns the DNS server address of .com (because the domain name suffix is .com) to the local DNS server.
5. The local DNS server sends the request to the top-level DNS server of .com.
6. The top-level DNS server of .com returns the address of the authoritative DNS server which provides authoritative records for example.com.
7. The local DNS server sends the request to the authoritative DNS server of example.com.

   If you have hosted www.example.com on the DNS service and configure **Huawei Cloud DNS name servers**, these name servers will provide authoritative DNS for the domain name.
8. The authoritative DNS server returns the IP address mapped to www.example.com to the local DNS server.
9. The local DNS server returns the IP address to the web browser.
10. The web browser accesses the web server with the IP address.
11. The web server returns the web page to the browser.
12. The end user views the web page using the browser.

For details, see **Routing Internet Traffic to a Website**.

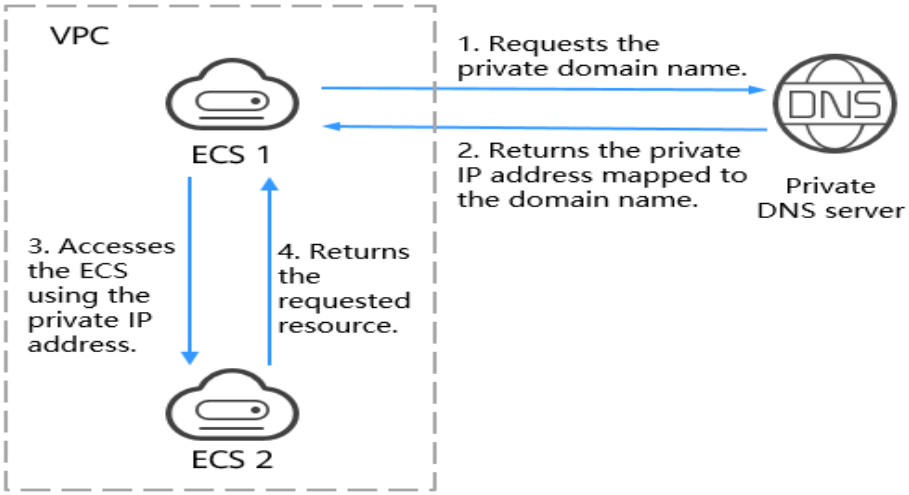
3 Private Domain Name Resolution

Private Zone

A private zone contains information about how to map a domain name (such as ecs.com) and its subdomains used within one or more VPCs to private IP addresses (such as 192.168.1.1). With private domain names, your ECSs can communicate with each other within a VPC without having to connect to the Internet. These ECSs can also access cloud services, such as OBS and SMN, over a private network.

Figure 3-1 shows how a private domain name is resolved by a private DNS server.

Figure 3-1 Process for resolving a private domain name



When an ECS in the VPC requests to access a private domain name, the private DNS server directly returns a private IP address mapped to the domain name.

Private zones allow you to:

- Flexibly customize private domain names in your VPCs.
- Associate one or more multiple VPCs with one domain name.
- Use private DNS servers to prevent DNS spoofing and quickly respond to requests for accessing ECSs in VPCs as well as OBS and SMN resources.

You can use private domain names in the following scenarios:

- **Managing ECS Host Names**
- **Keeping Your Website Up and Running Even While Your Server Is Being Replaced**
- **Accessing Cloud Resources**

Managing ECS Host Names

You can plan host names based on the locations, usages, and account information of ECSs, and map the host names to private IP addresses, helping you manage ECSs more easily.

For example, if you have deployed 20 ECSs in an AZ, 10 for website A and 10 for website B, you can plan their host names (private domain names) as follows:

- ECSs for website A: weba01.region1.az1.com – weba10.region1.az1.com
- ECSs for website B: webb01.region1.az1.com – webb10.region1.az1.com

After you configure the host names, you will be able to quickly determine the locations and usages of ECSs during routine management and maintenance.

See **Routing Traffic Within VPCs** for detailed operations.

Keeping Your Website Up and Running Even While Your Server Is Being Replaced

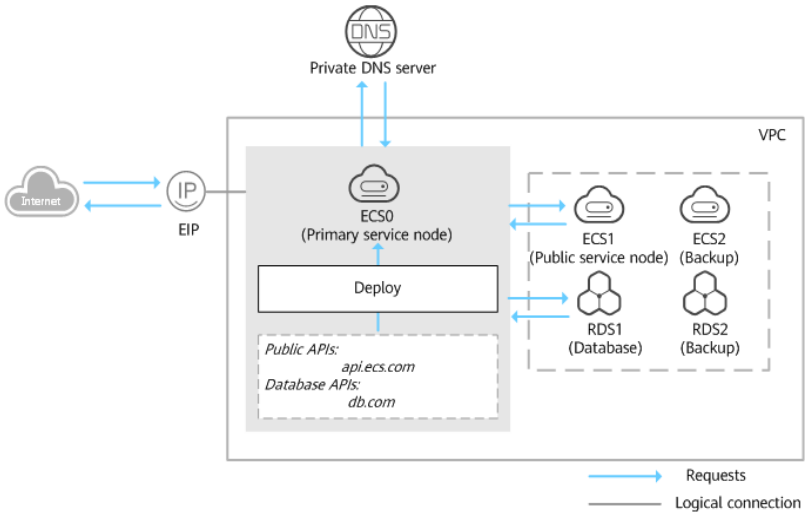
As the number of Internet users is continuously increasing, a website or web application deployed on a single server can hardly handle concurrent requests during peak hours. A common practice is to deploy the website or application on multiple servers and distribute the load across the servers.

These servers are in the same VPC and communicate with each other using private IP addresses that are coded into internal APIs called among the servers. If one of these servers is replaced, its private IP address changes. As a result, you need to change this IP address in the APIs and re-publish the website. This poses challenges for system maintenance.

If you create a private zone for each server and configure record sets to map their private domain names to the private IP addresses, they will be able to communicate using private domain names. When you replace any of the servers, you only need to change the private IP address in the record set, instead of modifying the code.

Figure 3-2 illustrates such use of private domain name resolution.

Figure 3-2 Configuring private DNS for cloud servers



The ECSs and RDS instances are in the same VPC.

- ECS0: primary service node
- ECS1: public service node
- RDS1: service database
- ECS2 and RDS2: backup service node and backup database

When ECS1 becomes faulty, ECS2 must take over. However, if no private zones are configured for the two ECSs, you need to change the private IP addresses in the code for ECS0. This will interrupt services, and you will need to publish the website again.

Now assume that you have configured private zones for the ECSs and have included their private names in the code. If ECS1 becomes faulty, you only need to change the DNS records to direct traffic to ECS2. Services are not interrupted, and you do not need to publish the website again.

See **Configuring a Private Domain Name for an ECS** for detailed operations.

Accessing Cloud Resources

Configure private domain names for ECSs so that they can access other cloud services, such as SMN and OBS, without connecting to the Internet.

When you create an ECS, note the following:

- If a public DNS server is configured for the VPC subnet where the ECS resides, requests to access cloud services will be routed over the Internet.

  Figure 3-3 shows the process for resolving a domain name when an ECS accesses Huawei cloud services such as OBS and SMN.

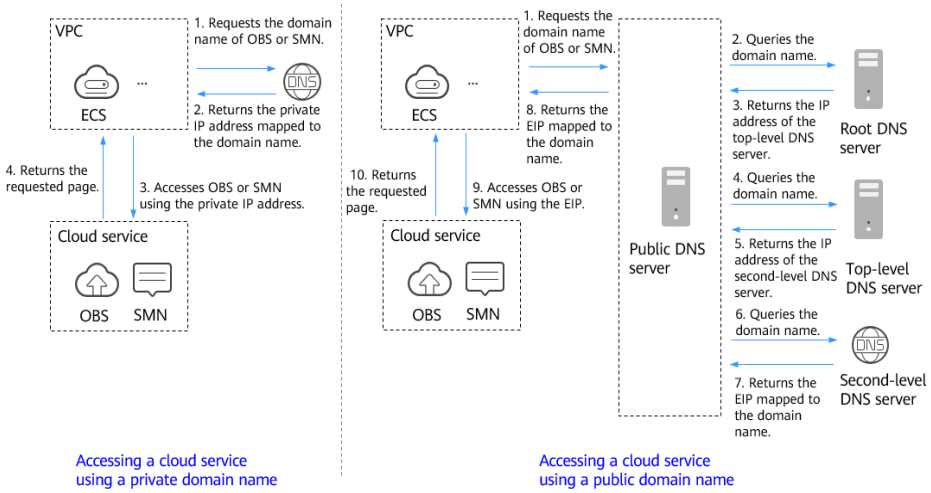
  Requests are routed over the Internet, resulting in an increase in network latency.
- If a private DNS server is configured for the subnet, the private DNS server directly processes the requests to access cloud services.

  When the ECS accesses the Huawei cloud services, the private DNS server returns their private IP addresses, instead of routing requests over the

Internet. This reduces network latency and improves access speed. Steps 1 to 4 on the left of **Figure 3-3** shows the process.

To make your ECS accessible within the private network, change the default DNS servers of the ECS to private DNS servers, see **How Do I Change Default DNS Servers of an ECS to Private DNS Servers Provided by the DNS Service?**

Figure 3-3 Accessing cloud services



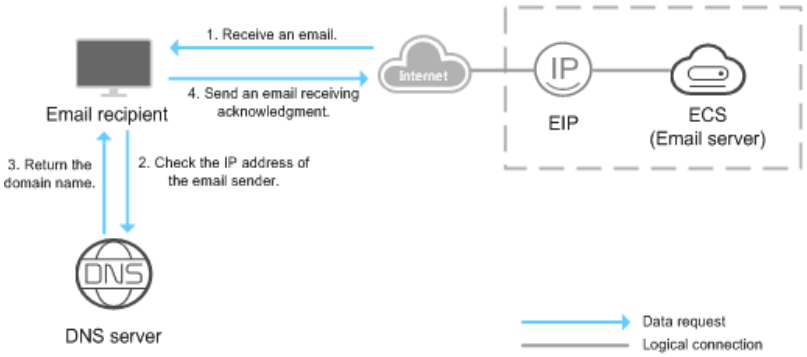
4 Reverse Resolution

Reverse resolution, also reverse DNS lookup, resolves an IP address back to a host name. This is typically used to affirm the credibility of email servers.

After a recipient server receives an email, it checks whether the IP address and domain name of the sender server are trustworthy and determines whether the email is spam. If the recipient server cannot obtain the domain name mapped to the IP address of the sender server, it concludes that the email is sent by a malicious host and rejects it. It is necessary to configure pointer records (PTR) to point the IP addresses of your email servers to domain names.

In the following figure, an ECS serves as an email server, and a PTR record is configured to map the EIP of the ECS to the domain name configured for accessing the email server.

Figure 4-1 Reverse resolution



NOTE

Figure 4-1 shows only the process for reverse resolution. Information about how an email server checks the credibility of the sender's IP address and whether domain name is available on the Internet is not provided here.

If no PTR records are configured, the recipient server will treat emails from the email server as spam or malicious and discard them.

See **Translating an IP Address to a Domain Name** for detailed operations.

5 Intelligent Resolution

If end users access a domain name, DNS servers return the same IP address to the end users regardless of their networks or geographic locations. However, in cross-network or cross-region access, this would lead to an increase in network latency and poor user experience.

With configurable resolution lines, you can specify different IP addresses for the same domain name based on the networks or geographic locations.

You can create more fine-grained resolution lines based on source IP addresses.

Huawei Cloud DNS supports the following types of resolution lines:

- **ISP lines**
- **Region lines**
- **Custom lines**
- **Weighted routing**

NOTE

Resolution lines are not available for private zones and PTR records.

6 Functions

Table 6-1 lists basic functions of the DNS service.

Before you use the DNS service, you'd better get familiar with **Product Concepts** to better understand the functions.

Table 6-1 Common DNS functions

Category	Function	Description
Public domain resolution	Public zone	A public zone is used to host a domain name you want to make accessible over the Internet and contains information about how you want to route traffic for the domain name and all its subdomains. You can create, modify, delete, enable, disable, and view public zones. For details, see **Public Zone**.
	Domain name level	You can create public zones for second-level domain names and their subdomains. • For domain names with 1-level suffixes like .com, you can create zones for example.com and www.example.com. • For domain names with 2-level suffixes like .com.cn, you can create zones for example.com.cn and www.example.com.cn.
	Record set	A record set is a collection of resource records that belong to the same domain name. A record set defines the resolution type and value of a domain name. You can add, modify, delete, view, disable, or enable record sets of the A, CNAME, MX, AAAA, TXT, SRV, NS, and CAA types for public zones. For details, see **Record Set**.

Category	Function	Description
	Regaining a domain name	If a public zone has been created for your domain name by another user, you can regain the domain name by proving that you are the holder of this domain name. For details, see **Regaining a Domain Name**.
	Wildcard resolution	You can add record sets for all subdomains of a second-level domain name. For details, see **Creating a Wildcard DNS Record Set**.
	TTL	TTL is short for time to live, which specifies the cache period of resource records on a local DNS server, in seconds. The TTL value ranges from **1** to **2147483647**.
	Weight	Weight indicates the proportion of DNS queries that will be routed to the record set. If a resolution line in a zone contains multiple record sets of the same type, you can set different weights to each record set. For details, see **Configuring Weighted Routing**.
	Batch operation	You can delete multiple public zones at a time.
Private domain name resolution	Private zone	A private zone is used to host private domain names that are used in VPCs. You can create, modify, delete, and view private zones, associate private zones with VPCs, and disassociate private zones from VPCs. • Private zones can be created without the need to register domain names. • Each private zone must be unique in the associated VPC. For details, see **Private Zone**.
	Associating a private zone with or disassociating a private zone from a VPC	You can associate a private zone with a VPC or disassociate a private zone from a VPC. For details, see **Associating a VPC with a Private Zone** and **Disassociating a VPC from a Private Zone**.

Category	Function	Description
	Record set	A record set is a collection of resource records that belong to the same domain name. A record set defines the resolution type and value of a domain name. You can add, modify, delete, or view A, CNAME, MX, AAAA, TXT, PTR, and SRV record sets for private zones. For details, see **Record Set**.
	Wildcard resolution	You can add record sets for all subdomains of a private domain name. DNS provides resolution services for all subdomains. For details, see **Creating a Wildcard DNS Record Set**.
	TTL	TTL is short for time to live, which specifies the cache period of resource records on a local DNS server, in seconds. The TTL value ranges from **1** to **2147483647**.
	Batch deleting private zones	You can delete multiple private zones at a time.
Reverse resolution	PTR record	Reverse resolution involves obtaining a domain name based on an IP address. This function is useful when you want to build an email server. You can create, modify, and delete PTR records. For details, see **PTR Record**.
	TTL	TTL is short for time to live, which specifies the cache period of resource records on a local DNS server, in seconds. The TTL value ranges from **1** to **2147483647**.
Intelligent resolution	ISP line	DNS can return the optimal IP addresses to end users based on the carrier networks they use. For details, see **Configuring ISP Lines**.
	Region line	DNS can return the optimal IP addresses to end users based on their geographic locations. For details, see **Configuring Region Lines**.

Category	Function	Description
Record set	Searching for record sets globally	DNS allows you to centrally manage record sets in both public and private zones, including the following: • Searching for record sets by status, type, name, value, ID, or tag • Modifying, deleting, disabling, or enabling record sets in public zones • Modifying or deleting record sets in private zones For details, see **Searching for Record Sets**.
	Batch deleting private zones	You can import, export, and delete record sets in both public and private zones in batches. For details, see **Importing Record Sets** and **Exporting Record Sets**.
Auditing	Viewing audit logs	With CTS, you can record operations associated with DNS for later query, audit, and backtrack operations. Huawei Cloud allows you to view and export operation records of the last seven days on the CTS console.
Tag	Resource tag	You can configure tags for public zones, private zones, record sets, and PTR records. You can also use **predefined tags** of TMS to quickly associate tags with resources.
Quota	Quota adjustment	Quotas are enforced for service resources on the platform to prevent unforeseen spikes in resource usage. Quotas can limit the number and capacity of resources available to end users, for example, how many public zones, private zones, record sets, and PTR records you can create. If the existing resource quotas cannot meet your service requirements, you can request higher quotas. For details, see **Quota Adjustment**.

7 Constraints

Table 7-1 lists the constraints on using DNS.

Table 7-1 DNS constraints

Resource	Default Quota	How to Increase
Public zone	50	Submit a service ticket.
Private zone	50	
Record set	500	
PTR record	50	
Custom line	50	
Maximum number of VPCs that can be associated with a private zone	Unlimited	-
Maximum number of VPCs that can be associated with an endpoint rule	Unlimited	-
Maximum number of resolution requests for a single ECS in a VPC	2,000 per second	For a single ECS in a VPC, the maximum number of resolution requests is 2,000 per second. If peak requests reach the limit, extra requests may not be resolved. If your services initiate an enormous volume of concurrent requests, enable DNS caching to improve lookup efficiency.
Total number of resolution requests for all ECSs in a VPC	Unlimited	-

Resource	Default Quota	How to Increase
Maximum number of recursive resolution requests for a single ECS in a VPC	600 per second	For a single ECS in a VPC, the maximum number of recursive requests is 600 per second. If peak requests reach the limit, extra requests may not be resolved. If your services initiate an enormous volume of concurrent requests, enable DNS caching to improve lookup efficiency.
Total number of recursive requests for all ECSs in a VPC	5,000 per second	For all ECSs in a VPC, the maximum number of recursive requests is 5,000 per second. If peak requests reach the limit, extra requests may not be resolved. If you have special services where access to a large number of Internet domain names is required, some domain names may not be accessed due to traffic limiting. To avoid this, **submit a service ticket**.

8 Security

8.1 Shared Responsibilities

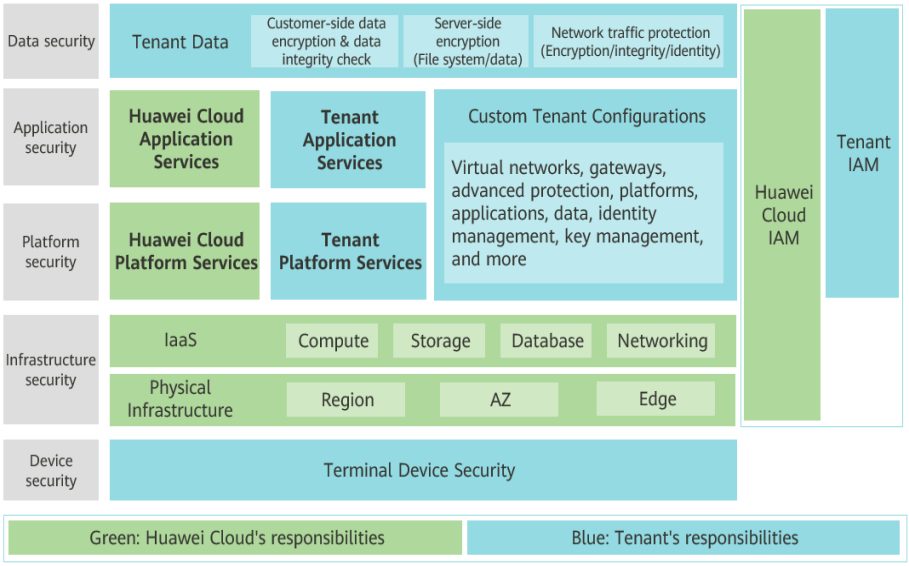
Huawei guarantees that its commitment to cyber security will never be outweighed by the consideration of commercial interests. To cope with emerging cloud security challenges and pervasive cloud security threats and attacks, Huawei Cloud builds a comprehensive cloud service security assurance system for different regions and industries based on Huawei's unique software and hardware advantages, laws, regulations, industry standards, and security ecosystem.

Figure 8-1 illustrates the responsibilities shared by Huawei Cloud and users.

- **Huawei Cloud**: Ensure the security of cloud services and provide secure clouds. Huawei Cloud's security responsibilities include ensuring the security of our IaaS, PaaS, and SaaS services, as well as the physical environments of the Huawei Cloud data centers where our IaaS, PaaS, and SaaS services operate. Huawei Cloud is responsible for not only the security functions and performance of our infrastructure, cloud services, and technologies, but also for the overall cloud O&M security and, in the broader sense, the security and compliance of our infrastructure and services.
- **Tenant**: Use the cloud securely. Tenants of Huawei Cloud are responsible for the secure and effective management of the tenant-customized configurations of cloud services including IaaS, PaaS, and SaaS. This includes but is not limited to virtual networks, the OS of virtual machine hosts and guests, virtual firewalls, API Gateway, advanced security services, all types of cloud services, tenant data, identity accounts, and key management.

Huawei Cloud Security White Paper elaborates on the ideas and measures for building Huawei Cloud security, including cloud security strategies, the shared responsibility model, compliance and privacy, security organizations and personnel, infrastructure security, tenant service and security, engineering security, O&M security, and ecosystem security.

Figure 8-1 Huawei Cloud shared security responsibility model



8.2 Identity and Access Control

You can use Identity and Access Management (IAM) to control access to your DNS resources. IAM permissions define which actions on your cloud resources are allowed or denied. After creating an IAM user, the administrator needs to add it to a user group and grant the permissions required by DNS to the user group. Then, all users in this group automatically inherit the granted permissions.

For details, see **Permissions Management**.

8.3 Auditing and Logging

Cloud Trace Service (CTS) is a log audit service for Huawei Cloud security. It allows you to collect, store, and query cloud resource operation records. You can use these records to perform security analysis, audit compliance, track resource changes, and locate faults.

After CTS is enabled, traces can be generated for DNS operations.

- For details about how to enable and configure CTS, see **Enabling CTS**.
- For details about key operations of DNS, see **Key Operations Recorded by CTS**.
- For details about traces, see **Viewing Traces**.

8.4 Resilience

100+ DNS nodes have been deployed in more than 20 countries and regions around the world. DNS provides multi-AZ, multi-cluster disaster recovery in each region, so even if some nodes, clusters, or regions go down, domain name resolution will not be interrupted. DNS provides service reliability you can count on.

Huawei has more than 10 years of information security experience and has a wealth of excellent practices to rely on. Based on Huawei Cloud's self-built high-security equipment rooms and high-security scrubbing centers on carriers' backbone networks, DNS provides Terabyte-level DDoS protection. It can quickly and effectively cope with various DNS attacks to ensure the continuity of domain name resolution.

Huawei's next-generation Data Plane Development Kit (DPDK) offers higher resolution performance. With DPDK, a single DNS node can support tens of millions of concurrent requests, so DNS can support hundreds of millions of concurrent requests. You get high-performance resolution services with unlimited scalability.

Huawei DNS supports intelligent resolution. User traffic is automatically scheduled to different backend servers by carrier, continent/country, or weight, greatly improving service reliability.

8.5 Monitoring Security Risks

Cloud Eye is a monitoring service from Huawei Cloud. It provides capabilities like real-time monitoring, timely alarm reporting, resource groups, and website monitoring. Cloud Eye helps you keep track of your resource usages and service statuses on the cloud, making it easier to respond to exceptions in a timely manner.

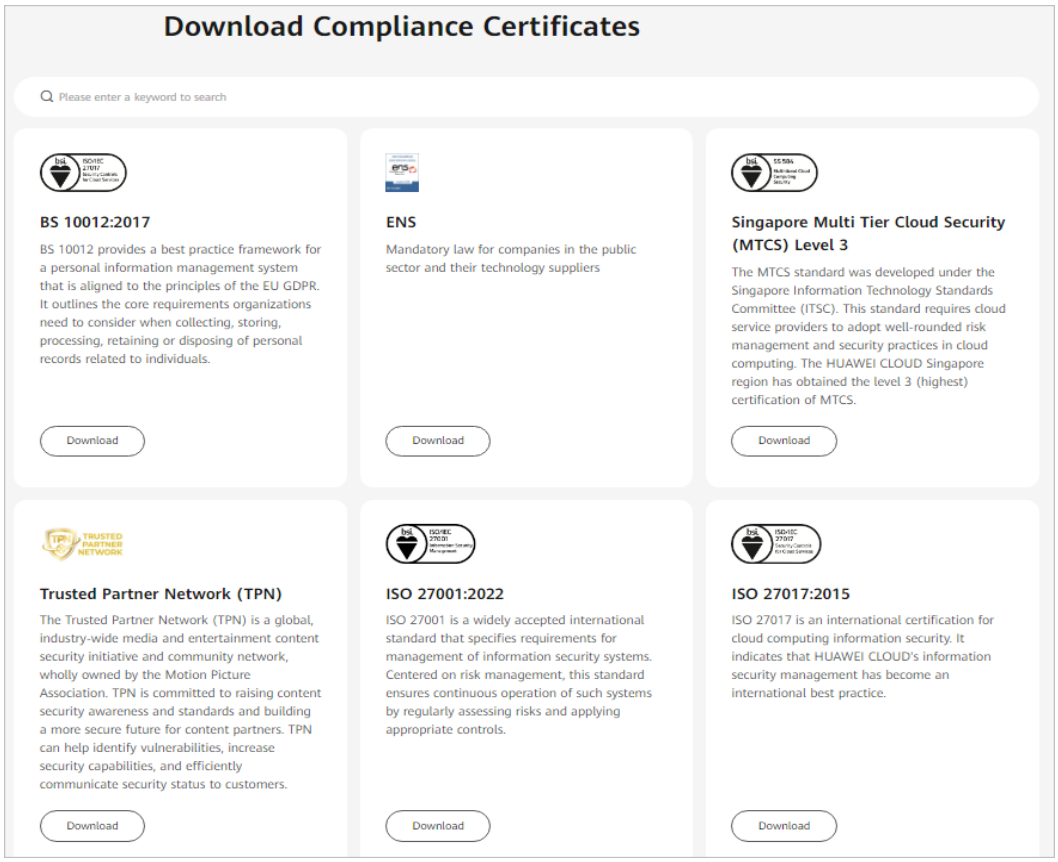
Monitoring is key to ensuring the reliability, availability, and performance of the DNS service. With Cloud Eye, you can view domain name resolution traffic and error logs within your selected time period. You can also dynamically analyze potential risks based on alarms generated.

8.6 Certificates

Compliance Certificates

Huawei Cloud services and platforms have obtained various security and compliance certifications from authoritative organizations, such as International Organization for Standardization (ISO). You can **download** them from the console.

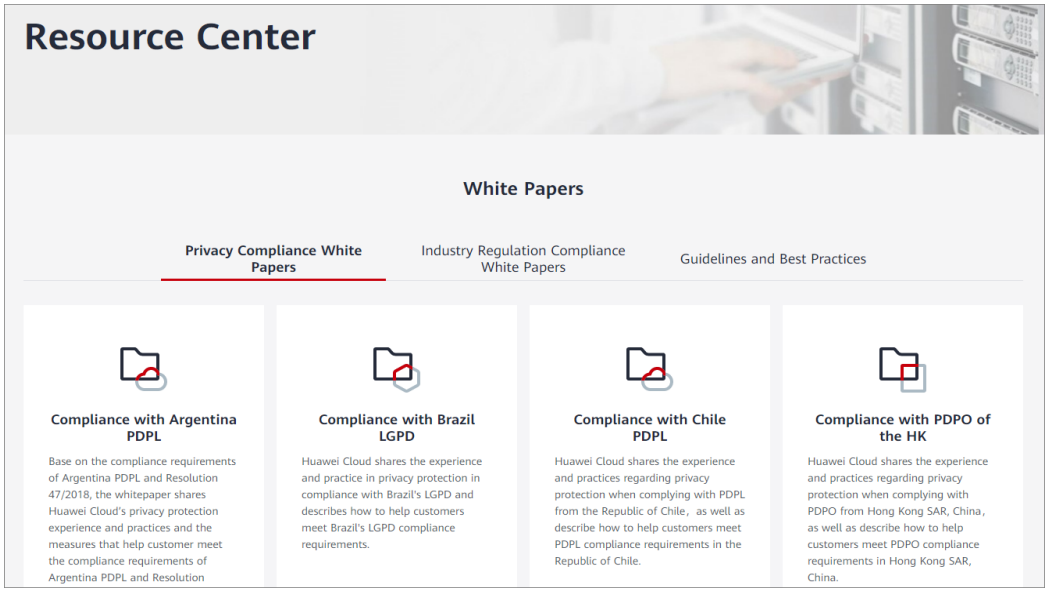
Figure 8-2 Downloading compliance certificates



Resource Center

Huawei Cloud also provides the following resources to help users meet compliance requirements. For details, see **Resource Center**.

Figure 8-3 Resource center



9 Permissions

If you need to assign different permissions to personnel in your enterprise to access your DNS resources, Identity and Access Management (IAM) is a good choice for fine-grained permissions management. IAM provides identity authentication, permissions management, and access control, helping you to securely access your Huawei Cloud resources.

With IAM, you can create IAM users and assign permissions to control their access to specific resources. For example, if you want some software developers in your enterprise to use DNS resources but do not want them to delete DNS resources or perform any other high-risk operations, you can create IAM users and grant permission to use DNS resources but not permission to delete them.

If your Huawei Cloud account does not require individual IAM users for permissions management, you can skip this section.

IAM is a free service. You only pay for the resources in your account.

For more information about IAM, see **IAM Service Overview**.

DNS Permissions

New IAM users do not have any permissions assigned by default. You need to first add them to one or more groups and attach policies or roles to these groups. The users then inherit permissions from the groups and can perform specified operations on cloud services based on the permissions they have been assigned.

DNS resources include the following:

- Public zone: global-level resource
- Private zone: project-level resource
- PTR record: project-level resource

DNS permissions for global-level resources cannot be set in the global service project and must be granted for each project.

When you set **Scope** to **Region-specific projects** and select the specified projects (for example, **ap-southeast-2**) in the specified regions (for example, **AP-Bangkok**), the users only have permissions for DNS in the selected projects. If you set **Scope** to **All resources**, the users have permissions for DNS in all region-

specific projects. When accessing DNS, the users need to switch to the authorized region.

You can grant permissions by using roles and policies.

- Roles: A coarse-grained authorization strategy provided by IAM to assign permissions based on users' job responsibilities. Only a limited number of service-level roles are available for authorization. Huawei Cloud services depend on each other. When you grant permissions using roles, you also need to attach dependent roles. Roles are not ideal for fine-grained authorization and least privilege access.
- Policies: A fine-grained authorization strategy that defines permissions required to perform operations on specific cloud resources under certain conditions. This type of authorization is more flexible and is ideal for least privilege access. For example, you can grant users only permissions to manage DNS resources of a certain type. A majority of fine-grained policies contain permissions for specific APIs, and permissions are defined using API actions. For the API actions supported by DNS, see **Permissions and Supported Actions**.

Table 9-1 lists system-defined permissions supported by DNS.

Table 9-1 System-defined permissions for DNS

Role/Policy Name	Description	Type	Dependencies
DNS FullAccess	Full permissions for DNS	System-defined policy	None
DNS ReadOnlyAccess	Read-only permissions for DNS. Users granted with these permissions can only view DNS resources.	System-defined policy	None
DNS Administrator	Full permissions for DNS	System-defined role	**Tenant Guest** and **VPC Administrator**, which must be attached in the same project as the **DNS Administrator** role

Table 9-2 lists common operations supported by system-defined permissions for DNS.

Table 9-2 Common operations supported by system-defined permissions

Operation	DNS FullAccess	DNS ReadOnlyAccess	DNS Administrator
Creating a public zone	Supported	Not supported	Supported
Viewing a public zone	Supported	Supported	Supported
Modifying a public zone	Supported	Not supported	Supported
Deleting a public zone	Supported	Not supported	Supported
Deleting public zones in batches	Supported	Not supported	Supported
Disabling or enabling a public zone	Supported	Not supported	Supported
Creating a private zone	Supported	Not supported	Supported
Viewing a private zone	Supported	Supported	Supported
Modifying a private zone	Supported	Not supported	Supported
Deleting a private zone	Supported	Not supported	Supported
Deleting private zones in batches	Supported	Not supported	Supported
Associating a VPC with a private zone	Supported	Not supported	Supported
Disassociating a VPC from a private zone	Supported	Not supported	Supported
Adding a record set	Supported	Not supported	Supported
Viewing a record set	Supported	Supported	Supported
Modify a record set	Supported	Not supported	Supported
Deleting a record set	Supported	Not supported	Supported
Delete record sets in batches	Supported	Not supported	Supported
Disabling or enabling a record set	Supported	Not supported	Supported
Exporting record sets in batches	Supported	Not supported	Supported
Importing record sets in batches	Supported	Not supported	Supported
Creating a PTR record	Supported	Not supported	Supported
Viewing a PTR record	Supported	Supported	Supported

Operation	DNS FullAccess	DNS ReadOnlyAccess	DNS Administrator
Modifying a PTR record	Supported	Not supported	Supported
Deleting a PTR record	Supported	Not supported	Supported
Deleting PTR records in batches	Supported	Not supported	Supported

Helpful Links

- What Is IAM?
- Creating a User and Granting DNS Permissions
- Permissions Policies and Supported Actions

10 Integration with Other Services

Figure 10-1 shows the relationships between DNS and other services.

Figure 10-1 Related services

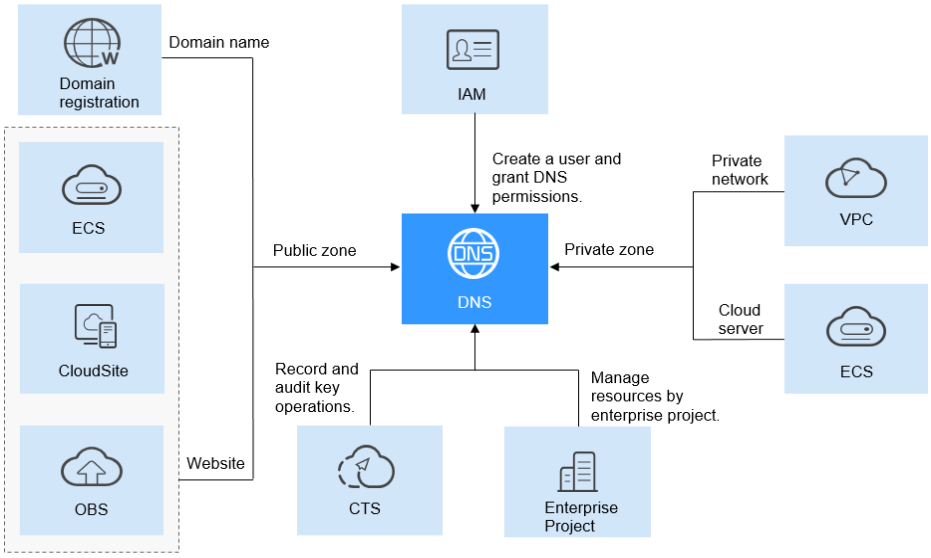


Table 10-1 shows the relationships between DNS and other services.

Table 10-1 DNS and other services

Related Service	Description	Reference
Elastic Cloud Server (ECS)	DNS can resolve the domain names to IP addresses of ECSs where a website or application is deployed so that end users can use domain name to access the website or application.	Routing Internet Traffic to a Website

Related Service	Description	Reference
Virtual Private Cloud (VPC)	DNS can resolve private domain names that are used for network connections within VPCs.	**Routing Traffic Within VPCs**
Object Storage Service (OBS)	DNS maps your domain name to a bucket's access domain name for you to access the static websites hosted in the bucket.	**Static Website Hosting**
Cloud Trace Service (CTS)	CTS can record the operations performed on the DNS service.	**DNS Operations Recorded by CTS**

11 Product Concepts

11.1 Domain Name Format and DNS Hierarchy

A valid domain name meets the following requirements:

- A domain name is segmented using dots (.) into multiple labels.
- A domain name label can contain specified characters in different languages, letters, digits, and hyphens (-) and cannot start or end with a hyphen.
- A label cannot exceed 63 characters.
- The total length of a domain name, including the dot at the end, cannot exceed 254 characters.

A domain name is divided into the following levels based on its structure:

- Root domain: . (a dot)
- Top-level domain: for example, .com, .net, .org, and .cn
- Second-level domain: subdomains of the top-level domain names, such as example.com, example.net, and example.org
- Third-level domain: subdomains of the second-level domain names, such as abc.example.com, abc.example.net, and abc.example.org
- The next-level domain names are similarly expanded by adding prefixes to the previous-level domain names, such as def.abc.example.com, def.abc.example.net, and def.abc.example.org.

11.2 Record Set

Overview

A record set is a collection of resource records that belong to the same domain name. A record set defines DNS record types and values.

If you have created a zone on the DNS console, you can create record sets to expand the domain name or record its detailed information.

Table 11-1 describes the record set types and their application scenarios.

Table 11-1 Record set usages

Type	Where to Use	Description
A	Public and private zones	Maps domains to IPv4 addresses.
CNAME	Public and private zones	Maps one domain name to another domain name or multiple domain names to one domain name.
MX	Public and private zones	Maps domain names to email servers.
AAAA	Public and private zones	Maps domain names to IPv6 addresses.
TXT	Public and private zones	TXT record sets are usually used to record the following: • DKIM public keys to prevent email fraud • The identity of domain name owners to facilitate domain name retrieval
SRV	Public and private zones	Records servers providing specific services.
NS	Public and private zones	Delegates subdomains to other name servers. • For public zones, an NS record set is automatically created, and you can add NS record sets for subdomains. • For private zones, an NS record set is automatically created, and you cannot add other NS record sets.
SOA	Public and private zones	Identifies the base information about a domain name. The SOA record set is automatically generated by the DNS service and cannot be added manually.
CAA	Public zone	Grants certificate issuing permissions to CAs. CAA record sets can prevent the issuance of unauthorized HTTPS certificates.
PTR	Public and private zones	Maps IP addresses to domain names.

Usage

Record sets are used in following scenarios:

- Routing Internet traffic to a website

  A and AAAA record sets are usually used to map domain names used by websites to IPv4 or IPv6 addresses of web servers where the websites are deployed.

Figure 11-1 Accessing a website over the Internet using domain name

- Private domain name resolution

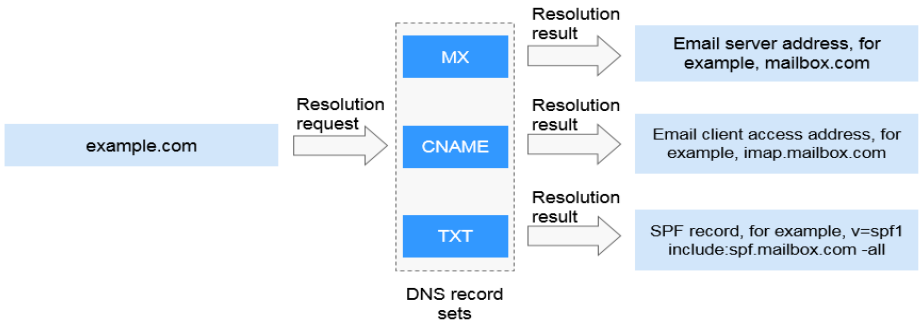
  On a private network, A and AAAA record sets translate private domain names into private IP addresses.

  Figure 11-2 Private domain name resolution

- Email domain name resolution

  MX, CNAME, and TXT record sets are usually used for email services.

  Figure 11-3 Email domain name resolution



- Reverse resolution on a private network

  PTR records translate private IP addresses into private domain names.

  Figure 11-4 Reverse resolution on a private network

Helpful Links

For details about how to add and manage record sets, see **Record Set**.

11.3 Region and AZ

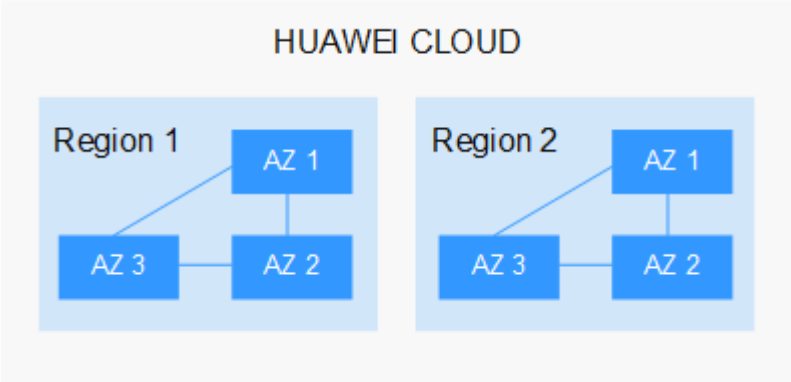
Concept

A region and availability zone (AZ) identify the location of a data center. You can create resources in a specific region and AZ.

- Regions are divided based on geographical location and network latency. Public services, such as Elastic Cloud Server (ECS), Elastic Volume Service (EVS), Object Storage Service (OBS), Virtual Private Cloud (VPC), Elastic IP (EIP), and Image Management Service (IMS), are shared within the same region. Regions are classified into universal regions and dedicated regions. A universal region provides universal cloud services for common tenants. A dedicated region provides specific services for specific tenants.
- An AZ contains one or more physical data centers. Each AZ has independent cooling, fire extinguishing, moisture-proof, and electricity facilities. Within an AZ, computing, network, storage, and other resources are logically divided into multiple clusters. AZs within a region are interconnected using high-speed optical fibers, to support cross-AZ high-availability systems.

Figure 11-5 shows the relationship between regions and AZs.

Figure 11-5 Regions and AZs



Huawei Cloud provides services in many regions around the world. You can select a region and an AZ based on requirements. For more information, see **Huawei Cloud Global Regions**.

Selecting a Region

When selecting a region, consider the following factors:

- Location

  It is recommended that you select the closest region for lower network latency and quick access.

  - If your target users are in Asia Pacific (excluding the Chinese mainland), select the **CN-Hong Kong**, **AP-Bangkok**, or **AP-Singapore** region.
  - If your target users are in Africa, select the **AF-Johannesburg** region.
  - If your target users are in Latin America, select the **LA-Santiago** region.

    NOTE

    The **LA-Santiago** region is located in Chile.

- Resource price

  Resource prices may vary in different regions. For details, see **Product Pricing Details**.

Selecting an AZ

When deploying resources, consider your applications' requirements on disaster recovery (DR) and network latency.

- For high DR capability, deploy resources in different AZs within the same region.
- For lower network latency, deploy resources in the same AZ.

Regions and Endpoints

Before you use an API to call resources, specify its region and endpoint. For more details, see **Regions and Endpoints**.

11.4 Project

Projects are used to group and isolate cloud resources, including computing, storage, and network resources. Multiple projects can be created for one account. A project can be a department or a project team.

Public zones are global-level resources, while private zones and PTR records are resources at the region level. Private zones and PTR records are isolated and managed based on projects. You need to create, query, and configure private zones or PTR records in specific regions and projects.

12 Change History

Released On	Description
2021-10-30	This issue is the seventh official release, which incorporates the following changes: Added the following section: **Permissions**
2020-02-12	This issue is the sixth official release, which incorporates the following changes: Added the following sections: **Functions** Optimized the following sections: • **Public Domain Name Resolution** • **Private Domain Name Resolution** • **Record Set**
2019-07-02	This issue is the fifth official release, which incorporates the following changes: Added the description for ISP and region lines in **Intelligent Resolution**.
2019-06-25	This issue is the fourth official release, which incorporates the following changes: Added the description for regions and AZs in **Region and AZ**.
2019-03-05	This issue is the third official release, which incorporates the following changes: Added links in **Integration with Other Services**.
2019-01-20	This issue is the second official release, which incorporates the following changes: Added the domain name resolution process and application scenarios.
2018-11-22	This issue is the first official release.

