

# Data Transmission Service

## Product Introduction

## Product Documentation



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# Product Introduction

## Overview

Last updated : 2022-09-02 15:04:24

## Overview

DTS supports multiple types of databases, such as MySQL, MariaDB, Percona, TDSQL-C, TDSQL for MySQL, PostgreSQL, Redis, MongoDB, and SQL Server. It helps you migrate your databases to the cloud without interrupting your business and build a high-availability database disaster recovery architecture through real-time sync channels. Its data subscription feature meets your requirements for commercial data mining and async business decoupling.

## Features

- **Data migration**

The data migration feature refers to data replication between different data sources. DTS supports non-stop data migration to minimize the impact of database downtime on the business. It is applicable to diverse business scenarios, including data migration to Tencent Cloud, cross-TencentDB instance data migration, and data migration from third-party cloud databases to TencentDB.

- **Data sync**

The data sync feature refers to real-time data sync between two database sources. It is suitable for cloud-local active-active, multi-site active-active, and cross-border data sync as well as real-time data warehousing.

Unlike data migration which is a one-time short-term task to migrate the entire database, data sync is a continuous task. After a task is created, the data will be continuously synced to keep consistency between the source and target databases.

- **Data subscription**

Data subscription refers to the process where DTS gets the data change information of a key business in the database, converts it into message objects, and pushes them to Kafka for the downstream businesses to subscribe to, get, and consume. DTS allows you to directly consume data through a Kafka client, so you can build data sync features between TencentDB databases and heterogeneous systems, such as cache update, real-time ETL (data warehousing technology) sync, and async business decoupling.

# Data Migration

Last updated : 2022-10-19 17:01:16

## Feature Overview

The data migration feature refers to data replication between different data sources. It is a short-term one-time task that migrates the entire database. After migration, cutover will be performed to continue the task in the new database. DTS supports non-stop data migration without locks to minimize the impact of database downtime on the business.

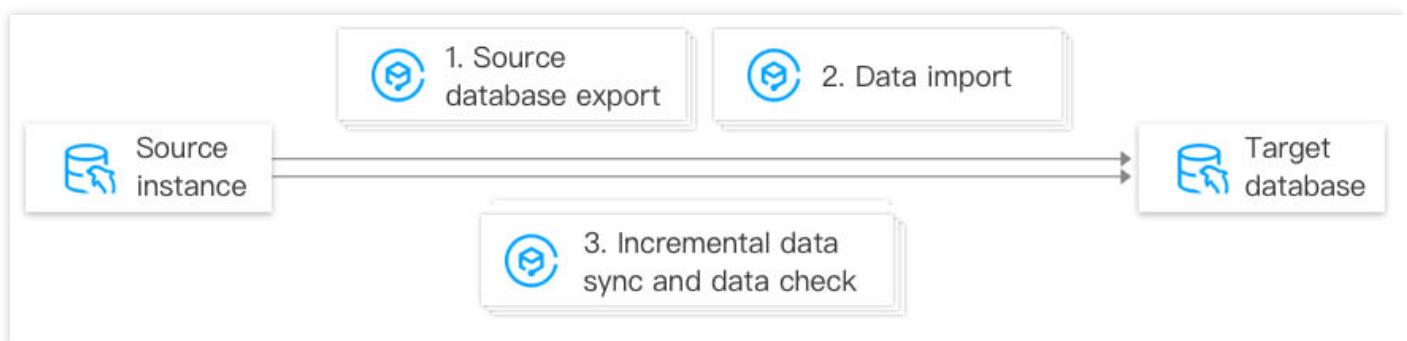
DTS supports migration of self-built, TencentDB, and third-party cloud source databases.

- Self-built database migration to the cloud: This means to migrate data from a self-built database based on a local IDC, CVM instance, or Lighthouse instance to TencentDB.
- Cross-TencentDB instance migration: This includes database version upgrade, cross-region migration (including cross-border migration), and cross-account instance migration.
- Third-party database migration: This means to migrate data from a database in another cloud such as Alibaba Cloud or AWS to Tencent Cloud.

## How It Works

The following takes MySQL as an example to describe the data migration process:

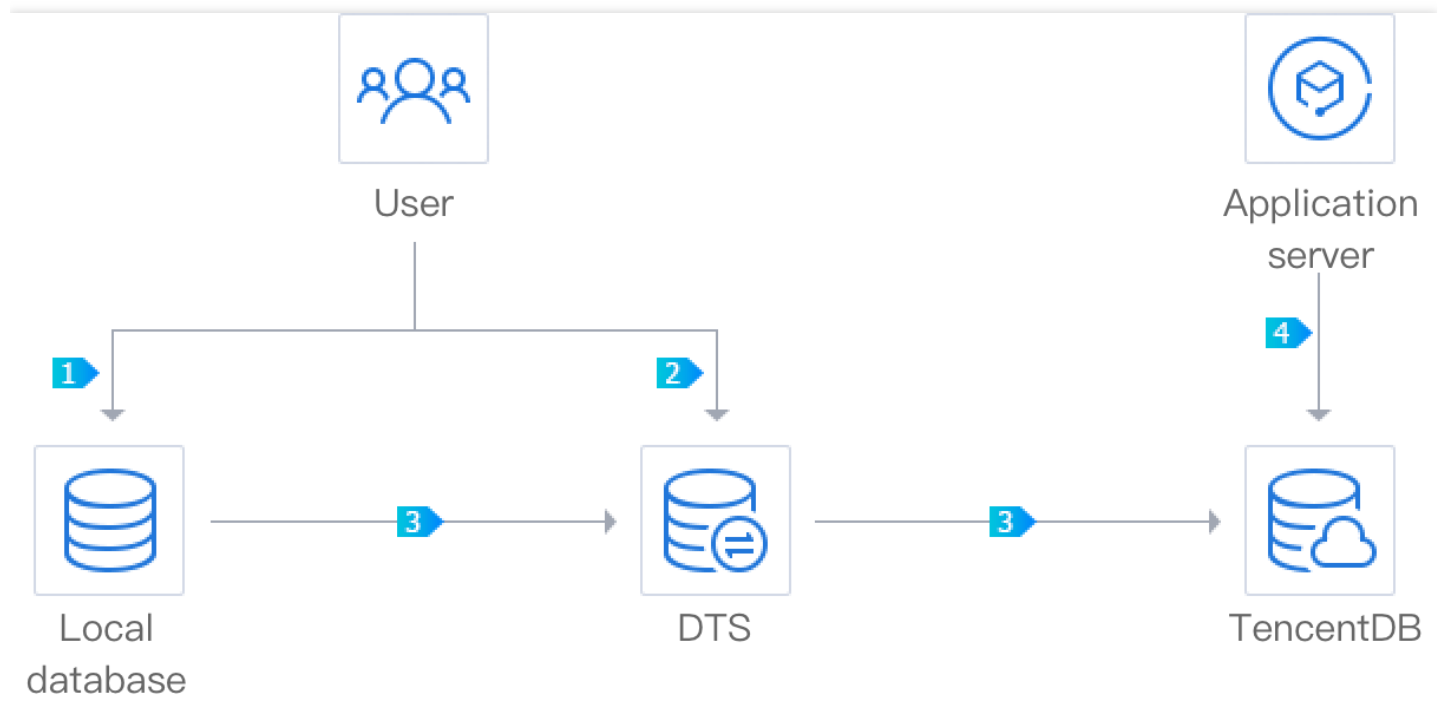
- Source database export: All existing data in the source database is exported.
- Data import: Existing data is imported into the target database.
- Incremental data sync and data check: Binlog takeover will begin when a migration task is started. During migration, SQL operations in the source database are written to the binlog, which DTS parses to write incremental data generated during existing data migration into the target database.



## Typical Use Cases

### Data migration to Tencent Cloud

It simply takes a few steps in DTS to set up data migration to Tencent Cloud without any complicated configuration. The migration process does not interrupt the service provided by your source database, thereby minimizing the impact of cloudification on your business.



## Restrictions

- Only basic tables and views can be migrated, and objects such as functions, triggers, and stored procedures are not supported currently (such unsupported migration objects will be gradually supported in the future).
- Correlated data objects must be migrated together; otherwise, migration will fail. Common correlations include table reference by views, view reference by views, view/table reference by stored procedures/functions/triggers, and tables correlated through primary/foreign keys.

## Supported Migration Types

DTS supports the following three migration types:

- Structural migration: The structure of the migration objects in the source database is migrated to the target database.

- Full migration: All data except system tables in the source database is migrated to the target database at a time. Full migration is one-time migration and is applicable to scenarios where the source database has no data writes.
- Full + incremental migration: Full migration is performed first to initialize the target database, and then the incremental data is migrated. Technical methods such as log parsing are used to keep the data between the source and target databases consistent. Full + incremental migration is applicable to scenarios where the source instance has data writes.
- If you select full data migration, do not write new data into the source instance during migration; otherwise, the data in the source and target instances will be inconsistent. In scenarios with data writes, to ensure the data consistency in real time, we recommend you select full + incremental migration.

## Supported Database Types

For more information on the source and target database types, versions, and migration types supported for data migration, see [Databases Supported by Data Migration](#).

## Supported Advanced Features

Feature	Description	Documentation
Heterogeneous migration and migration from third-party cloud databases	Data migration between databases in different types is supported, such as migration from MySQL to TDSQL-C. Currently supported third-party cloud databases include Alibaba Cloud and AWS databases.	<a href="#">Databases Supported by Data Migration</a>
Cross-account migration	Data migration between different Tencent Cloud accounts is supported.	-
Cross-version migration of most databases	The target database version should be equal to or later than the source database version; for example, data on v5.5.x can be migrated to v5.5.x, v5.6.x, or later. The last digit in the version number is the minor version number, which is not restricted.	<a href="#">Databases Supported by Data Migration</a>
Migration of user information, views, and advanced objects	User information, views, stored procedures, functions, triggers, and events can be migrated.	-

Feature	Description	Documentation
Data consistency check	The data in the source and target databases can be checked for consistency.	<a href="#">Creating Data Consistency Check Task</a>
Task progress visualization	Information such as migration steps and progress can be displayed.	<a href="#">Viewing Task</a>
Metric monitoring and default alarm policy	<ul style="list-style-type: none"><li>Data migration metrics can be monitored.</li><li>Default configuration is supported for data migration event monitoring to automatically notify you of abnormal events.</li></ul>	<a href="#">Supported Events and Metrics</a>
Migration without locks	Migration is implemented without locks, during which no global lock (the FTWRL lock) is added, and only tables without a primary key are locked.	-
Database/Table mapping	Databases/Tables migrated from the source database to the target database can be renamed.	-
Instance restart or upgrade	During incremental migration, the instances can be restarted or upgraded.	-
HA switch	HA switch from the source instance (with GTID enabled) to the target instance is supported.	-
No requirements for the super privileges	The operator does not need to have the super privileges of the source instance account (only for certain databases currently).	-



# Data Sync

Last updated : 2022-10-19 18:25:37

## Feature overview

The data sync feature refers to real-time data sync between two database sources. It is suitable for cloud-local active-active, multi-site active-active, and cross-border data sync as well as real-time data warehousing.

Data migration is a one-time short-term task to migrate the entire database and requires a cutover operation after migration for business connection to the new database. In contrast, data sync is a continuous task. After a task is created, the data will be continuously synced (almost in real time) to keep consistency between the source and target databases.

DTS supports the sync of self-built, TencentDB, and third-party cloud databases to TencentDB.

- Cloud-local sync: DTS can sync an IDC-based self-built database to a TencentDB instance and vice versa.
- Cross-cloud sync: DTS can sync a third-party cloud database to TencentDB instance.
- Cross-TencentDB instance sync: DTS can sync TencentDB instances in various scenarios, such as multi-site active-active, cross-border, and cross-Tencent Cloud account sync.

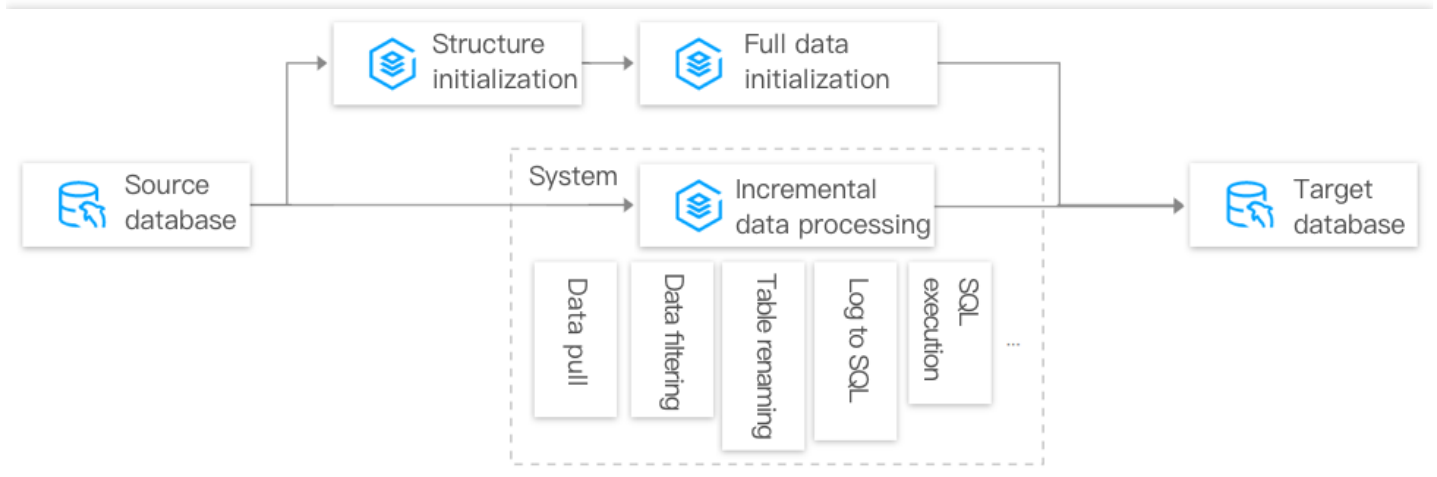
## How it works

The following takes MySQL sync as an example to describe the data sync feature, where data is exported from the source instance and imported into the target instance, and key steps include structure initialization, full data initialization, and incremental data processing.

- Structure initialization  
Structure initialization is to create the same table structure information in the target instance as that in the source instance. When configuring a sync task, you can select whether to sync the table structure. If the target database already contains the same structural information, you simply need to sync the data; otherwise, you'll need to sync the information as well.
- Full data initialization  
After structure initialization is completed, DTS will initialize the existing data, i.e., exporting all existing data from the source instance and import it into the target instance.

- Incremental data processing

In incremental data processing, DTS gets the incremental data continuously through the source instance's binlog and persistently stores such data in the intermediate storage after a series filtering and conversion operations. After importing the full data, it continuously replays the changed incremental data stored in the intermediate storage into the target database in order to ensure data consistency between the source and target databases.



## Data conflict resolution

During a DTS sync task, the data in the source and target databases may have conflicts. DTS can check for duplicate table name and primary key conflicts.

### Duplicate table name conflict

If the source and target databases have tables with the same name, the task can report an error (**Precheck and report error**) or append the data in the source database to the table with the same name in the target database (**Ignore and execute**).

### Primary key conflict

DTS can check for primary key conflicts and provides the following conflict resolution methods. For specific implementation examples, see [Selecting Data Sync Conflict Resolution Policy](#).

- Report: During a sync task, if an INSERT statement in the source database has a primary key conflict with the data in the target database, the task will report an error and pause. You need to handle the conflict manually first before proceeding.
- Ignore: During a sync task, if an INSERT statement in the source database has a primary key conflict with the data in the target database, the data inserted into the source database will be ignored, and the data in the target database will prevail.

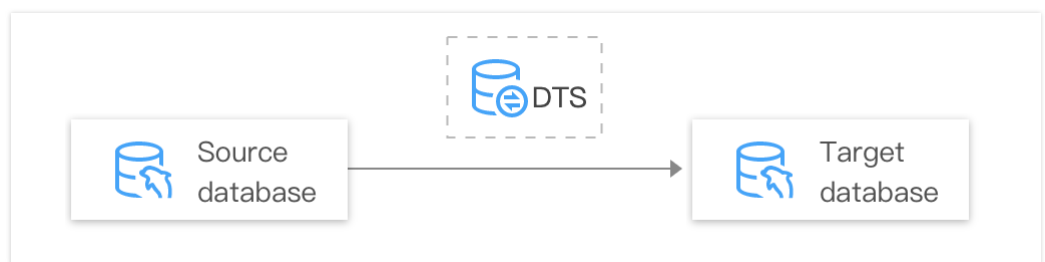
- **Overwrite:** During a sync task, if an INSERT or UPDATE statement has a primary key conflict with the data in the target database, the data in the target database will be overwritten by the inserted or updated data in the source database.

## Supported topologies

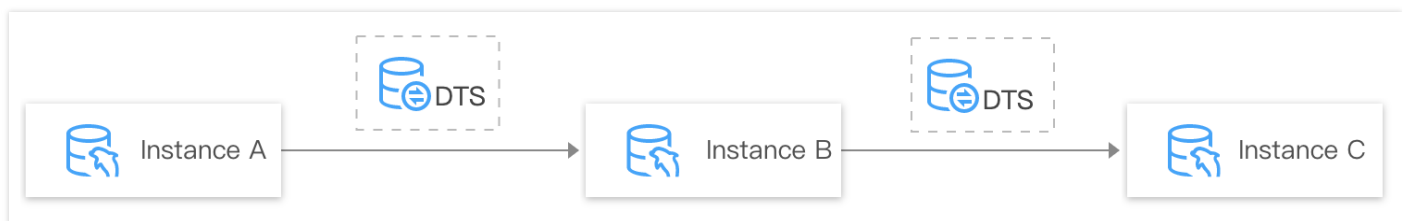
The basic unit of the sync service is one-way sync. During configuration, you can choose to use data definition language (DDL) or data manipulation language (DML) for sync. By combining one-way sync tasks, you can customize various complex topologies.

In a complex topology, technical measures will be used for DML operations to avoid data loop. However, for DDL, the data sync service will check for loop during configuration to avoid forming DDL loop.

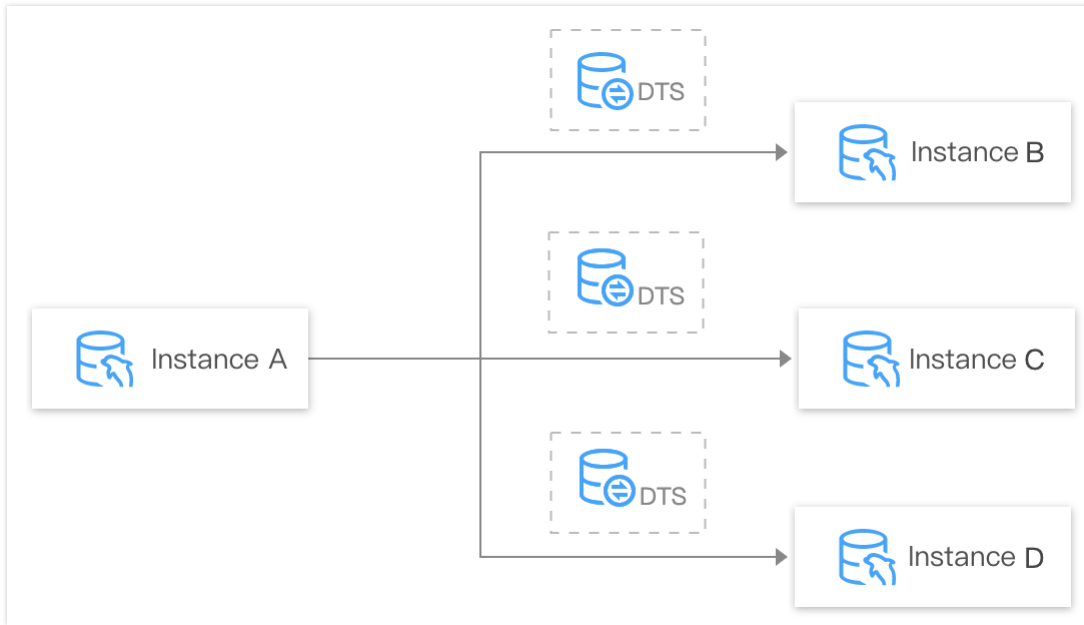
Below are some common topologies, which you can customize by purchasing multiple sync instances. For detailed directions on how to create a complex topology, see [Creating Two-Way Sync Data Structure](#), [Creating Many-to-One Sync Data Structure](#), or [Creating Multi-Site Active-Active IDC Architecture](#).



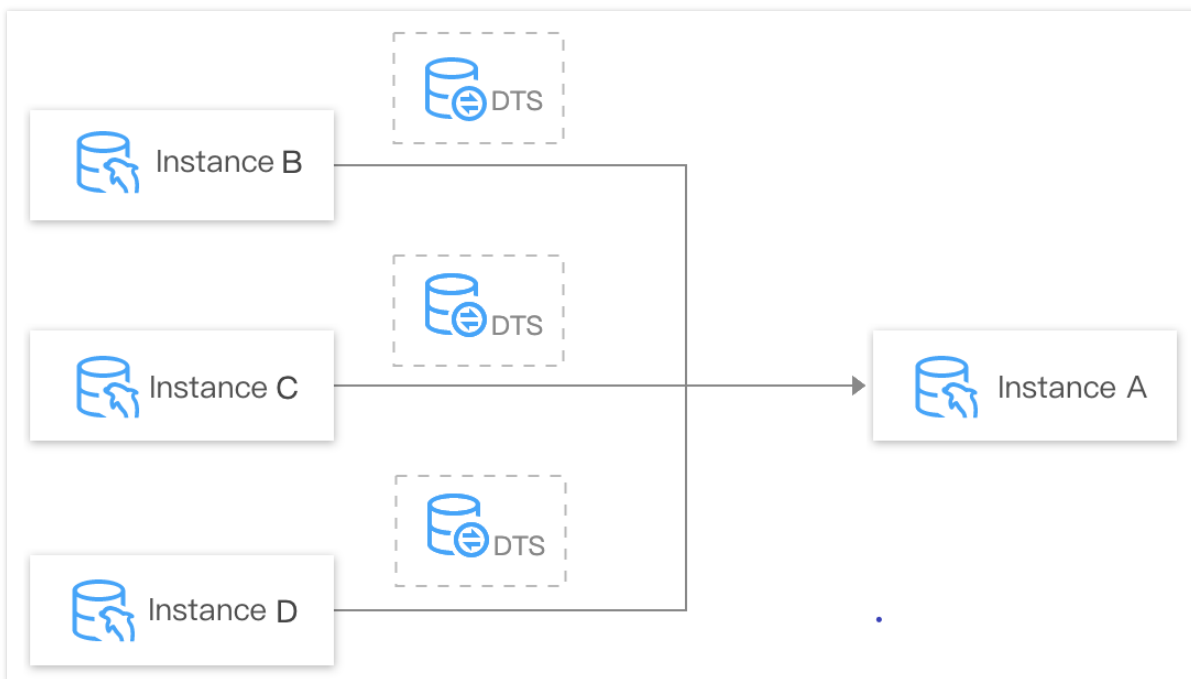
- One-to-One one-way sync
- Cascaded one-way sync



- One-to-Many one-way sync

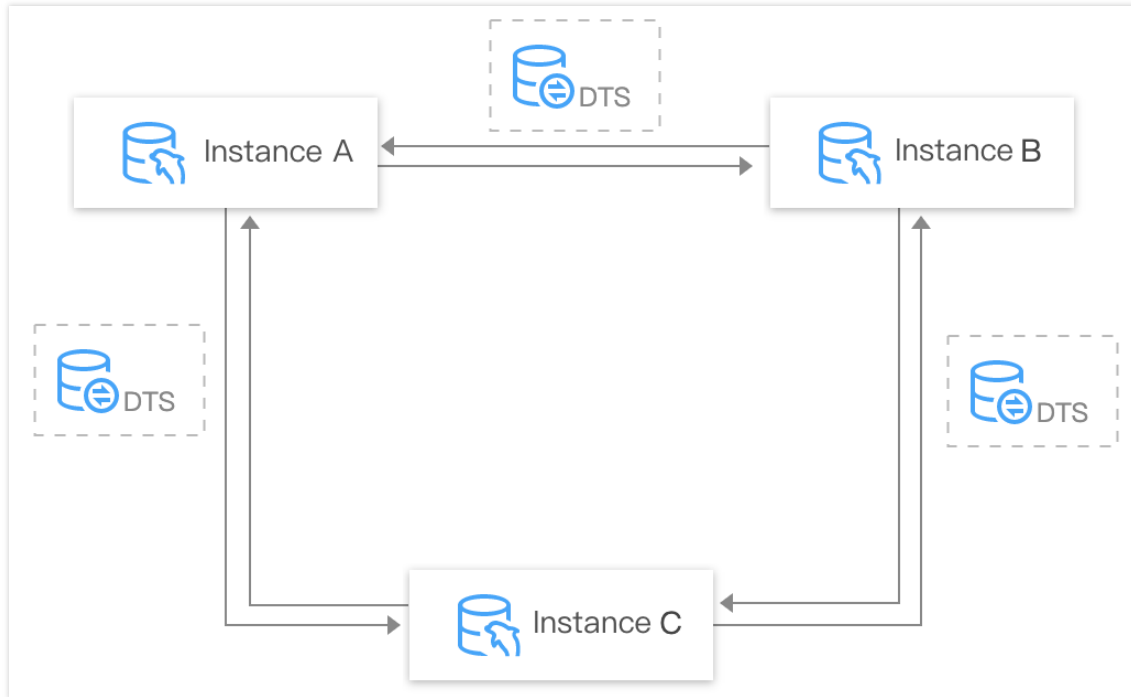


- Many-to-One one-way sync



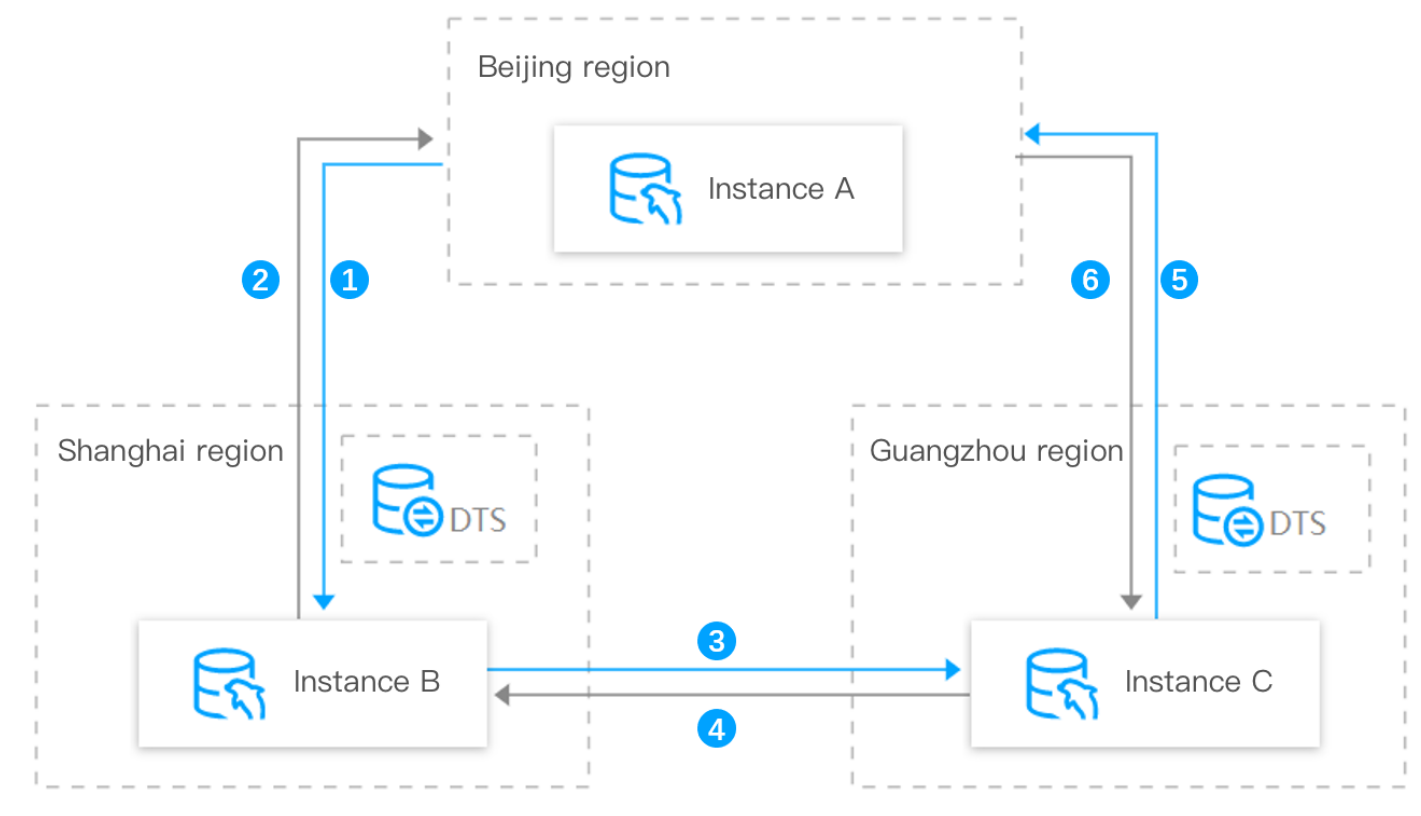
- Two-Way sync

- Cascaded two-way sync



## Typical use cases

By using DTS, you can sync data between MySQL databases in multiple regions to implement multi-site active-active deployment. Database instances in each region can run in the cloud or your self-built IDC.



## Restrictions

You can implement two-way sync by combining one-way sync tasks, but the following restrictions exist:

- Your business should cooperate in terms of data consistency and cannot update the data record with the same primary key on two nodes; otherwise, a primary key conflict or mutual overwrite may occur. For example, you can choose to update the data records with primary keys 1, 3, and 5 on node A and data records with primary keys 2, 4, and 6 on node B.
- If a data sync conflict occurs, DTS will process the data strictly according to the selected conflict resolution policy. You need to confirm whether the corresponding policy meets your business expectation during configuration.
- DML statements support two-way sync, but DDL statements support only one-way sync. To create two-way sync, ensure that DDL sync is disabled in one of the one-way instances.

## Supported database types

For more information on the source and target database types, versions, and sync types supported by data sync, see [Databases Supported by Data Sync](#).

## Supported advanced features

Feature	Description	Documentation
Two-way sync, ring sync, and many-to-one sync	Complex sync topologies such as two-way sync, ring sync, and many-to-one sync are supported.	<a href="#">Databases Supported by Data Sync</a>
Cross-account sync	Data sync between instances under different Tencent Cloud accounts is supported.	<a href="#">Databases Supported by Data Sync</a>
Cross-version sync of most databases	The target database version should be equal to or later than the source database version; for example, data on v5.5.x can be synced to v5.5.x, v5.6.x, or later. The last digit in the version number is the minor version number, which is not restricted.	-
Table conflict check	The duplicate table name check policy is provided.	-
Primary key conflict check	The following three primary key conflict resolution policies are supported: <ul style="list-style-type: none"> <li>Report: If a primary key conflict of tables is found during data sync, it will report an error and pause the data sync task.</li> <li>Ignore: If a primary key conflict is found during data sync, it will keep the primary key record in the target database.</li> <li>Overwrite: If a primary key conflict is found during data sync, it will use the primary key record in the source database to overwrite that in the target database.</li> </ul>	<a href="#">Selecting Data Sync Conflict Resolution Policy</a>
DML and DDL filtering	<ul style="list-style-type: none"> <li>You can select the data types to be synced, such as <code>INSERT</code> , <code>UPDATE</code> , and <code>DELETE</code> statements.</li> <li>You can select the specific DDL operation, such as <code>CREATE TABLE</code> , <code>CREATE VIEW</code> , and <code>DROP INDEX</code> .</li> </ul>	<a href="#">Setting SQL Filter Policy</a>
WHERE conditional filter	You can customize a filter for a single table.	<a href="#">Setting SQL Filter Policy</a>
Sync of views and advanced objects	Views, procedures, functions, triggers, and events can be synced.	-

Feature	Description	Documentation
Task progress visualization	Information such as sync steps and progress can be displayed.	-
Metric monitoring and default alarm policy	<ul style="list-style-type: none"><li>Data sync metrics can be monitored.</li><li>Default configuration is supported for data sync event monitoring to automatically notify you of abnormal events.</li></ul>	<a href="#">Supported Events and Metrics</a>
Instance restart or upgrade	During incremental data sync, the source and target instances can be restarted or upgraded.	-
HA switch	<ul style="list-style-type: none"><li>HA switch of the source instance is supported if GTID is enabled.</li><li>HA switch of the target database is supported.</li></ul>	-



# Data Subscription (Kafka Edition)

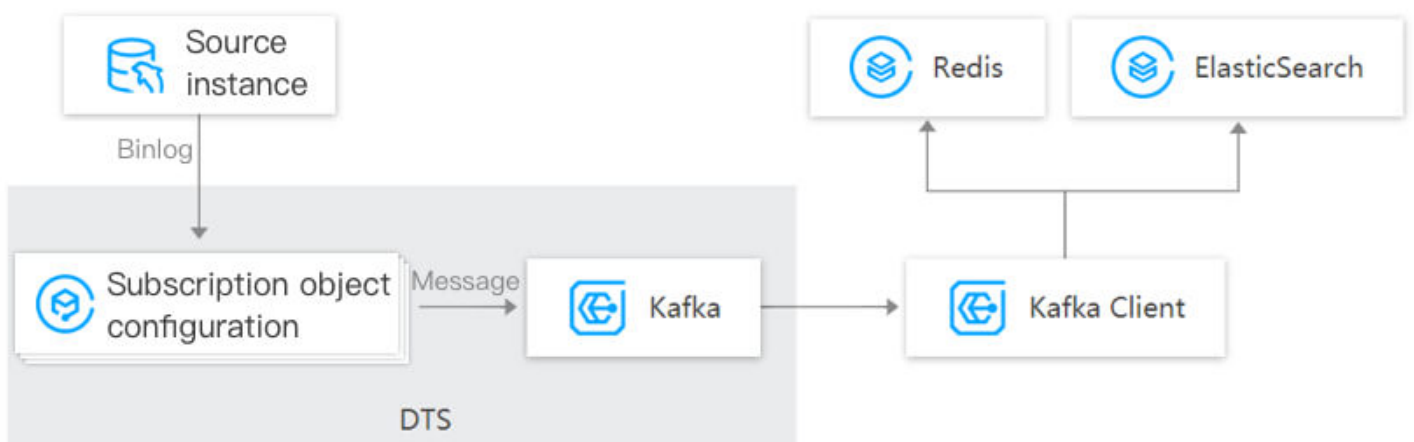
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## Feature Overview

Data subscription refers to the process where DTS gets the data change information of a key business in the database, converts it into message objects, and pushes them to Kafka for the downstream businesses to subscribe to, get, and consume. DTS allows you to directly consume data through a Kafka client, so you can build data sync features between TencentDB databases and heterogeneous systems, such as cache update, real-time ETL (data warehousing technology) sync, and async business decoupling.

## How It Works

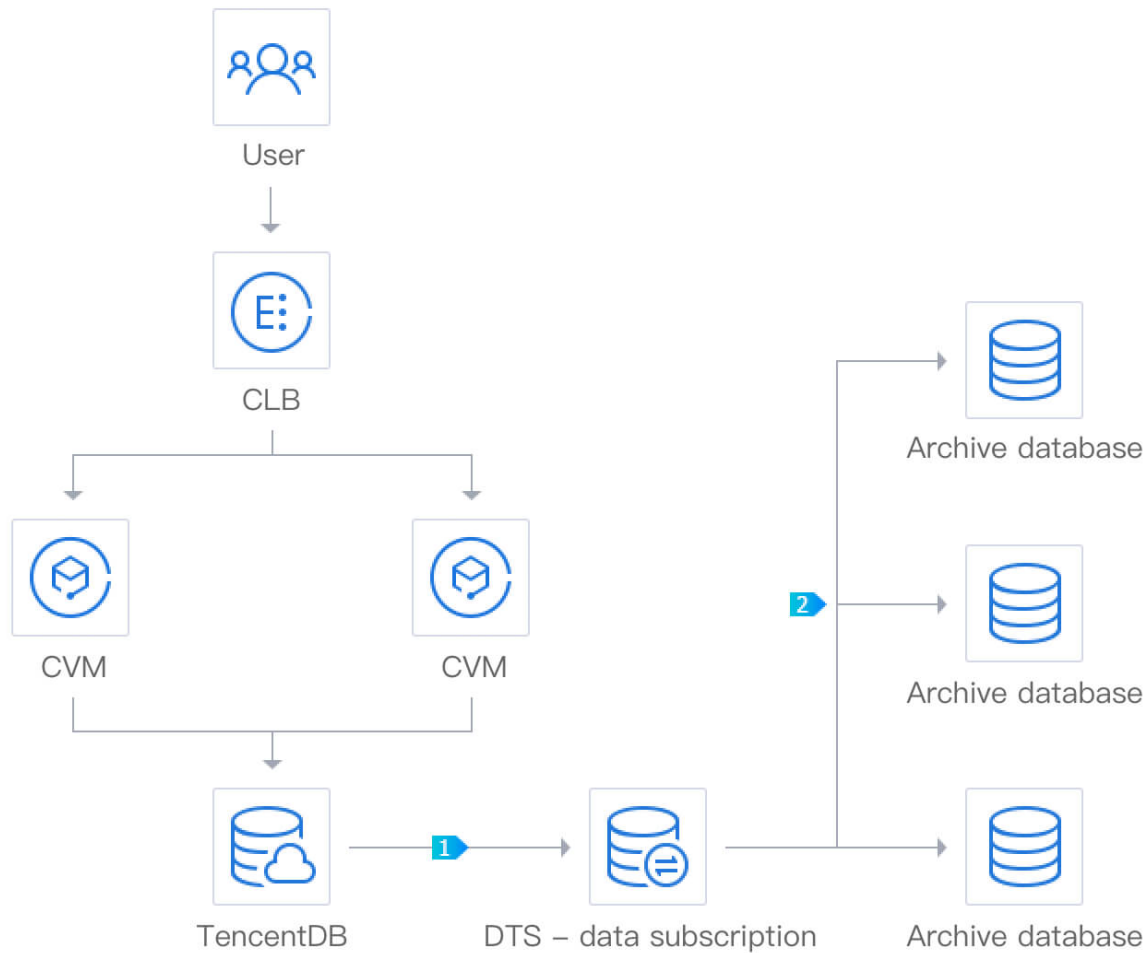
The following takes MySQL as an example to describe how data subscription pulls the incremental binlog from the source database in real time, parses the incremental data into Kafka messages, and then stores them on the Kafka server. You can consume the data through a Kafka client. As an open-source messaging middleware, Kafka supports multi-channel data consumption and SDKs for multiple programming languages to reduce your use costs.



## Typical Use Cases

### Data archiving

By using the data subscription feature of DTS, you can push the updated incremental data in TencentDB to an archive database or data warehouse as a stream in real time.



## Restrictions

- Currently, the subscribed message content is retained for 1 day by default. Once expired, the data will be cleared. Therefore, you need to consume the data promptly.
- The region where the data is consumed should be the same as that of the subscribed database.
- Data subscription to MySQL, MariaDB, and TDSQL for MySQL does not support geometry data types.

## Supported Subscription Types

DTS allows you to subscribe to databases and tables. Specifically, the following three subscription types are supported:

- Data update: Subscription to DML operations.
- Structure update: Subscription to DDL operations.

- Full: Subscription to the DML and DDL operations of all tables.

## Supported Advanced Features

Feature	Description	Documentation
SDKs for various programming languages	DTS uses the Kafka protocol and supports Kafka client SDKs for multiple programming languages.	-
Metric monitoring and default alarm policy	<ul style="list-style-type: none"><li>• Data subscription metrics can be monitored.</li><li>• Default configuration is supported for data subscription event monitoring to automatically notify you of abnormal events.</li></ul>	<a href="#">Supported Events and Metrics</a>
Multi-Channel data consumption	DTS allows creating multiple data channels for a single database, which can be consumed concurrently through a consumer group.	-
Partitioned consumption	DTS supports partitioned storage of data in a single topic for concurrent consumption of data in multiple partitions, improving the consumption efficiency.	-
Custom routing policy	DTS supports routing data fields to Kafka partitions according to custom rules.	-
Consumption offset change	DTS supports modifying the consumption offset.	<a href="#">Managing Consumer Group</a>

# Strengths

Last updated : 2020-06-29 16:49:29

DTS supports data transfer between RDBMS (relational) and NoSQL (non-relational) data sources and offers a wide range of data transfer methods such as data migration, real-time data subscription, and real-time data sync. Compared with third-party data flow tools, DTS provides a wider selection of more secure, reliable, and high-performance transfer linkages as well as convenient features, greatly facilitating the creation and management of transfer linkages.

## Data Sync

DTS helps migrate your databases to TencentDB with virtually no need for shutdown during data replication. All the changes made to data in the source database during migration will be replicated to the target database, so the service provided by the source database will not be affected during the process. After the replication is completed, the source and target databases will stay in sync, and you can choose the business switch time as needed.

## High Transfer Performance

DTS uses high-spec servers to ensure that every migration or sync linkage has outstanding transfer performance. In terms of data migration, its underlying layer adopts a variety of performance optimizations that make it outperform traditional data migration tools.

## Auto Recovery from Failure

DTS boasts an extremely high availability where each node is capable of high-efficiency recovery and self-healing that enable automatic failover in a matter of seconds. Thanks to its high reliability, DTS helps you migrate your data to the cloud with no concerns over data consistency.

## Visual Operations

DTS requires no separate drivers or applications or major changes to the source database. To enable DTS, you just need to complete some simple configurations in the visual management interface presented by Tencent Cloud.

## Easy and Quick Setup

A migration task can be set within minutes in the DTS Console, where you can specify various parameters as needed to perform migration, including setting the connection between source and target databases, migration type, and objects to be migrated.

# Comparison Between NewDTS and OldDTS

Last updated : 2022-10-10 17:53:13

## Overview

The legacy version of DTS implements incremental data sync through cloud native replication, which has a strong dependency on the kernel form of the source database and has many restrictions on the features; for example, it does not support advanced features such as table name mapping and many-to-one database sync.

The new version of DTS uses a new proprietary kernel and comprehensively improves the product features to provide more stable, available, flexible, and secure data transfer capabilities for better ease of use. Its capabilities are polished for data transfer, with advanced feature such as heterogeneous database migration and cross-account data migration.

## Feature Comparison

### Data migration

The key features of the new and legacy versions of DTS are compared as follows:

Item	Legacy Version	New Version
Database type	<ul style="list-style-type: none"> <li>Heterogeneous databases cannot be migrated.</li> <li>Alibaba Cloud source databases can be migrated.</li> </ul>	<ul style="list-style-type: none"> <li>Heterogeneous databases can be migrated.</li> <li>Alibaba Cloud and AWS source databases can be migrated.</li> </ul>
Cross-account migration	Not supported.	Supported.
Supported data types	<ul style="list-style-type: none"> <li>It supports the migration of basic tables, views, functions, triggers, and stored procedures.</li> <li>It supports the migration of user account information.</li> </ul>	<ul style="list-style-type: none"> <li>It only supports the migration of basic tables and views, while the feature of migrating functions, triggers, and stored procedures is under development.</li> <li>It supports the migration of user account information.</li> </ul>
Supported versions	It does not support cross-version migration.	It supports cross-version migration for most databases. For more information on the supported versions, see <a href="#">Databases Supported by Data Migration</a> .

Item	Legacy Version	New Version
Task progress visualization	Not supported.	Supported.
Monitoring and alarming	<ul style="list-style-type: none"> <li>It does not support metric monitoring.</li> <li>It does not support default alarm policy.</li> </ul>	<ul style="list-style-type: none"> <li>It supports metric monitoring.</li> <li>It supports default alarm policy, so that alarms will be automatically triggered for exceptions during migration.</li> </ul>
Enhanced operation experience	-	<ul style="list-style-type: none"> <li>It supports migration without lock to add locks only to tables without primary keys.</li> <li>It supports table mapping.</li> <li>It supports instance restart or upgrade during incremental migration.</li> <li>It decouples the migration task from databases and releases locks during incremental migration.</li> </ul>
High availability (HA)	It has strict restrictions for HA switch.	<ul style="list-style-type: none"> <li>It supports HA switch of the source instance if GTID is enabled.</li> <li>It supports HA switch of the target instance.</li> </ul>
Data verification	The operator must have the super privileges of the source instance account.	The operator does not need to have the super privileges of the source instance account (only for certain databases currently).

## Data sync

The key features of the new and legacy versions of DTS are compared as follows:

Item	Legacy Version	New Version
Sync type	It supports one-way and one-to-one sync modes.	It supports two-way, ring, and many-to-one sync modes.
Cross-account sync	It does not support cross-account sync.	It supports cross-account sync.
Supported versions	It does not support cross-version sync.	It supports cross-version sync. For more information on the supported versions, see <a href="#">Databases Supported for Data Sync</a> .

Item	Legacy Version	New Version
Content conflict	It does not support content conflict check.	It provides table conflict check policies and supports renaming tables.
Primary key conflict	It does not support primary key conflict policies.	It provides primary key conflict processing policies: <ul style="list-style-type: none"> <li>Report: If a primary key conflict of tables is found during data sync, it will report an error and pause the data sync task.</li> <li>Ignore: If a primary key conflict is found during data sync, it will keep the primary key record in the target database.</li> <li>Overwrite: If a primary key conflict is found during data sync, it will use the primary key record in the source database to overwrite that in the target database.</li> </ul>
Task progress visualization	Not supported.	Supported.
Monitoring and alarming	<ul style="list-style-type: none"> <li>It does not support metric monitoring.</li> <li>It does not support default alarm policy.</li> </ul>	<ul style="list-style-type: none"> <li>It supports metric monitoring.</li> <li>It supports default alarm policy, so that alarms will be automatically triggered for exceptions during sync.</li> </ul>
Enhanced operation experience	-	<ul style="list-style-type: none"> <li>It supports table mapping.</li> <li>It supports instance restart or upgrade during incremental sync.</li> </ul>
High availability (HA)	It has strict restrictions for HA switch.	<ul style="list-style-type: none"> <li>It supports HA switch of the source instance if GTID is enabled.</li> <li>It supports HA switch of the target instance.</li> </ul>

## Data subscription

The key features of the new and legacy versions of DTS are compared as follows:

Item	Legacy Version	New Version
Database type	TencentDB for MySQL only.	TencentDB for MySQL, TencentDB for MariaDB, and TDSQL for MySQL.
Subscribed data storage method	The data is stored on physical machines in master/slave mode.	The data is stored in the Kafka middleware, and partitioned storage of data in a single topic is supported (with partitioning strategy available), improving the consumption efficiency.

Item	Legacy Version	New Version
Supported protocol	Proprietary protocol with SDK for Java only.	Kafka protocol with Kafka client SDKs for multiple programming languages.
Monitoring and alarming	<ul style="list-style-type: none"><li>• It supports metric monitoring.</li><li>• It does not support default alarm policy.</li></ul>	<ul style="list-style-type: none"><li>• It supports more metric monitoring.</li><li>• It supports default alarm policy, so that alarms will be automatically triggered for exceptions during subscription.</li></ul>
Data channel	It allows creating only one data channel for a single instance.	It allows creating multiple data channels for a single instance, which can be consumed concurrently through a consumer group.
Consumption method	It supports only serial processing.	It supports partitioned storage of data in a single topic for concurrent consumption of data in multiple partitions, improving the consumption efficiency.



# Supported Regions

Last updated : 2022-10-19 10:50:43

DTS is supported in the following regions:

Region	Data Migration	Data Sync	Data Subscription
China	Guangzhou, Shenzhen, Shanghai, Hangzhou, Nanjing, Beijing, Tianjin, Chengdu, Chongqing, and Hong Kong	Guangzhou, Shenzhen, Shanghai, Hangzhou, Nanjing, Beijing, Tianjin, Chengdu, Chongqing, and Hong Kong	Guangzhou, Shenzhen, Shanghai, Nanjing , Beijing, Tianjin, Chengdu, Chongqing, and Hong Kong
Other countries and regions	Singapore, Jakarta, Bangkok, Mumbai, Seoul, Tokyo, Silicon Valley, Virginia, Toronto, Frankfurt, and Moscow	Singapore, Jakarta, Bangkok, Mumbai, Seoul, Tokyo, Silicon Valley, Virginia, Toronto, Frankfurt, and Moscow	Singapore, Jakarta, Bangkok, Mumbai, Seoul, Tokyo, Silicon Valley, Virginia, Toronto, Frankfurt, and Moscow