



i2Active

Database replication product white paper



SHANGHAI INFORMATION2 SOFTWARE INC.

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1 Brief

To be invincible in today's competitive environment, you need real-time information. Business critical systems must provide maximum availability, ensure fast and simple access to appropriate data, and quickly adapt to changing business and IT needs. As more and more business processes are processed online, transaction volume increases exponentially, so many enterprises need a better solution to collect and access massive enterprise data in real time. This requires a platform to integrate information from different systems within the enterprise without compromising availability and performance. i2Active is a high-performance software application for data capture, conversion and submission of real-time transaction change in database, providing data replication based on database log. This application can help you ensure that key systems run all day long and that relevant data is distributed throughout the enterprise to optimize decision-making.

In this paper, the DR data center and query application platform of the enterprise are built with i2Active products as the core, and the data replication backup protection system is designed and constructed rationally. The core data of different application systems are protected by replication, which constitutes the data replication and sharing system within the enterprise.

2 Product introduction

i2Active is an real-time data replication tool based on Oracle database redo log analysis technology. It has the characteristics of simple, flexible, high performance and low cost. It is easy to deploy and use, and has low demand for system resources and running environment. i2Active can help users complete Oracle data replication, data migration among different O/S platforms, business data distribution, building large-scale data warehouse and other basic data integration work in complex application environment.

3 What can i2Active do?

i2Active can satisfy users' multiple business needs.

- 1) improve overall system availability
- 2) data real-time logic replication
- 3) balancing the primary database load.
- 4) Data distribution
- 5) data online migration cross platforms
- 6) Monitor the status of the replication system in real time

3.1 Improves overall availability of the system

i2Active can help users improve the availability of Oracle database. Whether it is executing planned downtime (system upgrade, backup) or unplanned downtime caused by failure (such as hardware failure, disaster, human error, etc.), i2Active can minimize downtime by disaster preparedness and heterogeneous migration of database. Improving availability is the key to reducing data loss, economic loss and maintaining productivity level.

3.2 Real time logical replication of data

i2Active uses logical data replication technology to transfer binary files, so the amount of data transferred is very small. It guarantees low-latency data asynchronous replication in low-bandwidth environment. It is an efficient and low-cost disaster tolerance method for database. i2Active uses the standard IP network to communicate, and the DR database can be deployed in local or remote data centers with unlimited distances. In addition, the DR database is always open and running, so i2Active can support the front-end application to switch to the DR database quickly and seamlessly when the production database encounters planned or unplanned downtime. Compared with other physical replication technologies based on disk or file system, it not only omits the long database recovery and startup time,

but also guarantees 100% success rate of handover.

1.1.3 balancing main backup database load

i2Active replication technology makes the DR database always available. For read-only applications other than real-time transaction processing, such as historical query, report processing, data backup, statistical analysis, etc., can be handed over to the DR database for processing. Many applications do not have to compete for resources and time windows on the same transaction database. The pressure of operation and maintenance of production system is released, which improves the stability. Different applications can also be optimized on their own databases.

3.3 Data distribution

i2Active supports enterprise-wide data distribution, real-time replication from data production libraries to one or more local or remote databases. i2Active has a variety of data distribution topology, one to many, many to one, cascade replication and so on. Data distribution is a typical enterprise application mode which can share load and improve response speed by deploying multiple servers and databases.

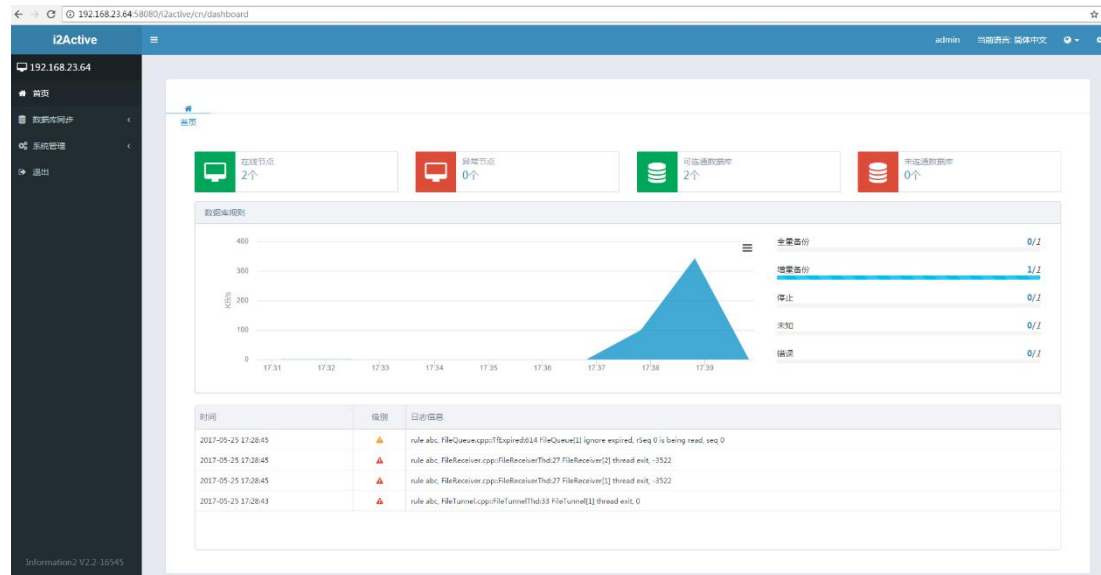
3.4 Cross platform data online migration

i2Active supports cross-platform data transmission. Replicated source and destination systems can be selected arbitrarily among AIX, Linux and Windows. i2Active supports Oracle 10g, Oracle 11g and Oracle 12C at the same time. For users, not only is the choice of hardware platform very flexible, but also i2Active can be used to complete database upgrade and migration of heterogeneous platforms.

3.5 Monitors the status of the replication system

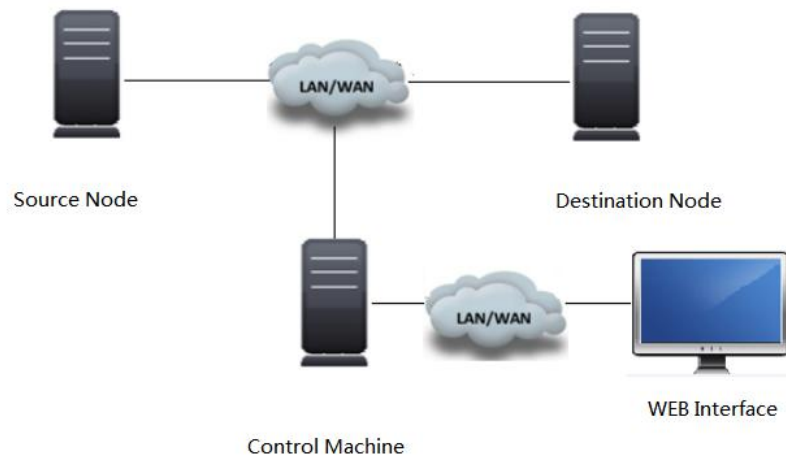
The i2Active product itself has a graphical monitoring and management page based on

WEB browser, which can be used to monitor the running status of i2Active software and manage and maintain the i2Active replication system as shown in the following figure:



4 Architecture and principles

4.1 Architecture specification



i2Active software network architecture diagram

The i2Active software system is divided into three parts: source node, destination node and control unit.

The source node refers to the user's production machine, that is, the commonly used source end (Source).

The destination node refers to the server that stores the replicated data, that is, the destination end (Target).

The control machine refers to the server belonging to the control platform of the i2Active software system.

i2Active software is configured and managed through the Web interface. The control program of i2Active software is deployed on the control computer, and any host accesses the control center through browser.

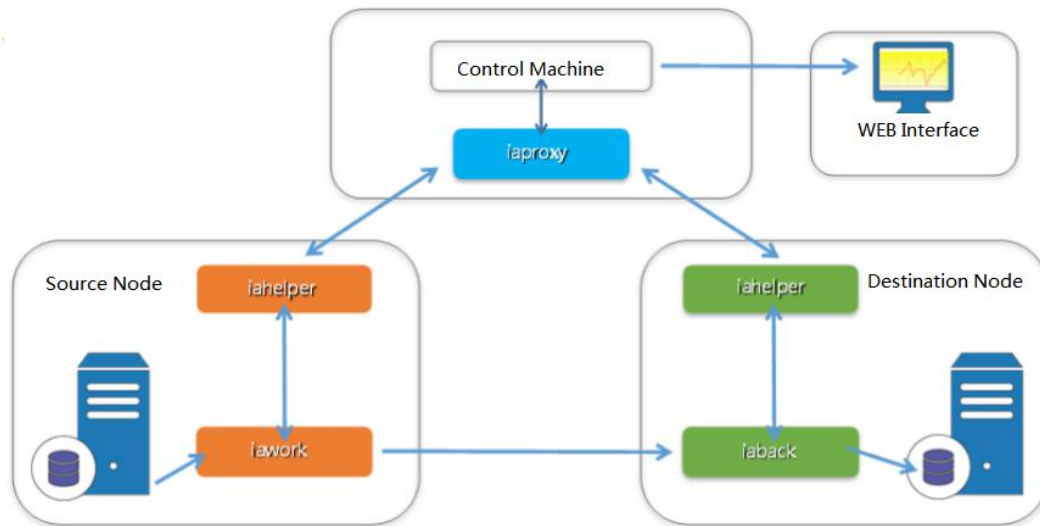
The software contains 4 programs, namely iawork, iaback, iahelper and iaproxy.

iawork and iaback: programs deployed at source and destination end nodes respectively to complete data replication from source to destination, real-time monitoring and

synchronization of incremental data. It is easy to install and run quickly without copying.

iaproxy: deployed in the control machine, used for web interface and communication with each machine node.

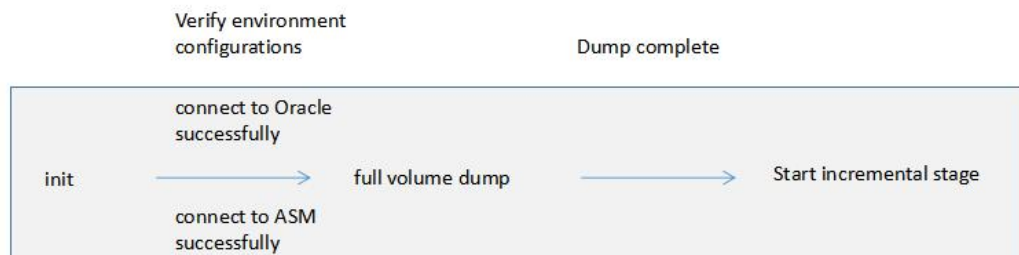
iahelper: deployed at the source and destination end nodes for communication with iaproxy, two programs together constitute a bridge between web and node interaction.



4.2 Working principle

i2Active software can realize real-time data synchronization at the SQL language level of database, that is, when the database is in normal use. Complete the replication of source end to destination data, and monitor and synchronize incremental data in real time.

Condition conversion and conditions of normal process:



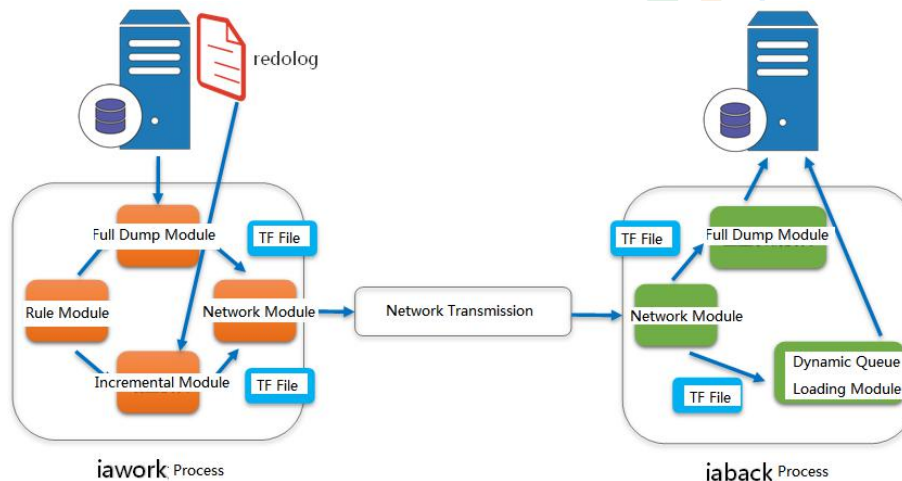
i2Active software transmits the data file formed by reading and analyzing the logs of the source database to the destination. The destination can analyze and load the file in order to

achieve the consistency of the source/destination data and structure.

i2Active software supports Oracle database concurrent log writing. It only needs to open supplemental log and force logging. The installation of software has no effect on the operation of business system, and the production library does not need to start or stop because of the installation of software.

And there is no invasion to the source end. The database does not need to be restarted.

2.2.1 Principle of full synchronization for 3.2.1. initial data

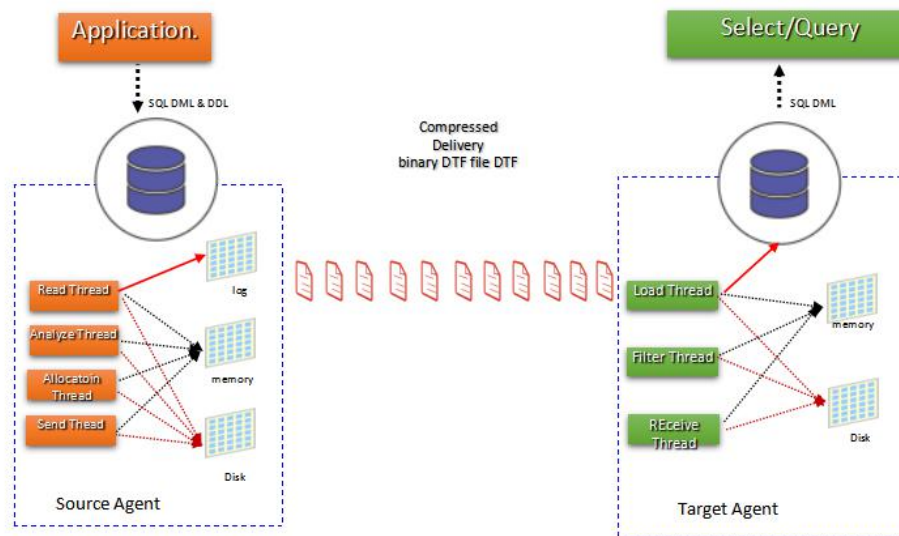


1. when the replication rule is started, the increment module begins to capture the increment according to the rules.
2. the full volume module starts with rule setting to get information about the objects involved in the rules.
3. starts with concurrent setup and multi queue to get table data. The process of obtaining data is
 - (1) the lock table obtains SCN (system change number) and releases the lock.
 - (2) scan according to the SCN full table. The scanning result is generated to be delivered to the destination host directly by generating the TF file (binary).
4. the full load module will be loaded to the DR database one by one according to the number of concurrent requests.
5. when the data in the table is loaded, the software starts to create indexes, constraints, and

other objects. When all objects and data are loaded into the target database, the incremental loading module begins to filter and load captured incremental data according to SCN.

6. When all objects and data are loaded into the target database, the incremental loading module begins to load the captured incremental data according to SCN filtering.

4.2.1 Incremental data replication principle



1. read (iareader) thread to capture changes in redo log, and pass these changes to analysis (analyzer) threads.
2. analyze thread according to the rule settings, change the DML and DDL to be copied to generate TF files.
3. send (sender) threads to send changes to the TF file through the network to the disk of the target host.
4. allocation queue (queue) thread reads out the TF file and automatically assigns different queues according to the dependencies of the table.
5. loading the (apply) thread loads the operation to the target end database.

Incremental positioning method in incremental synchronization process

ROWID data location technology

ROWID is the unique identification of a record in Oracle database tables. It is the physical address of the table records stored in the database. Through the first full synchronization, the software can establish the mapping relationship between source and target, so i2Active can locate the changed data accurately, quickly and efficiently. This method is simple, convenient, and has little correlation with business. It is suitable for disaster recovery, sharing business load and other application scenarios.

Primary key positioning technology

i2Active locates the data to delete and modify in the target segment by capturing the source side primary key. When using this method, the table in the production database must have a primary key. This technology is flexible and suitable for real-time data conversion and other application scenarios.

4.3 Technology advantages

I2RED is one of the core technologies of i2Active.

The technology processing model can greatly improve the processing performance and reliability of redo logs. So that database replication is efficient while ensuring database consistency.

When the database is not busy, writing is not usually concurrent, but when it is busy, it is necessary to turn on the backup cache and write concurrently. Therefore, in this scenario, if other programs want to read the redo log that has been written, it is very easy to have a certain probability of disorder, which is the database replication software of the previous general vendors. Many vendors require users to prohibit concurrent configuration of the database every time they deploy the system. Generally, this action needs to restart the database, which affects the continuity of business and reduces the performance of log writing.

The i2Active side deeply studies the algorithm and knows the root of the database

concurrency algorithm. i2Active can make the redo content read by the software complete and orderly. Users can set this parameter arbitrarily, and the relevant information of this parameter will not be set up when the software is installed.

4.4 Product advantage

Functional advantages

- Initial and full data replication simple and rich rule setting
- Integrated real-time synchronization of DDL/DML
- It supports multiple mapping methods (support for primary key mapping and ROWID mapping).
- Fault switching is fast and simple.
- Provide quick data comparison and report.
- Support table repair function

Performance advantages

- The source end multi-thread capture logs are parallel and speed up, and the analysis speed is very fast.
- The DR database is loaded dynamically and loaded very fast.
- No need for maintenance personnel to configure loading policy.
- Automatically load concurrent loading sequence according to load
- Network data transmission is fast / safe / stable.
- The optimized network transmission algorithm has much higher replication performance than the industry.

Monitoring operation and maintenance

- Support fault tolerant processing
- Graphical monitoring and configuration
- Alarm / rich / fast fault location

4.4.1 Functional advantages

- 1) initial full volume data replication with simple / rich rules

All operations are completed on WEB pages. The configuration of initialization and

replication is very simple. Full synchronization can be achieved without any other tools. Then seamless convergence enters the incremental synchronization stage. The whole process can see the progress of full synchronization, accurate to the number of tables that have been synchronized, the number of rows of tables currently being synchronized, etc. It can also view the real-time statistics of incremental synchronization phase. The whole process needs no manual intervention and operation. It is intuitive and simple.

A variety of synchronization strategies are provided to satisfy different application scenarios. For example, you can choose to set up replication rules for the whole library, or set up replication rules for users' Schema units, or set up replication rules for tables units.

2) DDL/DML integrated real-time synchronization

Fully support DML and DDL operation semantics; fully support DDL data definition language database operation, and DML data operation language database operation; also fully support the mixed use scenarios of DML and DDL, so that DDL synchronization mode and DML are not separated, without separate configuration, making database maintenance and upgrading simple.

3) support multiple mapping methods.

Whether user mapping, table mapping, or whole library mapping, i2Active fully supports ROWID and primary key mapping to meet the needs of different scenarios. Even if ROWID changes are caused by row movement of the source table, i2Active software can detect and process accurately, and automatically maintain internal data synchronization at the destination. The DML operation of modifying the primary key is supported to realize the fast operation without the primary key table.

4) fully support the DataGuard Failover scenario.

Product support for DataGuard cluster switching, to maximize the production environment. When DG failover handover occurs, i2Active destination can take over sequentially without full database mirroring to replicate break point database. Reduce manual intervention, reduce data completion time, and ensure data consistency to the maximum extent.

5) provide quick data comparison and statistics report

In the process of database replication, i2Active software provides data checking and comparison tools, which can greatly facilitate the operation and maintenance team. The comparison tool can accurately show the number difference between the target and source at the object level, and verify the accuracy of data replication.

This technology is based on MD5 encoding data comparison. If there is inconsistent synchronization between the results of data comparison, we can use WEB management to repair the data of the table directly or initialize synchronization of all data.

6) support table repair function

In the incremental use process, it is possible to change the destination data due to some misoperation of operation and maintenance. When the source changes the data of the relevant parts again, the result will be to stop the replication of this table. In this case, the software interface provides a table repair function to synchronize the data of the table to the destination based on the source data.

4.4.2 Performance advantages

1) the source multithread capture logs are parallel and speeded up, and the analysis speed is very fast. In the case of cluster, adaptive multi-node concurrent read and analysis, source redo log analysis speed is very fast, can be as high as several GB/min.

2) Dynamic loading of the DR database, which is very fast, does not require maintenance personnel configuration loading strategy, and the software automatically allocates concurrent loading order according to the load. The loading queue splits according to the dependency between tables and tables (foreign key dependencies). The interdependent table is split into a queue. The software will measure the amount of historical data in each queue and dynamically adjust the queue. The original transaction start tag will be pushed to all queues at the same time to ensure the integrity of the submission.

3) network data transmission is fast, safe and stable. Supporting heterogeneous hardware platforms and heterogeneous operating system environments, efficient compression, small amount of data transmission, low bandwidth requirements. Products support a variety of data compression levels to adapt to different customer environments, transmission distance and bandwidth constraints can be well adapted in different environments. Depending on the i2Activecore DOT serialization transmission mechanism to ensure that the source data is sent to the destination in an accurate and orderly manner.

4.4.3 Monitoring operation and maintenance

1) support fault-tolerant mechanism. In the process of replication, if one table fails (e.g. primary key conflict, deadlock, etc.), the synchronization of other tables is not affected; the software provides a variety of configuration strategies: error interrupt/skip the replication of the table/continue loading three different processing methods.

2) the configuration and control of the whole image without any commands or other operation interfaces.

3) Pages provide multi-level status monitoring. From the host level, process level, database level and replication rule level, there are real-time monitoring and connectivity query mechanisms, and the home page provides real-time replicated traffic diagrams and

related alarm logs.

State monitoring is divided into three levels: host level, process level, database level and replication rule level.

Host level: The communication between the node and the controller is realized through the iahelper process to monitor whether the node is online or not.

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<input type="checkbox"/>	back	在线	iaowork: ✗ iaback: ✓	192.168.42.201	Red Hat Enterprise Linux Server release 5.6 (Tikan)	2.2-16866	admin	修改 调试信息 删除
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Process level:

The source communicates with the controller through the iaowork process, and monitors whether the replication process at the source is in working state; the destination communicates between the node and the controller through the iaback process, and monitors whether the replication process at the destination is in working state.

As an example, the source node (named "prod") only needs to start the iaowork process, which is responsible for real-time capture of logs, parsing, sending and so on, to ensure that the initial full incremental data is copied to the destination in real time; the iaback process in the source package is closed;

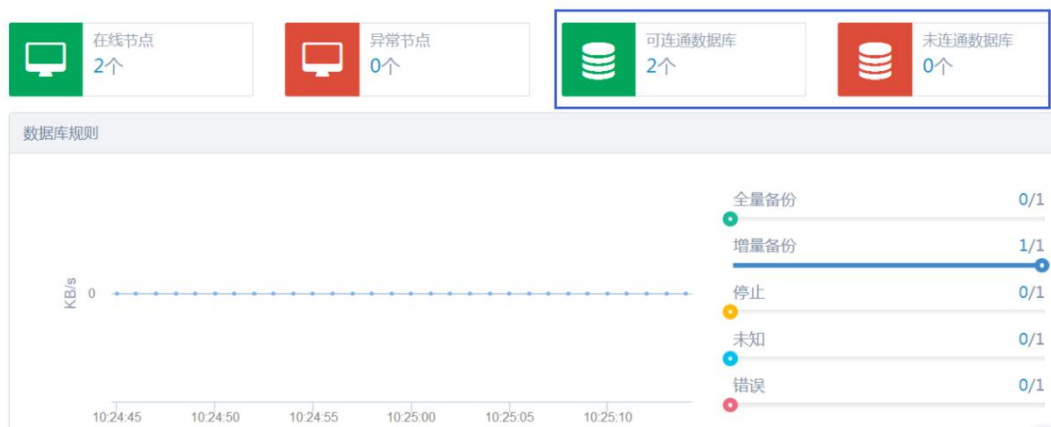
The destination end node (named "back" node) only needs to start the iaback process, which is responsible for receiving the log content sent by the source and the loading of the destination end in real time, while the iaowork process in the destination package is closed.

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Database level:

In the early stage, when configuring IP address, port, instance name, database type, etc. for database remote connection, it can test and verify the connection of database server in

time. In the following day-to-day operation, the home page of the console will refresh and track the connected or disconnected state of the database in real time. The following figure contains two nodes, one source and one destination. Each of them corresponds to the source database and the DR database. The status of the two databases is shown as being connected. Assuming that a database service cannot be accessed due to exceptional reasons for a destination instance, the page will provide alarms and logs.



The level of replication rules:

After the rules are added successfully, the default configuration is started directly, and the source and destination ends begin to enter the full volume synchronization state.

Administrators can see the full amount of synchronization process by full and incremental information. In the first mirror stage, because of the large amount of data, the source may still be in the EMP table under the name of the parsing user TOM. The current export progress is at line 3042600. The destination has received the data from the source to the destination, that is, COMRAW1 table under the name of the source user TOM, and the loading progress is 73941 rows.

When the source and destination rule states are all changed to incremental synchronization, it means that the full synchronization is completed and the incremental state begins.

Note: The source may complete full synchronization first, and the rule state will become incremental synchronization. Please wait for the destination to become incremental synchronization. After synchronization, the full synchronization of source destination ends.

5 Use and deployment

5.1 Compatibility

The ability of i2Active to use logic replication technology is very popular among users. i2Active can support Oracle replication in different versions of Unix/Linux/Windows system. For enterprises with complex hardware environment, heterogeneous deployment can save a lot of resources and reduce costs effectively.

Product compatibility platform type released by i2Active:

Support 2003 Server (Windows 32/64 bit) and later versions.

Centos 5

Centos 6

Suse 11sp4

Suse 11sp2

Aix7.1

Aix6.1

Product compatibility database version type released by i2Active:

Oracle 10g

Oracle 11g

Oracle 12C

i2Active supports for product synchronization objects:

	object type	Remark
Objects supported	Table (External table)	Including compression table, IOT, etc
	Tablespace	
	Index	
	View	Including Materialized view

	Sequence	
	Trigger	
	Synonyms	
	Procedure/Function	
	Package/Package Body	
	User defined Type/Type body	
	Java	
	Directory	
	User privilege	
Objects not supported	Users, group	
	Profiles	
	Queue	

i2Active supports product synchronization data type:

	Field type	Remark
Supported type	VARCHAR2, NVARCHAR2	
	NUMBER	
	LONG	
	DATE	
	CLOB, NCLOB、 BLOB	
	RAW、 LONG RAW	
	ROWID、 UROWID	
	CHAR、 NCHAR	
	BINARY_FLOAT、 BINARY_DOUBLE	
	TIMESTAMP 、 TIMESTAMP WITH TIME ZONE 、 TIMESTAMP WITH LOCAL TIME ZONE	
	UDT (ANYDATA)	
	INTERVAL YEAR TO MONTH、 INTERVAL YEAR TO	

	SECOND	
Not supported	REF	
	BFILE	

5.2 Multiple replication modes

i2Active supports one to one, one to many, many to one, and cascade replication. In either mode, the replicated source and destination systems are separate parts that can be used, maintained and optimized separately.

5.3 Rapid deployment

During the installation and debugging process, the main configuration of the database will not be changed, nor will the file system, operating system and data volume be involved. No tables are created on the source and DR database. It can completely install and debug the business system without changing database running state. At the same time, the deployment process is simple enough. For technicians familiar with Unix/Linux and Oracle, consult the relevant documentation and deploy in 10-30 minutes.

5.4 Performance index

Performance, data consistency and system stability are often the main concerns of users when using data replication products. i2Active, as a perfect replication software product, not only meets users' various business needs in function, but also satisfies users in the above aspects.

i2Active requires little system resources. There is no need to purchase a specified type of hardware, such as disk arrays; no need for special basic software cooperation; no need for application software support.

For the use of resources in a single system, the average CPU utilization rate is about 5%. When there is no transaction processing work, the system resources are not occupied. Such

resource usage basically does not have any impact on the operation of the database.

i2Active software can meet the pressure of not less than tens of thousands of transactions per second of traffic, and the loading delay is controlled at the second level. This crawling capability can support TB logs per day. At the same time, i2Active software runs stably in the high concurrent scenario where multiple tables are written at the same time, and the loading delay is still controlled at the second level.

In a word, i2Active is an excellent product in two aspects of performance and resource utilization.

5.5 Software reliability

i2Active products provide two levels of reliability design.

Node level

1) Assuming the shared storage architecture, the redo logs and the caches and logs of the i2Active software nodes themselves are on the shared storage, the i2Active destination can reconstruct an i2Active source with the above caches as long as the i2Active caches and logs on the shared storage are still available, even if the i2Active node is down or damaged. The continuous number of breakpoints does not affect the continuity of replication.

2) If the source node fails in the architecture of non-shared storage, it can also be recovered by the high availability design of i2Active. The configuration of synchronization rules will retain a copy on the host computer. The data cached by synchronization rules preserves redundant breakpoint information and can also query breakpoints from the target end when the source data is not accessible.

Control machine level

1) The control machine is only responsible for providing the console interface of WEB interface to facilitate management and maintenance; moreover, it is only responsible for activating i2Active nodes at source and destination, establishing the corresponding

relationship of database, and finally configuring the replication rules at source and destination; after completing the initial configuration, the source and destination nodes can realize the reality of each other. If the control machine is not reachable, when iawork or i2back can not contact the control machine, the alarm will send a log to the alarm platform through syslog to remind the operation and maintenance to check.

When the local postgres database and i2Active rules and configurations of the controller still exist, the source and destination nodes continue to communicate online and monitored with the console by their regular polling after the process of the controller is restored.

2) If the system damage of the control machine itself is to be prevented, the i2Active side can use i2COOPY real-time replication mechanism to achieve disaster preparedness. Because the configuration information and rule information of i2Active source and destination are stored in the master postgres database, only a simple real-time replication rule can protect the core data of the control computer; in the case that the control computer must be rebuilt in an extraordinary period, only the backup postgres database mentioned above can be saved. The information is restored to the console.

6 Replication system effectiveness

6.1 Data delay

i2Active is an asynchronous but real time replication technology, and its data delay is very small. In a production system, data latency is related to the number of things synchronized by the source system and the bandwidth of the network. Data delay is usually within one second.

The delay of replication refers to the time difference between the end of the source log and the end of the transaction. Users' stringent requirements for real-time data make replication delay an important concern. The following factors will affect the delay.

6.1.1 Hardware speed

If CPU capacity is insufficient, data analysis and processing will be affected, especially in the destination system, which may require more CPUs to perform parallel data loading to reduce replication latency.

6.1.2 Transmission efficiency

i2Active tracks and analyses online logs in transaction units, only deals with transactions that have already been COMMIT. i2Active does not deal with data changes caused by ROLLBACK operations, indexes, etc. So i2Active only grabs about 1/3 log changes. Software also has hierarchical network transmission compression algorithm, so network traffic is one tenth or even lower of the log changes, which greatly reduces the pressure on the network. Moreover, i2Active uses mature network traffic control algorithm to precisely control bandwidth occupancy in order to meet data synchronization replication under network resource constraints.

6.2 Robustness of replication environment

The i2Active scheme is robust enough. Any failure of the source system and the target system will not affect the replication environment. When the following failures occur, the i2Active troubleshooting methods are as follows:

1) host system failure: when the host system fails, the Oracle database and operating system will be repaired. After restarting, i2Active automatically retests the connection to the database and continues the synchronization from the breakpoint.

2) database failure: when the source system database fault is repaired, when the Oracle database is restarted, user can continue to work synchronously from breakpoints.

3) copy software failure: when the software process has problems, it can automatically restart the related processes. The results can not be automatically restarted or manually restarted. The restart of the process will not affect the replication data.

4) network failure: when the network is recovered, it can synchronize automatically from breakpoints.

5) host failure of the target system: data is stored in the target system queue, when the host system of the target system is repaired, the synchronization work is carried out from the breakpoint.

6) database failure: data is stored in the target system queue, and when the target system database is repaired, synchronize work from breakpoints.

6.3 Integrity and availability of things

The basic unit of i2Active replication is a transaction. After reading the transaction data from Oracle log, according to the transaction relationship, all operations belonging to a transaction are combined and sent to the target end as a basic unit. The target end is strictly executed according to the transaction sequence, so it is strictly guaranteed. The integrity of the transaction. For the order between transactions, i2Active strictly ranks according to Oracle's SCN tags to ensure the order between transactions.

That is to say, the source side analyses redo log, grabs the complete transaction,

transfers the whole transaction file to the target side, and submits the transaction data to the database in batches; each transaction or several transactions executes a commit action to ensure that the transaction is complete; the order of transaction submission is the same at the source side; and in each transaction, the commit order is the same. In a transaction file, the earliest location of all uncompleted transactions in the redo log at the time of transaction commit is recorded. This location information is also included in the source cache file, and a new round of log analysis will be started when the synchronization task is restarted. Even if the source-side cached data is not accessible, the correct breakpoint location can be obtained from the transaction file captured by the target-side, and the analysis can be continued.

7 Data query platform construction plan

7.1 Build hot standby data center of enterprise

In the framework of replication based on i2Active products, not only the centralized disaster preparedness function of production system can be realized, but also the "zero time" database switching can be realized. At the same time, it can provide a more expansive data base management platform for external systems, as well as query functions and various operations of data.

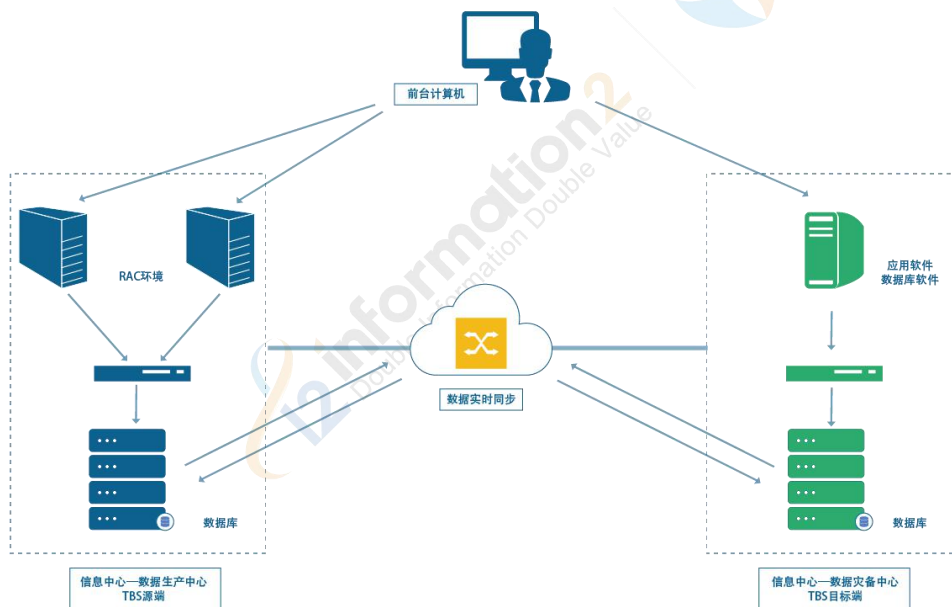


Chart: disaster recovery database is mainly shared by libraries.

7.2 Advantages of data query platform

7.2.1 Improves query real-time performance

At present, many query schemes are used to extract data from production database manually at regular intervals, and the real-time performance of data is not guaranteed. The characteristics of production database are to handle sudden and random transactions (Insert/ Update / Delete/ Select). For data analysis, the lack of real-time data is undoubtedly the best time to delay the analysis and decision-making.

i2Active can automatically replicate data to query database in real time, and reduce the latency of query data from "minute" to "second" to fundamentally improve the effectiveness and timeliness of data application.

7.2.2 Reduces resource footprint for production systems.

In the future, the emergence of a large number of concurrent query requests will seriously compete for resources of production database system, which will lead to very slow query business, but also lead to a significant decline in the performance of production business. So after separating the query database, we can lighten the pressure of the production system. By querying the independence of the query system, the query performance can be improved. Query database and production database are completely independent, and can be optimized separately according to the standard of OLAP system, such as modifying database storage and memory parameters, increasing index and so on, which can greatly improve query performance.

7.2.3 Provides support for subsequent businesses.

Through the independent query system, besides satisfying the basic query function, it can also provide the interface functions of various reports, statistical analysis and data application on this platform, and then develop into a unified data platform within the enterprise. On this platform, it can realize the deployment of all peripheral systems, accelerate the flow of data, and enhance data value.

8 Features of 7.i2Active solution

8.1 Main standby database is in dual live state.

DR database undertakes real-time remote disaster recovery of data. It provides business acceptance and timely data recovery in time when disaster occurs in production database. Meanwhile, the DR database is always in open state. It can access the DR database in real time. The system maintains the database Office of production center and disaster preparedness center. In double activated state. The scheme technically ensures that the target database is available online and the data can be read in real time. There is no contradiction between the replication process and the data reading. The replication delay of i2Active is very small. The data read from the DR database is the latest real-time data, and there is no need for some switching work to read the latest data.

Facilitate the establishment of internal data application center

By replicating the data platform, the business modules of the trading system can be shared, and those modules which only read and query database can be migrated to the DR database, mainly including:

- 1) provide other business systems for real-time query of DR database.
- 2) provide data from other business systems to support batch extraction.
- 3) provide other system data access interface;

The internal data application platform based on disaster preparedness replication data, namely the DR data center, can improve the efficiency of data access, the flexibility of peripheral system deployment, the operational efficiency of core system and the stability and reliability of core system operation. This mode will bring more application value and return on investment to enterprises.

9 Brief introduction of Information2 Software Inc.



Information2 Software Inc. It is a leading professional vendor specializing in disaster recovery and high availability solutions. The company takes ensuring business continuity as its primary objective, and takes unique real-time data replication and continuous data protection technology as its primary objective, to provide continuous protection and rapid recovery for key business data and applications of various enterprises on physical/virtual or cloud computing platforms, and to thoroughly solve various problems of traditional data protection methods, to the maximum extent. To reduce the huge losses of various systems due to downtime.

i2 disaster recovery and high availability solutions are easy to use, economical and efficient, and have become the best choice for many high-end and high-quality customers around the world. Headquartered in Shanghai, it has established double R&D centers in Shanghai and Beijing, Internet operation centers in Shenzhen, and a full sales system including North China, South China, East China, Southwest China, Northwest China and overseas areas. It is located in Beijing, Shenyang, Harbin, Jilin, Hohhot, Guangzhou and Shenzhen. Zhengzhou, Jinan, Shijiazhuang, Hefei, Hangzhou, Nanjing, Wuhan, Xi'an, Lanzhou, Chengdu, Chongqing, Kunming, Urumqi, Hong Kong and other places have set up offices. In addition, Britain and Microsoft, Aliyun, Tencent Yun, VMware, Oracle, HP, DELL, IBM and other leading professional and technical manufacturers in the world have established offices. A close partnership has been established.

For information on products and services of Information2 Software Inc., please visit www.info2soft.com, www.i2yun.com or contact your local office 400-0078-655 or email info@info2soft.com.