SuperMap iServer Map Cache

SuperMap Software Co., Ltd.

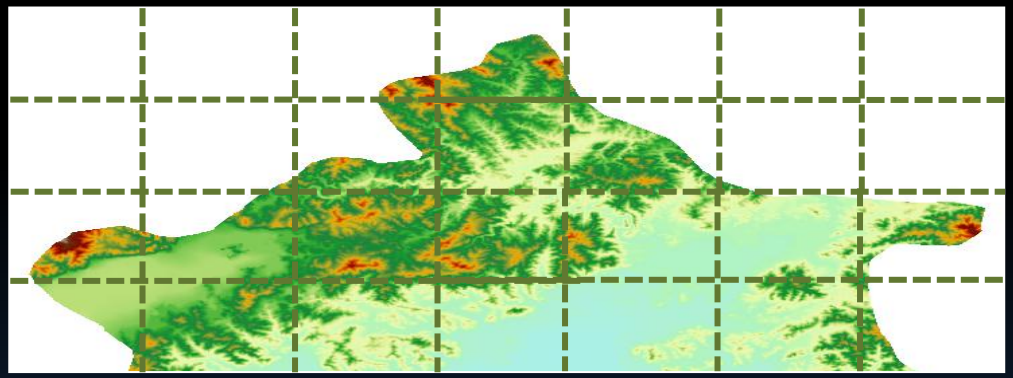
Main Contents

- What is map cache?
- Why map cache?
- Mechanism of map cache.
- How to create map cache?
- How to use map cache?
- Suggestions for using map cache.

Decleartion: all the ‘iServer’ mentioned in the ducument refers SuperMap iServer products if no other specific name mentioned

What is map cache?

- The pre-produced map tiles which can improve the map access efficiency



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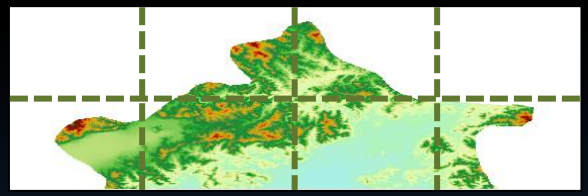

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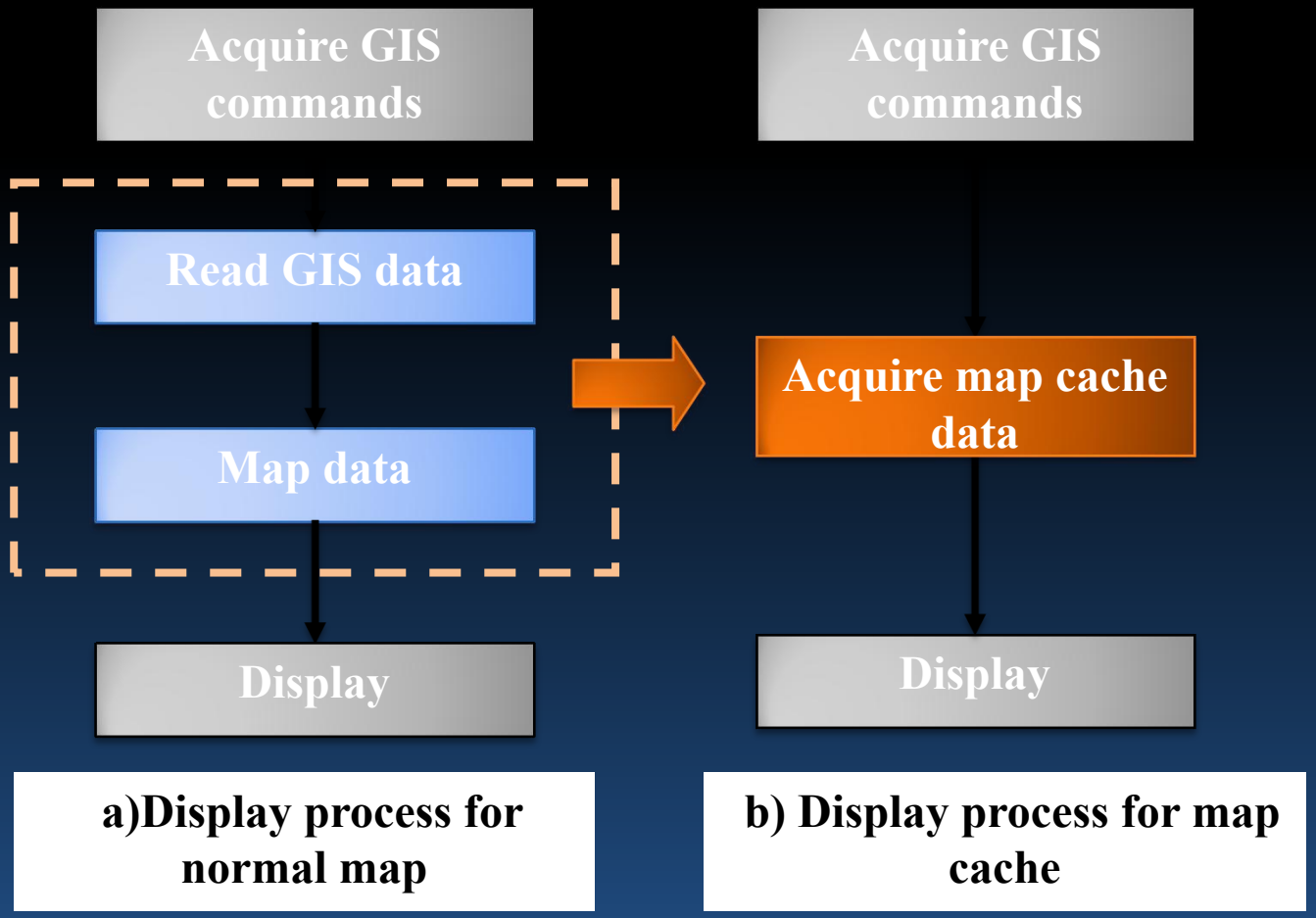
- Produce map cache according to pre-defined map scale.
- Produce according to tiling algorithm.

Why map cache?

- Cache technology



a)Display process for normal map

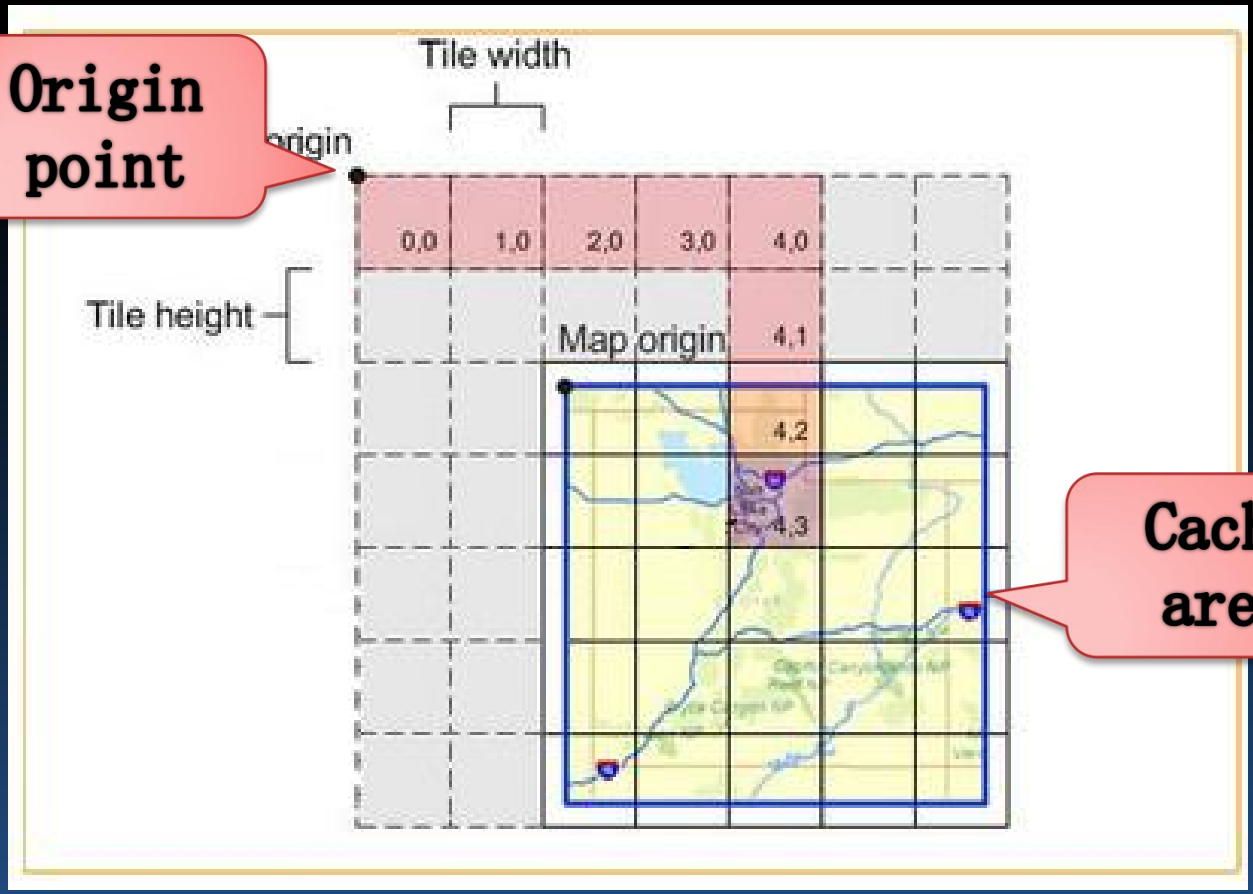
b) Display process for map cache

Cache Model

- SuperMap products have unified cache model
  - From iDesktop to component products SuperMap iObjects Java/.Net, and server product iServer, they all have the same map cache model.

Cache Construction Mechanism

- Construct cache through tile files generated by dividing layer and block, and consider the cache update problems from perspectives of coordinate system, map, layer style and data range



Map Cache Mechanism

Static cache mechanism

- Pre-cache
- SuperMap iServer directly use pre-produced cache data to respond to the mapping request from the client side, saving the time of server.
- For massive GIS data, they have lower update frequency, using cache mechanism is recommended.

Dynamic cache mechanism

- SuperMap iServer dynamically generate cache in map viewing, and provide quick response for the same requests in the future.

Cache Storage Mechnism

File storage

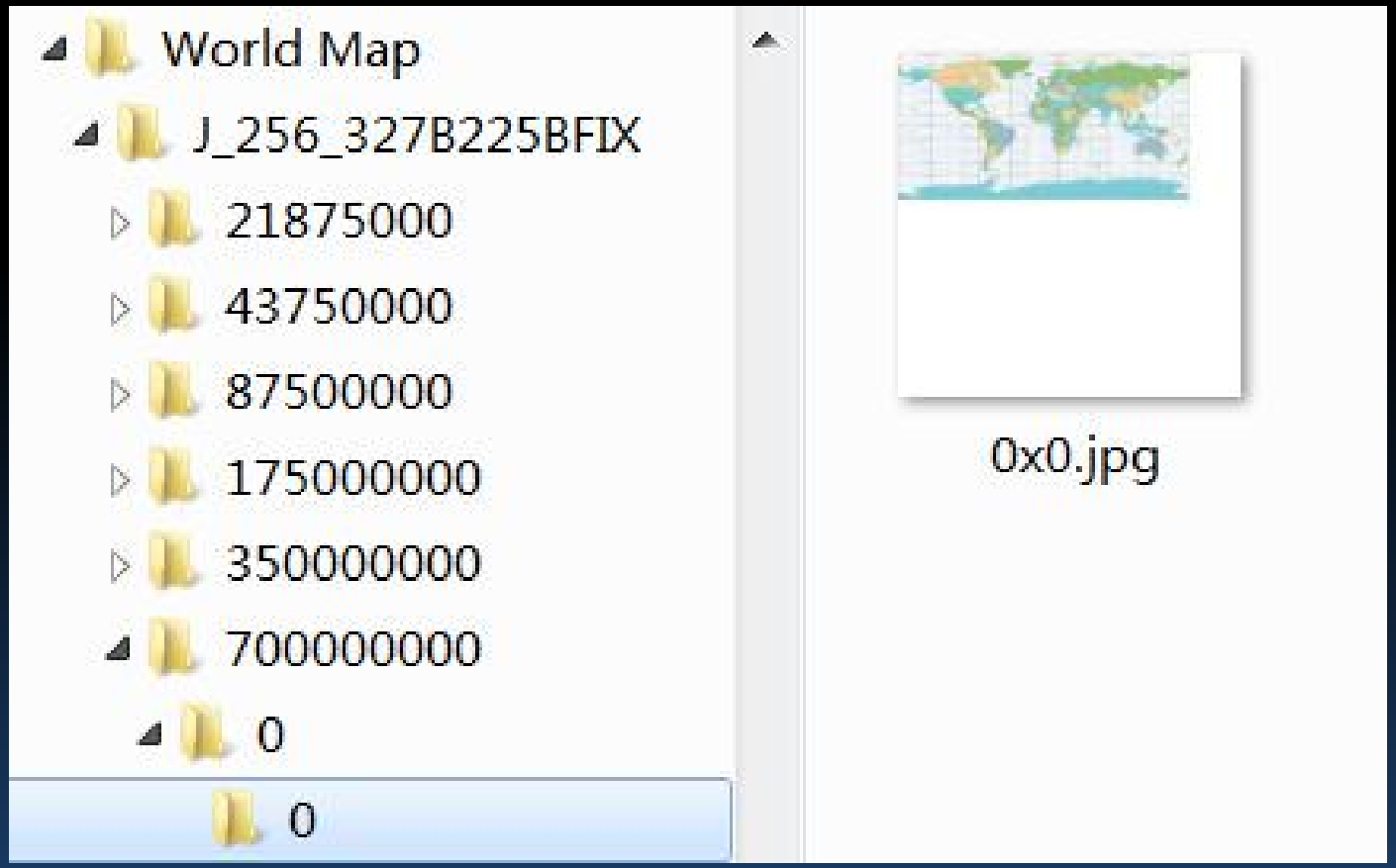
- Original picture
- Compact file

Database storage

- MBTiles
- FastDFS
- MongoDB

Original Picture Cache

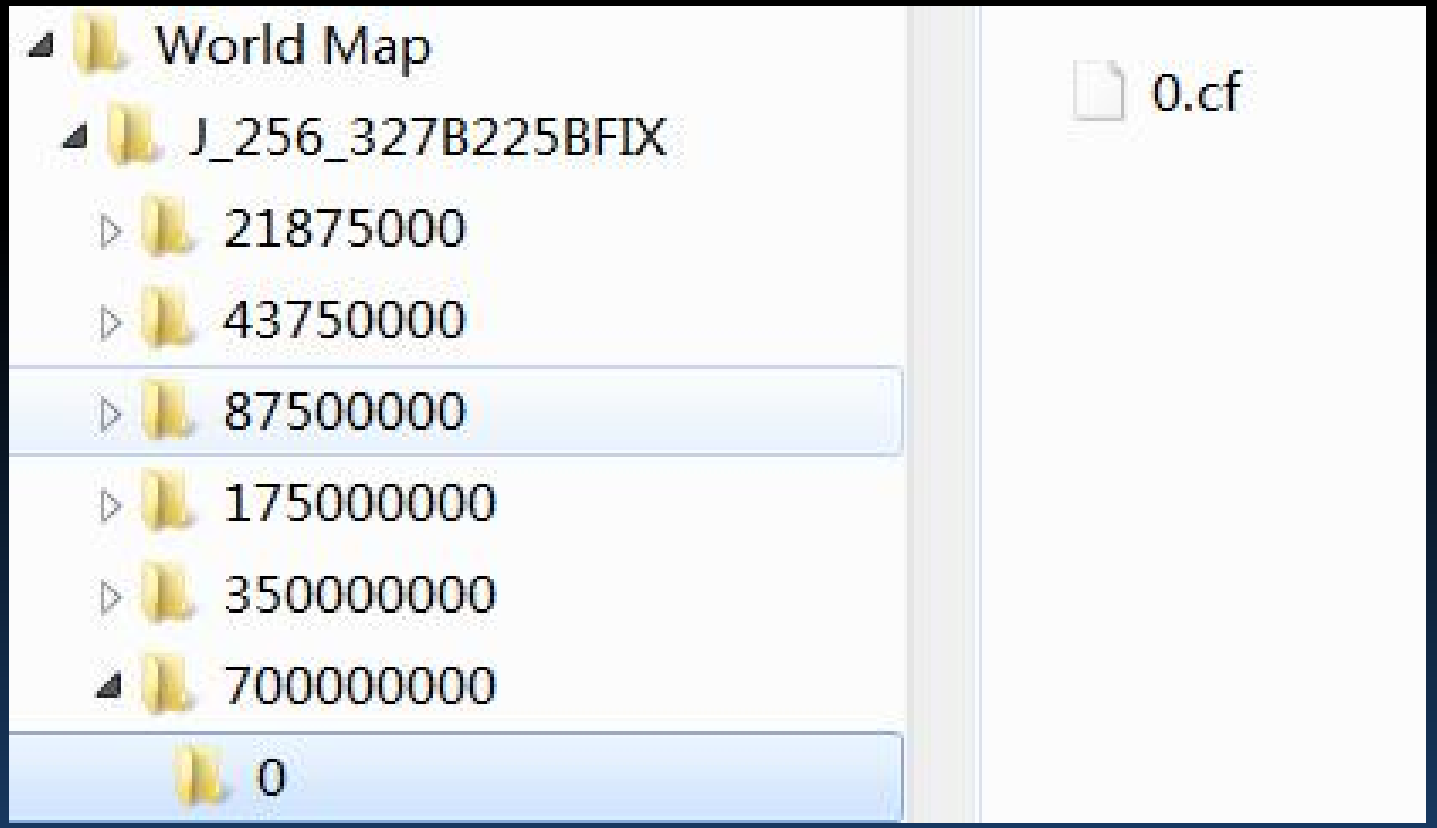
- Cache folder structure



V5.0 Cache structure

Compact File Cache

- **Cache folder structure**



V5.0 Cache structure

Comparison

- Original picture cache
  - Readable
  - More utilization
  - Time consuming when copying and deploying
- Compact file cache
  - Less readable
  - Easy to copy and deploy

MBTiles Cache

- MBTiles is a standard that putting tile map data stored into SQLite database and quickly use, manage and share.
- Cache format：

- When there is MBTiles cache in the service component, the map will be acquired directly from cache other than service provider.
- MBTiles cache are usually used in offline cache in mobile terminal.

FastDFS Cache

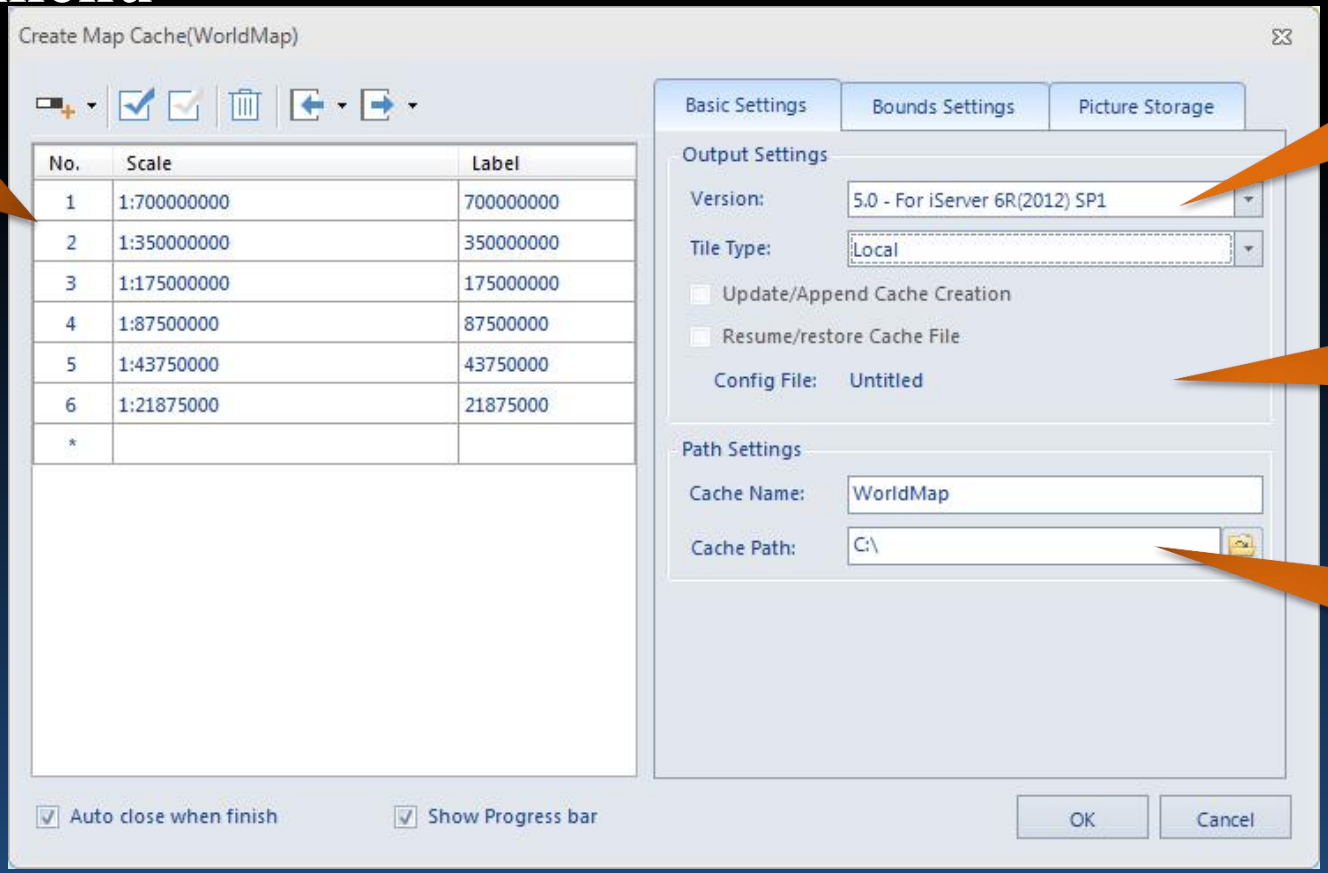
- FastDFS is an open source lightweight distribution file system, which can manage the files, solving the problems of big volume storage and loading balance.
- FastDFS cache can do parallel tiling on multiple machines, distributed storage to improve the efficiency of cache.
- For service layer cache

How to Create Cache

- Generated pre-cache by SuperMap iDesktop
- Generate cache by iServer pre-cache server
- Generate by iServer distribution tiling service

Create Map Cache

- Use SuperMap iDeskptop to create cache
  - Select map. Click ‘create map cache’ in right-click menu



Set scale

Select cache version

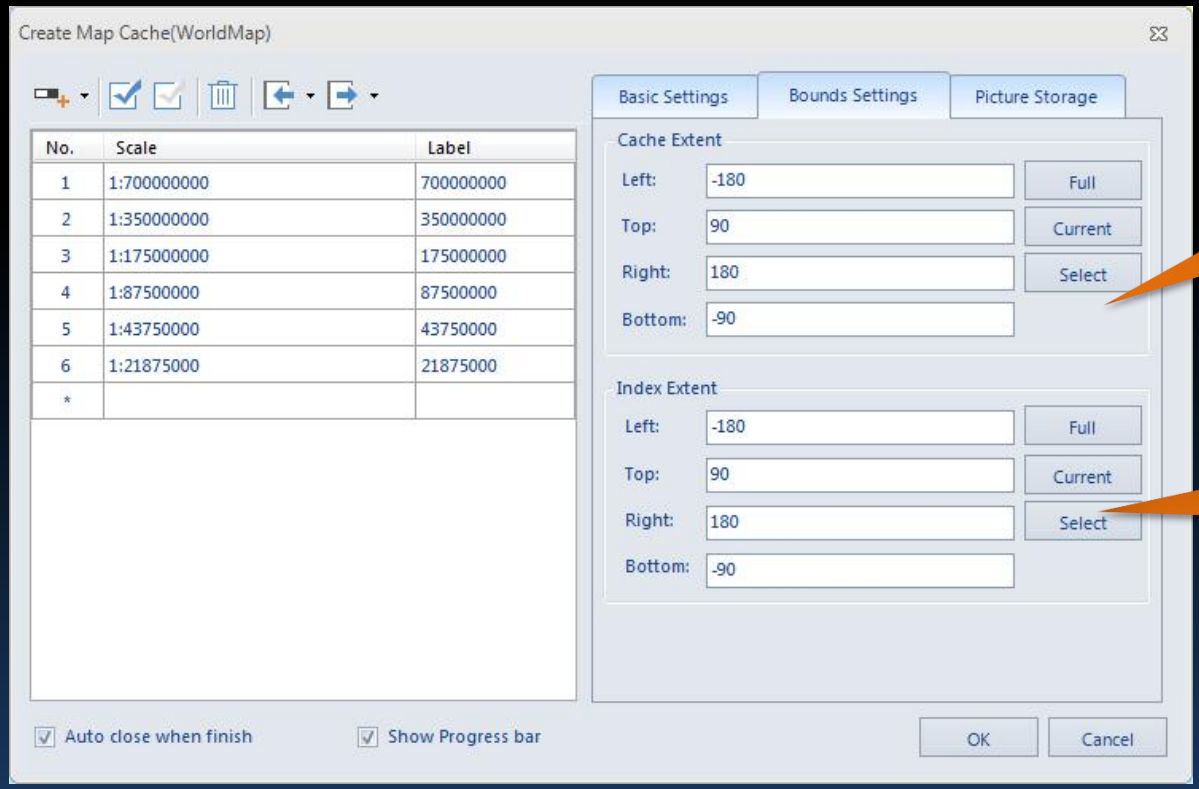
5.0 supports cache appending

Set cache path

SuperMap

Create Map Cache

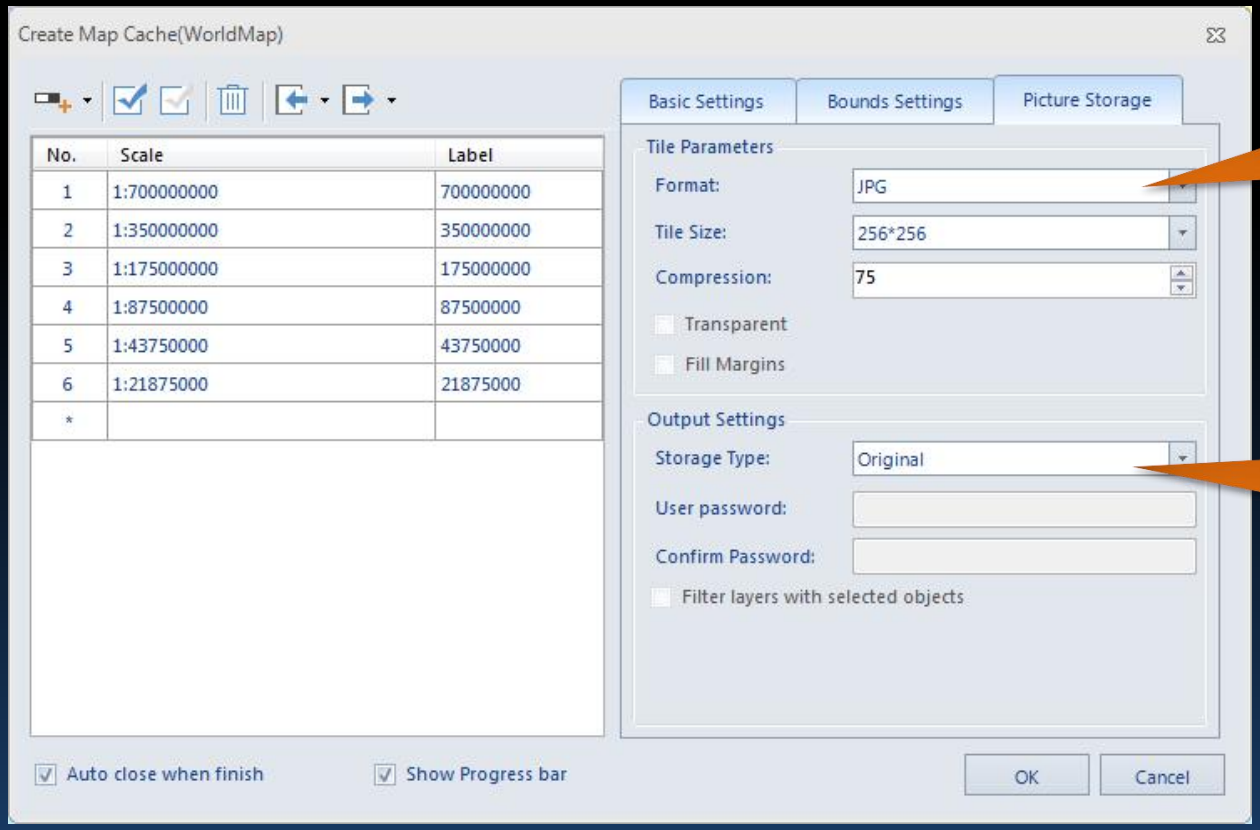
- Use SuperMap iDesktop to create map cache



Index range directly influence the location of tiles, when appending cache, making sure the ranges are the same.

Create Map Cache

- Use SuperMap iDesktop to create cache



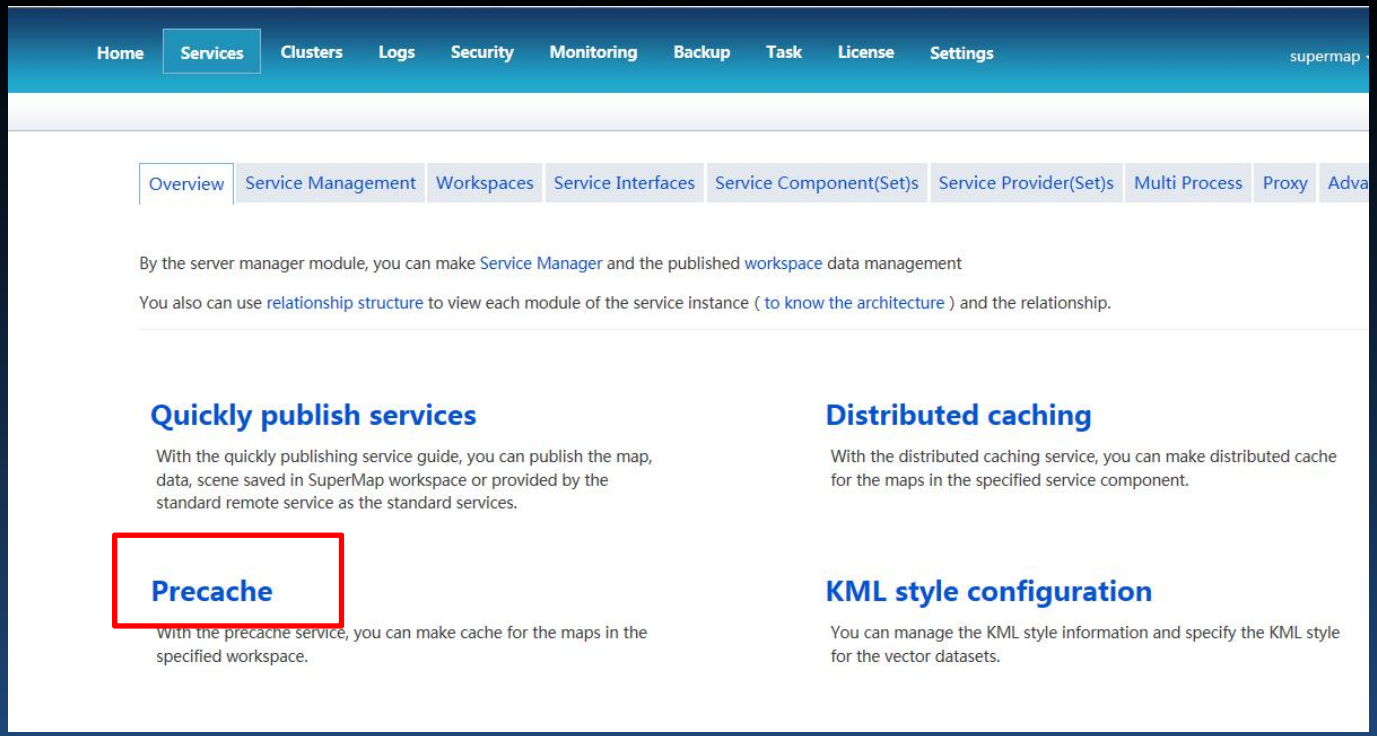
Set pic parameter

Choose storage type

No need to encrypt cache when generating compact map cache.

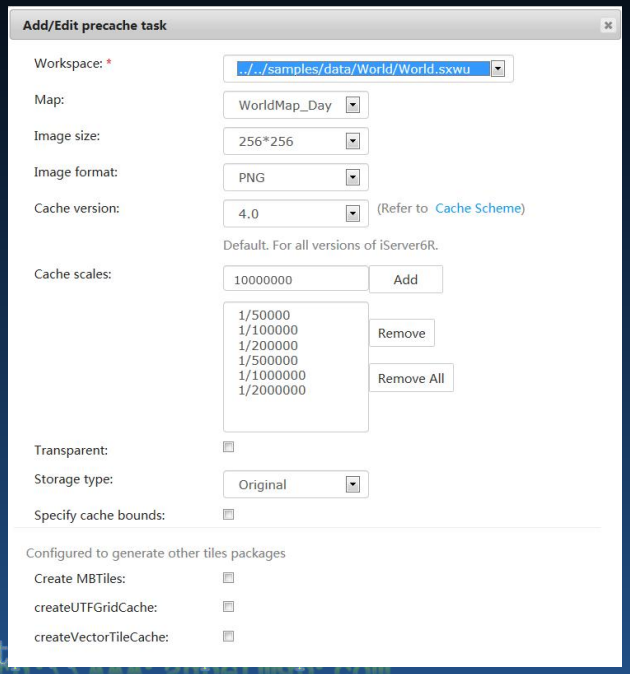
Create Pre-cache

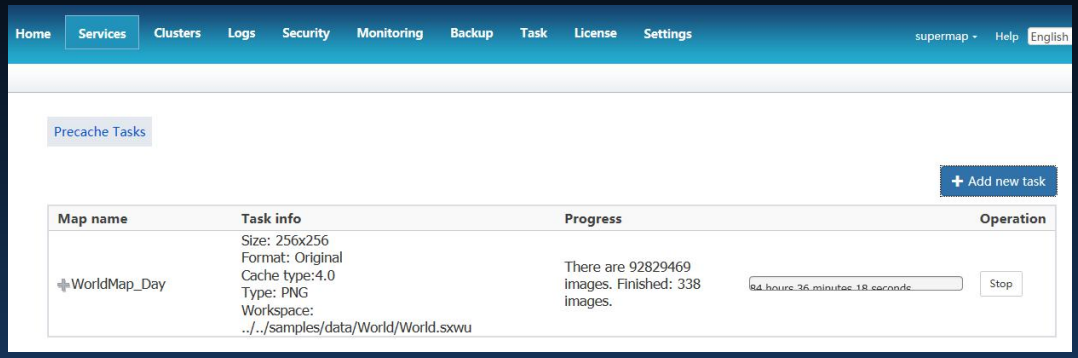
- Create cache in iServer pre-cache server.
- Also can create MBTiles cache
- Method: service management tool->service->overview->pre-cache



Create Pre-cache

- Create cache in iServer pre-cache server.
  - SuperMap iServer takes a process of map pre-cache generation as a task.
  - Multiple pre-cache tasks can run simultaneously in a pre-cache task list, however, only one task can take place in the tasks under the same map.





Pre-cache service supports adding scale, but please pay attention that all the pictures will be re-produced after editting

SuperMap

Create Map Cache

- Create cache in iServer pre-cache server
  - For tile cache
    - Cache will automatically be stored in [installation flolder]\webapps\iserver\output\cache
  - For MBTiles cache
    - Cache will automatically be stored in [installation folder]\webapps\iserver\output\sqlite中
  - Cache generated by iServer pre-cache server does not need to deploy the cache path.

Distributed Tiling Service

- SuperMap iServer raised distributed map tile creation and dispatching technology.

  — Through one TileMaster and multiple TileWorker to construct distributed map tiling system.

- Distributed tiling technology supports distributed tiling and distributed storage management of map tiles.

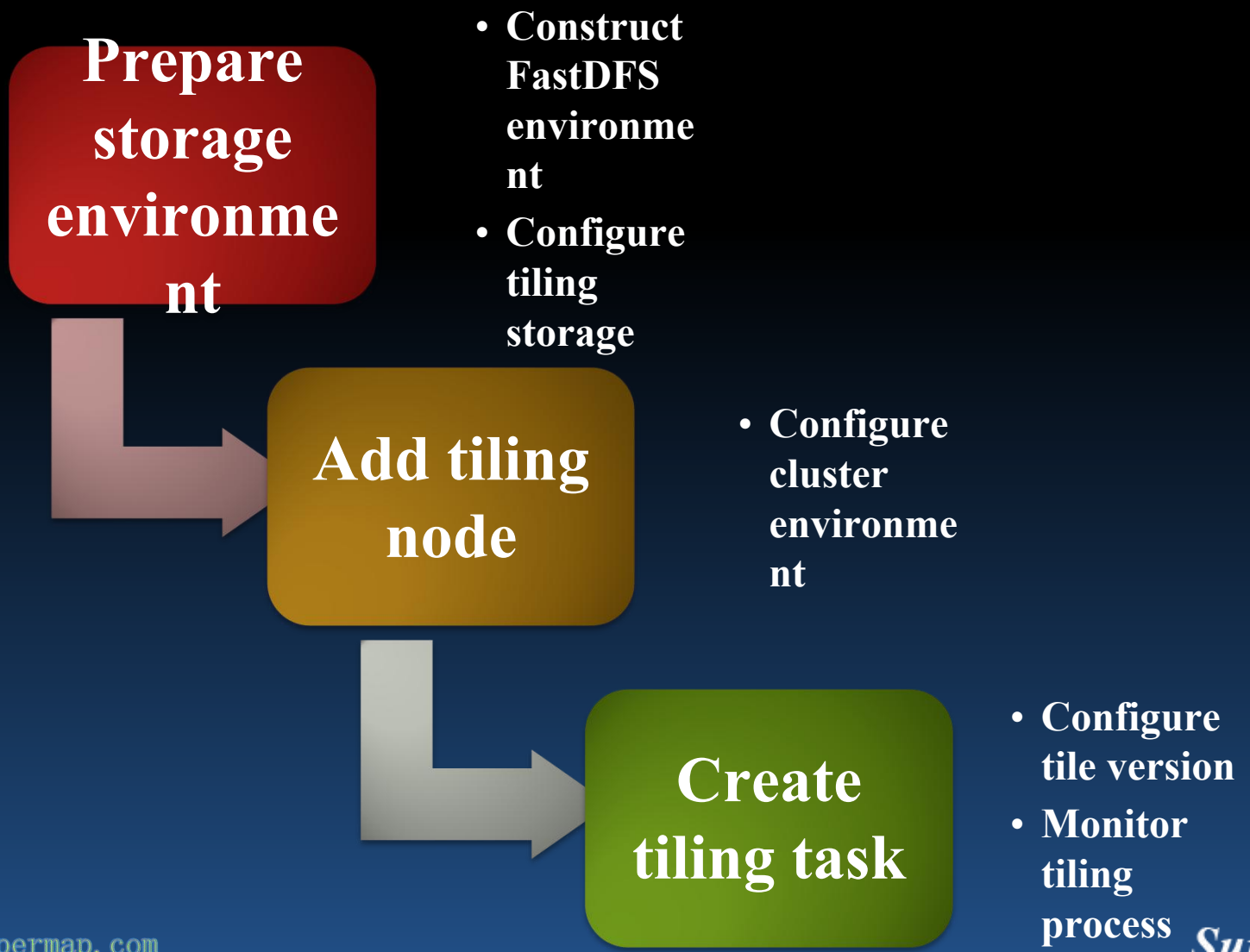
  —Supports multiple distributed file system, NAS and big data storage system (like FastDFS, MongoDB)

Create Distributed Tiling FastDFS

- Use iServer distributed tiling service to create FastDFS cache.
- iServer supports parallel tiling on multiple machines, can add multiple tiling nodes on different machines.
- Can effectively avoid the disadvantages of traditional cache tiling technology, like long response time, no malfunction disorder, etc.

Create Distributed Tiling FastDFS

- Steps



Prepare Storage Environment

- Construct FastDFS
  - Version requirements
    - FastDFS 4.00 or above
    - FastDHT 1.21 or above
    - Libevent 1.4.x or above, latest version stable is recommended.
    - Berkeley DB 5.3 or above
  - FastDFS supports UNIX systems like Linux, FreeBSD
  - FastDFS needs to collaborate with FastDHT, which is an effective Hash system based on key value pair, it can be used to store massive key value pair, like file name mapping sheet, session data, user related data, etc.
  - The installation of FastDHT depends on libevent and oracle Berkeley Db

Prepare Storage Environment

- Steps of installing FastDFS

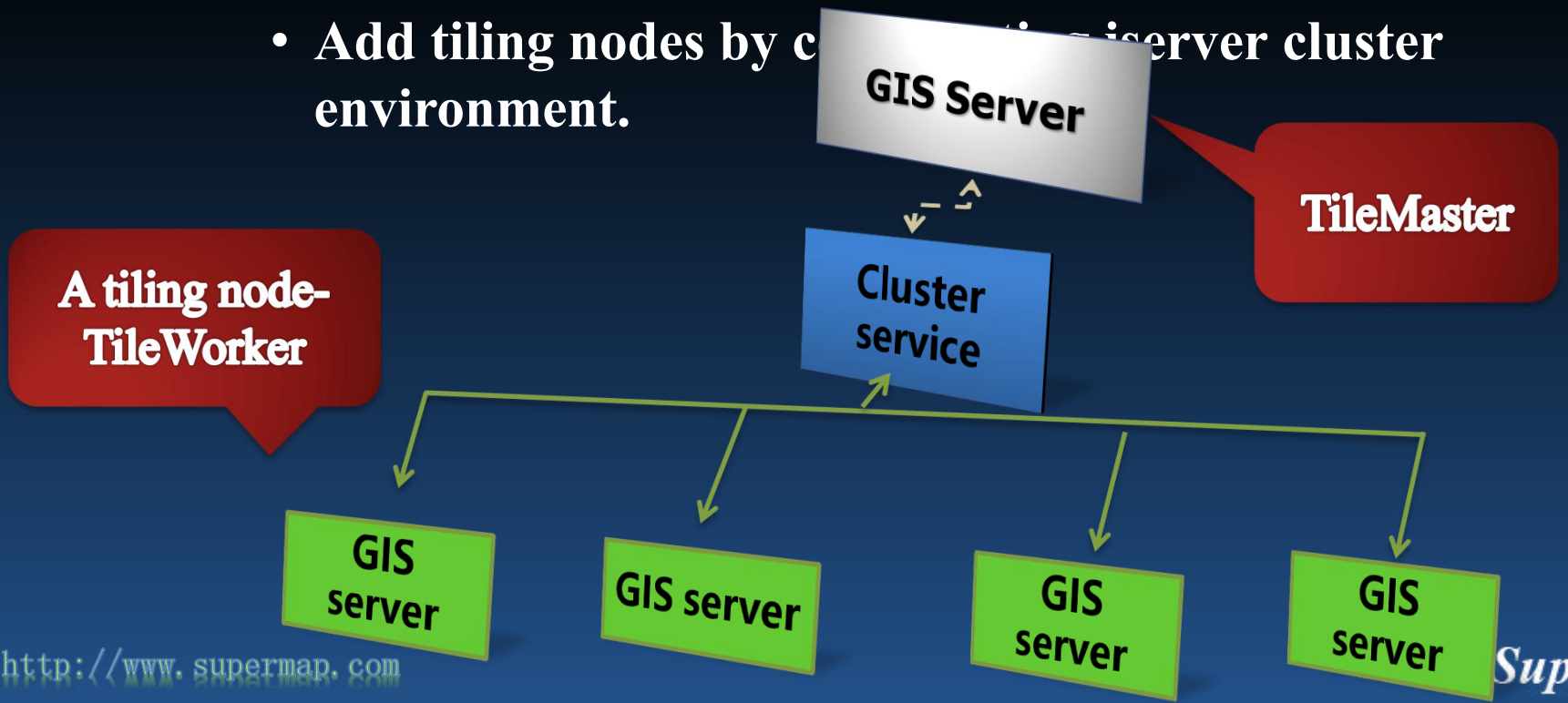
Refer the help document for more information

Add Tiling Nodes

- Terms
  - TileMaster: Create nodes of tiling tasks
    - Main function is to divide tiling tasks into mulltiple unit task according to scale and geographic range, and dispatch, manage tiling units, assign to TileWorker
  - TileWorker: Add nodes which execute tiling task
    - TileWorker executes the tasks dispatched by TileMaster
- The relaiton between TileMaster and TileWorker is one to more.

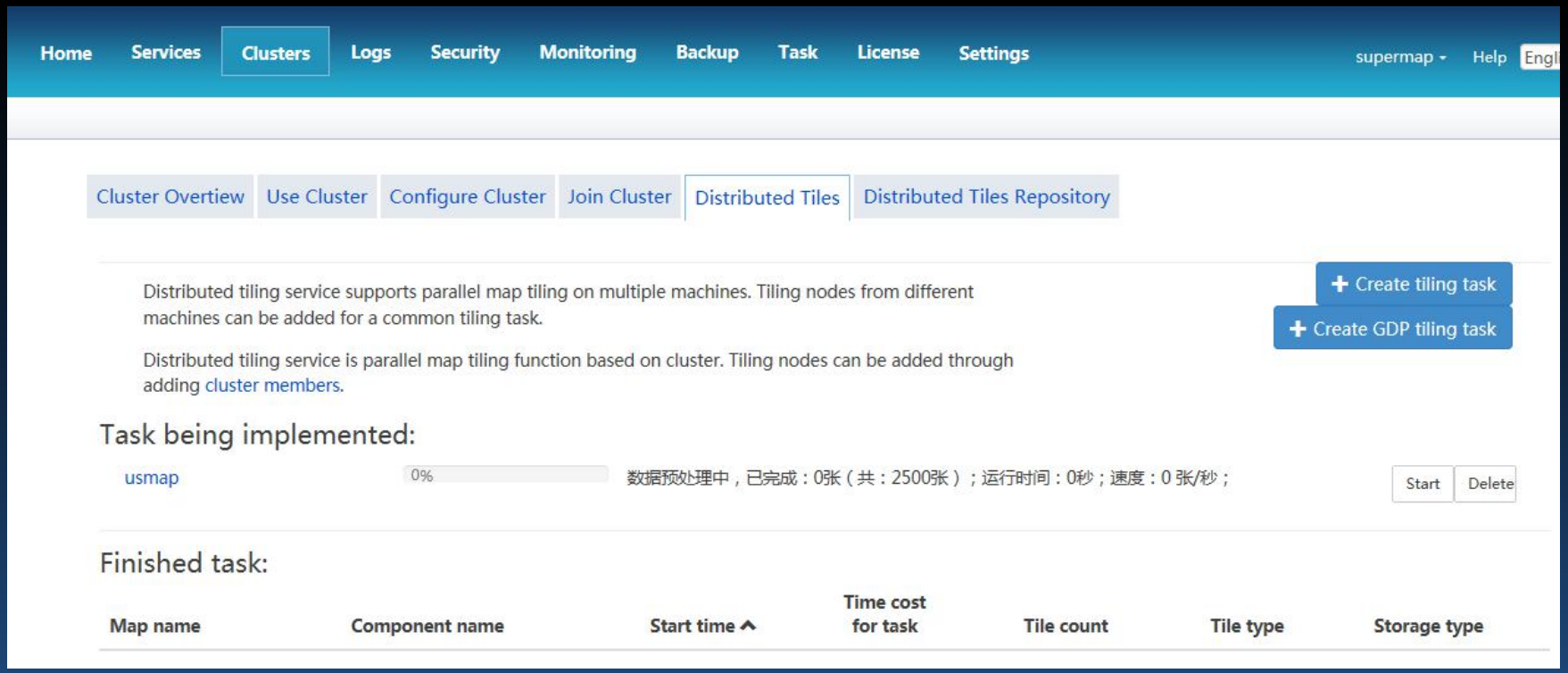
Add Tiling Nodes

- Tiling mode
  - Tiling on the single machine（TileMaster =TileWorker）
    - Default mode, no operation needed.
  - Parallel tiling on multiple machine
    - Add tiling nodes by c… …erver cluster environment.



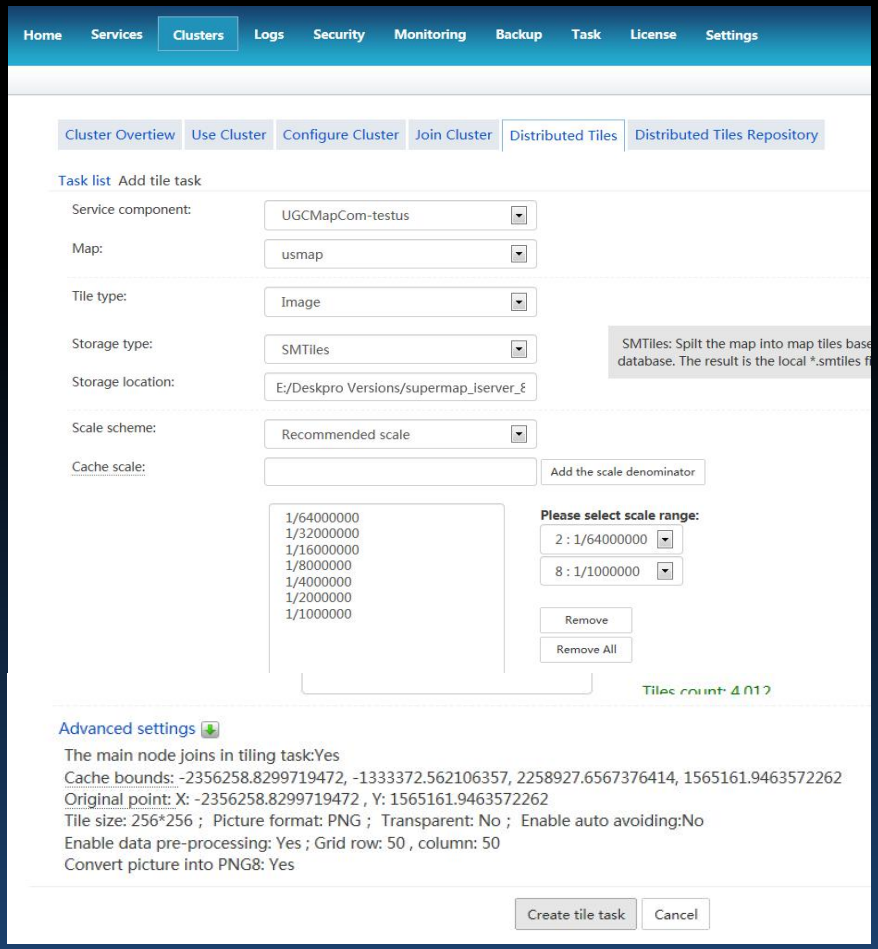
Add Tiling Tasks

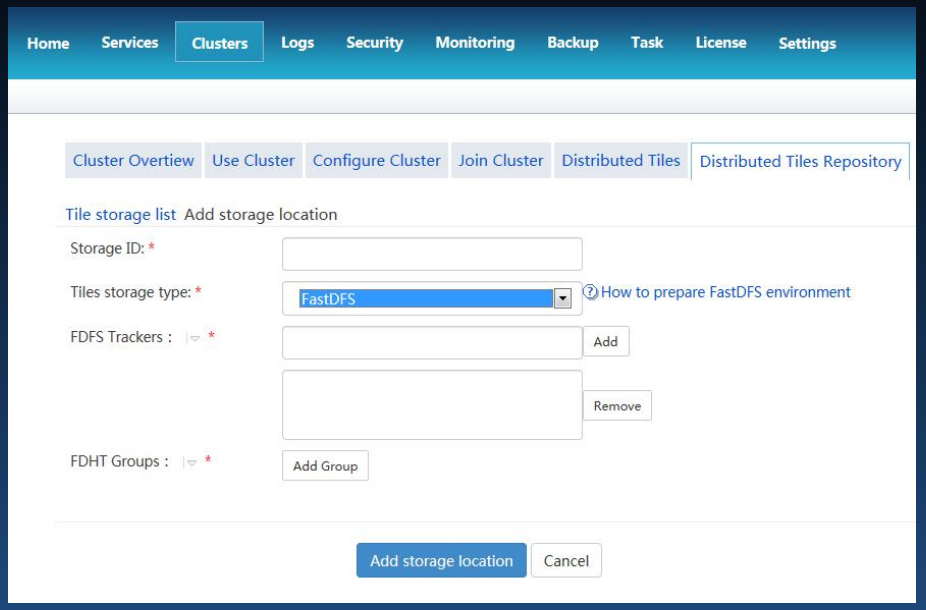
- View the added tiling nodes information in TileMaster
  - TileMaster management tool->Home>>Distributed tiles



Add Tiling Tasks

- **Add tiling tasks in distributed tiling page of TileMaster**





Create Distributed Tiling MongoDB

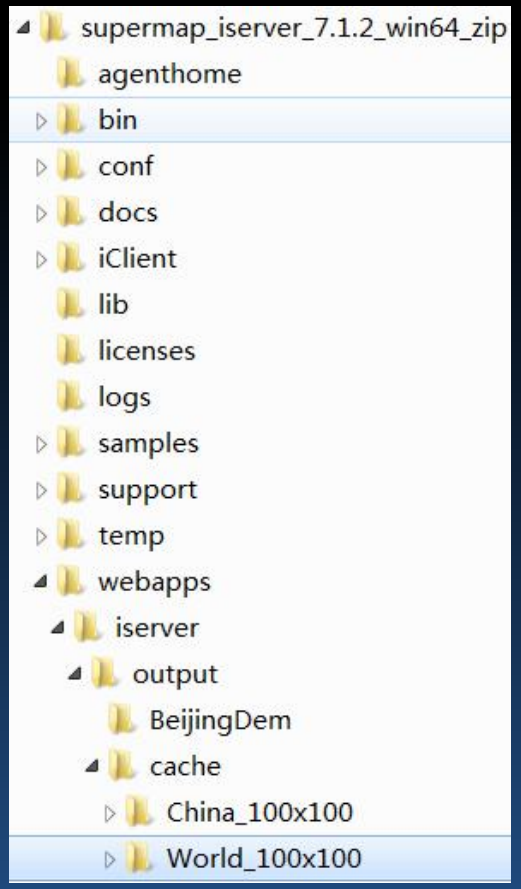
- MongDB can be used for map tile storage
- Same steps as FastDFS
- Store different databases

Please refer to iServer help document

How to use cache

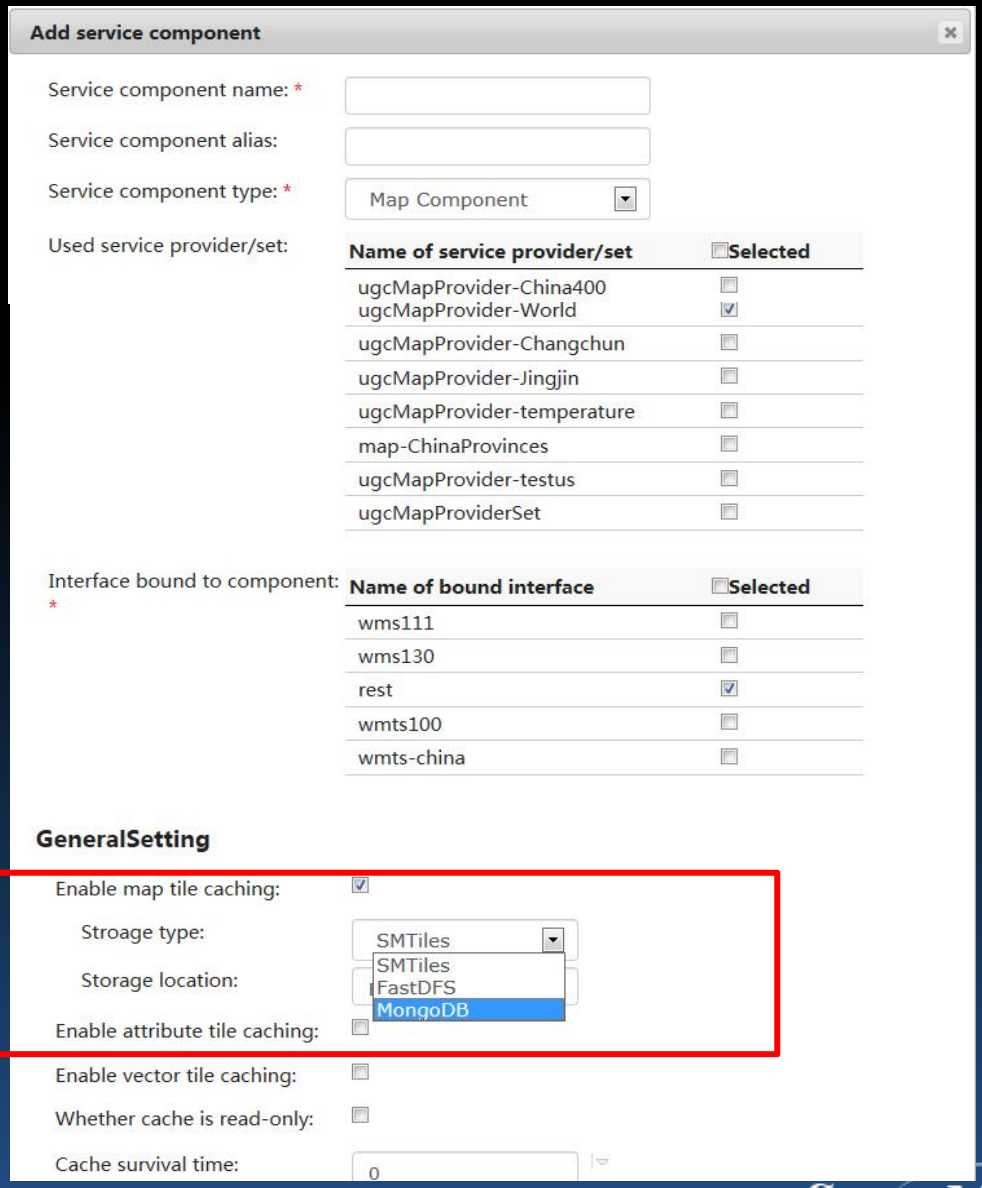
- Usage of static cache (pre-cache)
  - Copy pre-cache generated by SuperMap iDesktop (Original/compact) to [iServer installation folder]

\webapps\iserver\output\cache



How to use cache

- Service component cache configuration



How to use cache

- The client side controls if use cache

```
//创建图层对象
layerWorld = new SuperMap.Layer.TiledDynamicRESTLayer("World", url, {
transparent: true, cacheEnabled: true }, { maxResolution: "auto",scales:[1/
5000000,1/2500000,1/500000,1/250000] });
```


SuperMap

Notice

- When to use cache?
  - Massive data, especially with image data
  - Data with low update frequency.
- Choose suitable scale
  - Set more scale levels to have a smoother displaying when viewing
  - Consider if the elements need to be displayed in different scales

Notice

- Cache path setting
  - %SuperMap iServer _HOME%\webapps\iserver\output\cache
  - When using SuperMap iDesktop to generate cache, can directly use the path mentioned above.
- Map creation
  - Consider Anti-Aliasing on line or text type
  - Filter small objects
  - For complicated map, avoid too many objects, consider resampling.

Notice

- Keep the same workspace
  - The parameters may influence include map style, data connection status, layer order, default scale. map range, etc.
  - Cannot have the connection layer without datasource or dataset.
  - When editing objects in dataset, like adding, deleting, updating, etc., doesn't influence the cache picture outside the editing area.
- Set map cache range and index range
  - It is recommended setting index range as the same as extent map range of published map, being consistent with search index of SuperMap iServer.

Notice

- Cached pictures and output devices
  - Different devices have different resolutions, so the cache on different devices may not work together, like map joining.
  - Configure map cache and device resolution as irrelevant
    - Change CustomDPIEnable attribute in SuperMap.xml file under bin folder, SuperMap iDesktop installation folder, as true.
    - Change the corresponding CustomDPIEnable attribute, in SuperMap.xml file under bin folder in SuperMap iServer installation folder\support\objectsjava as true。
    - Keep CustomDPIX and CustomDPIY in SuperMap.xml as the same value.

Notice

- Compact cache password setting
  - SuperMap iServer does not support setting password for compact cache, therefore, setting password when using SuperMap iDesktop to generate compact cache is not recommended.

Notice

- The scale in iDeskptop and in iClient have to be the same.
- The main versions of iDesktop and iServer have to the same
- If there are codes that set background transparency attributeon iClient (like the parameter transparent= true in TiledDynamicRESTLayer), then the cache images need to be stored in iServer installation folder\webapps\iserver\output\cache_t
- When tiling, first tile 3-4 level of scale, test its effect and then execute the tasks.
- In the optimization function, tiling cache after the styles of data and map are fixed is recommended.

Thank You!

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