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Introduction

What is WebSphere DynaCache?

IBM provides an embedded cache called Dynamic Cache (DynaCache) as a feature of their WebSphere Application Server. By utilizing a caching-strategy applications can bypass the latency-costs of processing web services, business logic, data access, network & IO overhead, etc. DynaCache is the underlying caching strategy for many of the WebSphere-based family of products such as:

- WebSphere Commerce Server
- WebSphere Portal Server
- WebSphere Enterprise Service Bus
- Business Process Manager
- WebSphere Application Server

WebSphere allows administrators to enable a service called Dynamic Cache Service which intercepts calls to cacheable objects within the underlying WebSphere Application Server. DynaCache uses WebSphere's Distributed Replication Service (DRS) in order to keep data synchronous across application servers in a clustered environment. DynaCache provides a feature called cache instance which comes in two flavors: servlet cache instance and object cache instance. The servlet cache instance stores artifacts such as SOAP request/responses, JSP(s), Struts, etc. The object cache instance stores POJO(s) which are used within applications and web containers. Artifacts are stored in the application server cache instances based on a LRU (Least-Recently-Used) policy.

How does GigaSpaces enhance DynaCache?

WebSphere allows administrators to configure the Dynamic Cache Service to use GigaSpace's XAP IMDG as its alternative Cache Provider instead of the default DynaCache. GigaSpaces XAP enhances WebSphere's caching strategy by providing:

- Elastic Scalability
- High availability
- Transactional Support
- Event Processing
- Persistency
- Filtering
- Big Data Integration
- Security
- Enhanced Monitoring Capabilities
- Distributed and Centralized System of Record
- HTTP Session Sharing (across various Web Containers)
- Replication across multiple Data Centers
- Other XAP Features...

GigaSpace's XAP features increase the capabilities of WebSphere's DynaCache beyond the limitations of the default dynamic cache engine and data replication service. While DynaCache can only provide caching across replicated and synchronized WebSphere application servers, GigaSpaces XAP provides a truly distributed and remote caching architecture. WebSphere administrators no longer need to worry about data loss due to cluster failures, redeployments and upgrades. Additionally, scaling the Data Cache Tier will no longer be a function of adding additional WebSphere Application Server instances.

GigaSpace's XAP environment is distributed across multiple 64-bit JVMs providing a cluster of shared memory which can add up to multiple terabytes (GigaSpaces-SDD Integration can have Data Grids larger than 100 terabytes). Since DynaCache's default caching provider runs as an embedded cache, its memory is limited to the cluster of WebSphere Application Servers. Furthermore, it does not provide an alternative to managing a large application server heap other than deploying the WebSphere Application Servers as 64-bit JVM(s).

Use cases

If you are currently using DynaCache, you can simply use the administrative console or wsadmin commands to replace WebSphere's default cache provider with GigaSpace's XAP. You do not have to make any changes to the code interacting with the default dynamic cache or caching data model. In the **How to Configure Demo Guide** we will show how to switch to GigaSpace's XAP IMDG in just a few configuration changes.

In-Line Cache

With this mechanism, the IMDG is the system of record. The database data is loaded into the IMDG when it is started. The IMDG is responsible for loading the data and pushing updates back into the database. The database can be updated in synchronously or asynchronously.

- When running in all-in-cache <u>cache policy mode</u>, all data is loaded from the database into the cache once it is started.
- When running in LRU <u>cache policy</u> mode, a subset of the data is loaded from the database into the cache when it is started. Data is evicted from the cache based on available memory or a maximum amount of cache objects. Once there is a cache miss, the cache looks for the data within the underlying data-source. If matching data is found, it is loaded into the cache and delivered to the application.



HTTP Session Sharing

It's becoming increasingly important for organizations to share HTTP session data across multiple data centers, multiple web server instances or different types of web servers. Here are a few scenarios where HTTP session sharing is required:

- **Multiple different Web Servers running your Web Application** You may be porting your application from one web server to another and there will be a period of time when both types of servers need to be active in production.
- Web Application is broken into multiple modules When applications are modularized such that different functionalities are deployed across multiple server instances. For example, you may have login, basic info, check-in and shopping functionalities split into separate modules and deployed individually across different servers for manageability or scalability. In order for the user to be presented with a single, seamless, and transparent application, session data needs to be shared between all the servers.
- Reduce Web application memory footprint The web application storing all sessions within the web application process heap is consuming large amounts of memory. Having the session stored within a remote process will reduce web application utilization avoiding garbage collocation and long pauses.
- Multiple Data-Center deployment You may need to deploy your application across multiple data centers for high-availability, scalability or flexibility, so session data will need to be replicated.

The following diagram depicts a common use case where there are multiple data centers connected across the WAN, and each is running a different type of web server.



WebSphere Commerce Server Performance

The WebSphere Commerce Server is an IBM e-commerce framework that is widely used in retail environments of many sizes. The WebSphere Commerce Server contains the components for the various B2B and B2C functionalities needed in a retail environment.

WebSphere Commerce Server applications heavily leverage DynaCache to reduce database roundtrips and thus gain improved performance in terms of latency. WebSphere Commerce uses DynaCache to store entire JSP(s), page fragments, and commands. While DynaCache stores portions of its data in the available heap space of the clustered WebSphere Commerce Servers, the remaining overflow of data persists to disk. By using GigaSpace's XAP as an alternative caching provider, the WebSphere Commerce Server applications are not captive to the limited shared-memory of the server cluster nor will they pay the penalty of overflowing their data to disk.

E-Commerce web sites aspiring to manage high volumes of traffic might find that the default caching provider of the WebSphere Commerce Server will not scale to meet SLA requirements. With only a few simple configurations changes this bottleneck can be removed by using GigaSpace's XAP as the alternative caching provider.

Demo: Step-By-Step Walkthrough

Requirements

The following technology is required to run this demo

An Application Server from the WebSphere Family

- WebSphere Application Server 7+
- WebSphere Enterprise Service Bus
- IBM Integration Bus
- IBM WebSphere Process Server

An IBM IDE

- Ration Application Developer
- IBM Integration Designer

GigaSpaces Software

- GigaSpaces XAP Premium Edition 9+
- GigaSpacesDynaCacheIntegration.jar
- GigaDynaCacheTestWeb.war

Create New Dynamic Cache Resource

e <body> B Publishing to WebSphere ESB Server at localhost</body>	
<h3;< th=""><th></th></h3;<>	
Operation in progress	
Launching delegate	
Always run in background	
Run in Background Cancel Details >>	
Curringat type- text size- 5 name- personia ////tur	
input type="text" size="20" name="personName" />	
Design Source Split Preview	
🔝 Markers 回 Properties 👭 Servers 🙁 🙀 Data Source Explorer 🔚 Snippets 👸 Server Logs 🖳 Console	
🔀 WebSphere ESB Server at localhost [Starting, Synchronized]	
WebSphere ESB Server at localhost	
WebSphere ESB Server - 0 modules	
Press 'F6' for Focus.	

Start your Websphere Application Server

Open the Administrative Console

			Publish	CIII+AII+P			
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🔛 Web	Sphere ESB Server at localhost [Starte	0	Create Tables and Data Sources		Г		
		-	Reconnect Debug Process		Ŀ		
		23	View and Publish Changes to Server		Ŀ		
			Manage Server Profiles		L.		
			Administration	+	Ę.	Run Administrative Console	
			Universal Test Client	+		WebSphere Administration Command Assist	
			Server Configuration	+		Run Administrative Script	
			Launch	+	Г		_
			Add and Remove Integration Solution Projects	+			

Login to the administrative cosole

WebSphere, software	
	WebSphere Integrated Solutions Console User ID: admin Password: •••••• Log in
License Rights register many ji tradem availab	d Materials - Property of IBM (c) Copyright IBM Corp. 1997, 2011 All Reserved. IBM, the IBM logo, ibm.com and WebSphere are trademarks or ed trademarks of International Business Machines Corp., registered in urisdictions worldwide. Other product and service names might be arks of IBM or other companies. A current list of IBM trademarks is e on the Web at <u>Copyright and trademark information</u> .

Expand "Resources" -> "Cache instances" and Click on "Object cache instances"

WebSphere. software		
View: All tasks	Welcome	
 Welcome 	Welcome	
Guided Activities		
± Servers	Integrated Solutions Console provides a common administra	ative console for multiple products. Th
Applications	table lists the product suites that can be administered throug view more information.	gh this installation. Select a product su
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- Pasaureas	Suite Name	Version
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Object pool managers	WebSphere Enterprise Service Bus	8.0.1.0
IMS		
WebSphere Business Integration Adapters		
± JDBC		
Resource Adapters		
🗄 Asynchronous beans		
Cache instances		
 Object cache instances 		
Servlet cache instances		
± Mail		
Remote artifacts		
■ URL		
Resource Environment		
Security		

2 _

Choose the "Node" scope from the drop-down list

Object	cache instances				
An object cache instance is a location, in addition to the default shared dynamic cache, where Java(TM) Platform, Enterprise Edition (Java EE) applications can store, distribute, and share data. This gives applications greater flexibility and better tuning of the cache resources. Use the DistributedObjectCache programming interface to access this cache instance. See the DistributedObjectCache API documentation in the WebSphere (R) Application server API documentation for more information.					
🖃 Sco	pe: =All scopes				
Scope specifies the level at which the resource definition is visible. For detailed information on what scope is and how it works, see the scope settings help. All scopes All scopes Preferen Cell=GIGASPACESNode03Cell Node=GIGASPACESNode03 New Node=GIGASPACESNode03, Server=server1					
Select	Name 🛟	JNDI name 🗘	Scope 🗘	Cache size 🗘	
You c	an administer the following r	esources:			
	Lotus Mashups Catalog Object Cache	services/cache/catalog/mashupInstance	Node=GIGASPACESNode03,Server=server1	2000	
	Lotus Mashups Navigation Object Cache	services/cache/navigation/mashupInstance	Node=GIGASPACESNode03,Server=server1	2000	
	Lotus Mashups User Object Cache	services/cache/user/mashupInstance	Node=GIGASPACESNode03,Server=server1	2000	
Total	Total 3				

Click the "New" button

roject cache instances				
Object cache instances An object cache instance is a location, in addition to the default shared dynamic cache, where Java(TM) Platform, Enterprise Edition (Java EE) applications can store, distribute, and share data. This gives applications greater flexibility and better tuning of the cache resources. Use the DistributedObjectCache programming interface to access this cache instance. See the DistributedObjectCache API documentation in the WebSphere (R) Application Server API documentation for more information.				
Scope: Cell=GIGASPACESNode03Cell. Node=GIGASPACESNode03				
Scope specifies the level at which the resource definition is visible. For detailed information on what scope is and how it works, see the scope settings help. Node=GIGASPACESNode03 Preferences New Delete				
Select Name JNDI name Scope Cache size				
None				
Total 0				

Enter the name and JNDI specified below. Then click "OK" and "Save"

Application Server API documentation for more information.	re instance. See the DistributedObjectCache API documentation in the WebSpi
Infiguration	
General Properties	The additional properties will not be available until the general properties f this item are applied or saved.
* Scope	Additional Properties
* Name	Custom properties
Demo Cache Instance	
* JNDI name	
cache/demo	
Category	
* Cache provider Default dynamic cache 🔽	
* Cache size	
* Default priority	
* Default priority 1	
* Default priority 1	

An object cache instance is a location, in addition to the default shared dynamic cache, where Java(TM) Platform, Enterprise Edition (Java EE) applications can store, distribute, and share data. This gives applications greater flexibility and better tuning of the cache resources. Use the DistributedObjectCache programming interface to access this cache instance. See the DistributedObjectCache API documentation in the WebSph (R) Application Server API documentation for more information.	here
Scope: Cell=GIGASPACESNode03Cell, Node=GIGASPACESNode03	

	Scope:	Cell=GIGASPACESNode03Ce	II, Node=GIGASPACESNode03
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New Delete				
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Click on "Custom properties"

iect cache instances > Demo Cache Instance		
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cache/demo		
Description		
Category		
* Cache provider		
Default dynamic cache 💌		
* Cache size		
2000		
* Default priority		
1		

Add new property "com.ibm.ws.cache.CacheConfig.showObjectContents=true"

bject cache instances ? -						
Object cache instances > Demo Cache Instance > Custom properties Use this page to specify custom properties that your enterprise information system (EIS) requires for the resource providers and resource factories that you configure. For example, most database vendors require additional custom properties for data sources that access the database.						
New Delete						
Select Name 🛟	Value 🗘	Description 🗘	Required 🗘			
You can administer the following resources:						
com.ibm.ws.cache.CacheConfig.showObjectContents	true		false			
Total 1						

View: All tasks			cell=GIGASPACESNode03Cell, Profile=ESB03			
= Welcome			Dbject cache instances			
± Guided Activities						
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Services		-			Value 🗘	Description 🗘
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Schedulers		Paste	Ctrl+V	jectContents	true	
 Object pool managers 	×	Delete	Delete			
± JMS		Rename	F2			
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Resource Adapters	N	Restart	Ctrl+Alt+R			
	_0=	Restart in Profile				
Cache instances		Cton	Chall Althe S			
Object cache instances		stop	Ctrl+Alt+S			
Servlet cache instances		Publish	Ctrl+Alt+P			
+ Mail		Clean				

Restart WebSphere application server

Run Demo with Dynamic Cache as WebSphere Caching Provider

Deploy Dynamic Cache Monitor

Expand "Applications" -> "Application Types" and Click on "Websphere enterprise applications". On the "Enterprise Applications" screen, click the "Install" button

WebSphere. software			Welcome admin	Help			
View: All tasks	Cell=GIGA	SPACESNode03Cell, Profile=E5B03					
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Guided Activities							
± Servers	Encerprise Applications						
Applications	Preferences						
 New Application Application Types WebSphere enterprise applications 	Star	Stop Install Uninstall Update Rollout Update	Remove File Export Export DDL	Export File			
 Business-level applications Assets SCA modules 	Select Name 🗘		Application Status 👲				
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± Services		BPMAdministrationWidgets GIGASPACESNode03 server1	₽				
± Resources		BSpaceEAR GIGASPACESNode03 server1	€				
± Security		BSpaceHelp GIGASPACESNode03 server1	♦				
Environment		DefaultApplication	€				
Integration Applications		IBMUTC	⇒				
System administration		J2EESecureChannel	€				
Monitoring and Tuning		PageBuilder2 GIGASPACESNode03 server1	•				
Troubleshooting		REST Services Gateway	•				
Service integration		RemoteAL61	•				
+ UDDI		TestController70	€				
		ivtApp	⇒				

Browse into your Websphere installation /AppServer/installableApps, Click on CacheMonitor.ear

	Dre	paring for the application installation			2 -	н
terprise appli l applications	ications	Specify the EAR, WAR, JAR, or SAR mo Path to the new application © Local file system Full path Compatibility of the system Full path	vse Browse			
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	Documents	CacheMonitor.ear	2/26/2014 11:04 PM	EAR File	531 KB	-
	Pictures	DefaultApplication.ear	2/26/2014 11:04 PM	EAR File	390 KB	

Download IBM Extended Cache Monitor from IBM's offical site. Extract the contents of cachemonitor7_package into any temp directory or onto your desktop



licenses

cachemoni...

cachemonito r7_update

In your admin console, click the checkbox near "Dynamic Cache Monitor" and Click "Update"

Enterpris	nterprise Applications ? -					
Enterprise Applications Use this page to manage installed applications. A single application can be deployed onto multiple servers. Preferences						
Star	Start Stop Install Uninstall Update Rollout Update Remove File Export DDL Export File					
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	BSpaceEAR GIGASPACESNode03 server1	⇒				
	BSpaceHelp_GIGASPACESNode03_server1	\$				
	DefaultApplication	⇒				
~	Dynamic Cache Monitor	8				
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Choose "Replace, add, or delete multiple files" and browse for "cachemonitor7_update.zip"

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Local file system Full path C:\Users\LENOVO USER\[Browse	
Full path C:\Users\LENOVO USER\[Browse	
C:\Users\LENOVO USER\E Browse	
Remote file system	
Full path	
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	rowse

Click OK and Save.

Updating Application	= ?
The following components will be updated. During application update, the contents of a partial application are merged wi application EAR file. The contents of the files are not merged with the corresponding file in the application EAR file.	th the deployed
cachemonitor7_update.zip	
OK Cancel	

Setup Dynamic Cache Monitor Security

In the "Enterprise Applications" screen, click on the link named "Dynamic Cache Monitor"

nterprise Applications	? -						
 Messages Application Dynamic Cache Monitor on server server1 and node GIGASPACESNode03 stopped successfully. The collection may need to be refreshed to show the current status. 							
Enterprise Applications							
Use this page to manage installed applications. A single application can be deployed onto multiple servers.							
Start Stop Install Update Rollout Update Remove File Export Export DDL Export File							
Select Name 🛟	Application Status 👲_						
You can administer the following resources:							
BPMAdministrationWidgets GIGASPACESNode03 server1	€>						
BSpaceEAR_GIGASPACESNode03_server1	\$						
BSpaceHelp_GIGASPACESNode03_server1	₽						
DefaultApplication	♦						
Dynamic Cache Monitor	*						

Click on the link named "Security role to user/group mapping"

interprise Applications Interprise Applications > Dynamic Cache Monitor Ise this page to configure an enterprise application. he application or its modules. Configuration	Click the links to access pages for further configuring o
General Properties * Name Dynamic Cache Monitor Application reference validation	 Modules Manage Modules Display module build Ids
Issue warnings Detail Properties Target specific application status Startup behavior Application binaries	Web Module Properties Session management Context Root For Web Modules JSP and JSF options Virtual hosts
 Class loading and update detection Request dispatcher properties Security role to user/group mapping JASPI provider Custom properties View Deployment Descriptor 	Enterprise Java Bean Properties Default messaging provider references Client Module Properties Client module deployment mode Database Profiles
 Last participant support extension <u>References</u> <u>Shared library references</u> <u>Shared library relationships</u> 	SQLJ profiles and pureQuery bind files

Check the radio button near administrator and click on "Map Users..."

nterprise .	Applications			?	L		
Enterprise Applications > Dynamic Cache Monitor > Security role to user/group mapping							
Security	Security role to user/group mapping						
Each role that is defined in the application or module must map to a user or group from the domain user registry. accessIds: The accessIds are required only when using cross realm communication in a multi domain scenario. For all other scenarios the accessId will be determined during the application start based on the user or group name. The accessIds represent the user and group information that is used for Java Platform, Enterprise Edition authorization when using the WebSphere default authorization engine. The format for the accessIds is user:realm/uniqueUserID, group:realm/uniqueGroupID. Entering wrong information in these fields will cause authorization to fail. AllAuthenticatedInTrustedRealms: This indicates that any valid user in the trusted realms be given the access. AllAuthenticated: This indicates that any valid user in the current realm be given the access.							
	<u></u>						
Select	Role	Special subjects	Mapped users	Mapped groups			
~	administrator	None					
OK Cancel							

Click Search. Find your User ID in the Available List, click on it and then click on the Right arrow

Enterprise Applications		? =
Enterprise Applications > Dyn Use this page to search for use	amic Cache Monitor > Security role (ers or groups and add them to the s	to user/group mapping > Map users/groups selected roles.
 administrator 		
Search and Select Users		
Decide how many results to dis the Available list and add them	play, enter a search string (use * font to the Selected list.	or wildcard), and click Search. Select users in
Display a maximum of 20	results	
Search string *]	
Search		
Available:		Selected: admin

Your User ID should be visible in the "Mapped users" Column. Click OK and Save

Enterprise	Applications			? =			
Enterprise Applications > Dynamic Cache Monitor > Security role to user/group mapping							
Security role to user/group mapping							
Each role that is defined in the application or module must map to a user or group from the domain user registry. accessIds: The accessIds are required only when using cross realm communication in a multi domain scenario. For all other scenarios the accessId will be determined during the application start based on the user or group name. The accessIds represent the user and group information that is used for Java Platform, Enterprise Edition authorization when using the WebSphere default authorization engine. The format for the accessIds is user:realm/uniqueUserID, group:realm/uniqueGroupID. Entering wrong information in these fields will cause authorization to fail. AllAuthenticatedInTrustedRealms: This indicates that any valid user in the trusted realms be given the access. AllAuthenticated: This indicates that any valid user in the current realm be given the access.							
Select	Pole	Spacial subjects	Mapped users	Manned groups			
	administrator	None	admin	mapped groups			
OK Can	OK Cancel						

Click the checkbox near "Dynamic Cache Monitor" and click the "Start" button

Enterpris	e Applications	? _					
Enterp Use th	Enterprise Applications Use this page to manage installed applications. A single application can be deployed onto multiple servers.						
E Pret	ferences						
Start	t Stop Install Uninstall Update Rollout Update	Remove File Export DDL Export File					
D							
Select	Name 🗘	Application Status 👲_					
You c	an administer the following resources:						
	BPMAdministrationWidgets GIGASPACESNode03 server1	⇒					
	BSpaceEAR GIGASPACESNode03 server1	⇒					
	BSpaceHelp GIGASPACESNode03 server1	\$					
	DefaultApplication	\$					
~	Dynamic Cache Monitor	8					
	GigaDynaCacheTestWeb war	⇒					
	IBMUTC	⇒					

Open an Internet Browser and go to <u>http://localhost:9082/cachemonitor</u> Enter your User ID and Password then Click OK.



Find the Object Cache you created earlier "cache/demo" and Click OK.



Check the Cache Statistics Page. Confirm that the cache has 0 "Used Entries"

WebSphere. Application Server Cache Monitor		
Cache instance Refresh Instances		
cache/demo	▼ OK	
Cache Statistics Edge Statistics	Cache Statistics Refresh Statistics Reset Statistics Clear Cache	
Cache Contents	Statistic	Value
Cache Contents: PushPull Table	Cache Size	2000
Dependency IDs	Used Entries	٥
Disk Offload	Cache Hits	0
Cache Policies	Cache Misses LRU Evictions	0 0
MBean Statistics	Explicit Removals	0
Compare Cache Contents	Default Priority	1
	Servlet Caching Enabled	Yes
	Disk Offload Enabled	No

Deploy Demo Application

Expand "Applications" -> "Application Types" and Click on "Websphere enterprise applications". On the "Enterprise Applications" screen, click the "Install" button

WebSphere. software		Welcome admin Help Logou				
View: All tasks	Cell=GIGASPACESNode03Cell, Profile=ESB03					
= Welcome	Enterprise Applications	? _				
Guided Activities	R Massager					
Servers	Application Dynamic Cache Monitor on server serve	er1 and node GIGASPACESNode03 started				
Applications	successfully. The collection may need to be refreshed to show the current status.					
New Application						
Application Types	Enterprise Applications					
WebSphere enterprise applications	Use this page to manage installed applications. A single application can b	e deployed onto multiple servers.				
= Assets	Preferences					
= SCA modules	Start Stop Install Uninstall Update Rollout Update R	Remove File Export Export DDL Export File				
Global deployment settings						
± Services						
± Resources	Select Name 🗘 Ap	pplication Status 👲_				
± Security	You can administer the following resources:					
± Environment	BPMAdministrationWidgets GIGASPACESNode03 server1	•				
± Integration Applications	BSpaceEAR_GIGASPACESNode03_server1	•				
System administration	BSpaceHelp_GIGASPACESNode03_server1	•				
± Users and Groups	DefaultApplication	•				
Monitoring and Tuning						
± Troubleshooting	Dynamic Cache Monitor					

Browse for the "GigaDynaCacheTestWeb.war" in your local directory and Click "Next". Continue to Click "Next" until the summary page. Then click "Finish" and "Save"

	? _	Help					
		Field help Local file sys	tem path				
		Page help					
		More informa	ation abo	ut			
Full path							
				57			
•	∳ Searc	h temp		م			
		0		_			
		8== 🔻		0			
Date modified	Туре	Size					
7/4/2014 12:05 AM	File folder						
7/4/2014 12:00 AIVI	FILC LL						
6/30/2014 10:47 PIVI	File tolder						
1 M C (2004 1 C 24 D1 4							
4/16/2014 6:31 PM	File folder						
4/16/2014 6:31 PM 2/24/2014 10:18 AM	File folder TXT File		1 KB				
4/16/2014 6:31 PM 2/24/2014 10:18 AM 7/3/2014 11:56 PM	File folder TXT File WAR File		1 KB 901 KB				
	Date modified 7/4/2014 12:06 AM 6/30/2014 10:47 PM	✓ 49 Searce ✓ 2011 ✓ 201 ✓ 2	V V	Help Field help Local file system path Page help More information abore his page ✓			

Choose the "GigaDynaCacheTestWeb" Application in the list and click on the "Start" button

Enterprise Applications	? =						
Enterprise Applications	Enterprise Applications						
Preferences							
Start Stop Install Uninstall Update Rollout Update	Remove File Export DDL Export File						
Select Name 🛟	Application Status 👲_						
You can administer the following resources:							
BPMAdministrationWidgets GIGASPACESNode03 server1	€						
BSpaceEAR_GIGASPACESNode03_server1	÷						
BSpaceHelp_GIGASPACESNode03_server1	\$						
DefaultApplication	\$						
Dynamic Cache Monitor	\$						
GiqaDynaCacheTestWeb	*						
	÷						

Test Demo Application using Dynamic Cache

Open an Internet Browser and go to

http://local	nttp://localhost:9082/GigaDynaCacheTestWeb/DynaCacheTestServlet							
(Iocalh	Carlhost:9082/GigaDynaCacheTestWeb/DynaCacheTestServlet							
🗳 GigaSpaces	🕓 GigaSpaces 🗍 WebEx 🎧 GitHub 🗏 QVC 🤹 Amazon Web Services							
Write Ope	eration							
Id	Name	AddressLinel	City	ZipCode				
Submit								
Read Oper	ration							
Person ID: Submit								
Id Name	AddressLinel C	City ZipCode						

Enter some data into the tabled textboxs under "Write Operation" and click "Submit"

Vrite	Operation			
Id	Name	AddressLinel	City	ZipCode
1	GigaSpaces	110 42nd Street	New York	10017

Confirm the data was written to the cache under "Read Operation" and clicking "Submit"

Write (Operation			
Id	Name	AddressLinel	City	ZipCode
Submit				
Read O	peration			
Person II Submit): 1			
Id	Name	AddressLinel	City	ZipCode
1	GigaSpaces	110	New	10017

Go back to the Cache Monitor Page and click "Refresh Statistics"

ache instance							
cache/demo V							
Cache Statistics	Cache Statistics Reset Statistics Clear Cache						
Cache Contents	Statistic	Value					
Cache Contents: PushPull Table	Cache Size	2000					
Dependency IDs	Used Entries	1					
Disk Offload	Cache Hits	0					
Casha Balirias	Cache Misses	0					

Click on the "Cache Contents" to see the contents of the Data you entered

Cache instance Refresh Instances cache/demo V OK				Enter regular expression to filter on cache Search	Ids. The default, .*, list	s all cache ids. 📑	
Cache Statistics Edua Statistics Cache Contents	Current Cache Contents Entries 1 through 1 of 1 < 0> Clear Cache						
Cache Contents: PushPull Table	Action	Cache ID	Timeout (seconds)	Dependency IDs	Replication	Priority	Size
Dependency IDs	Invalidate	1	none	none	None	1	-1
Disk Offload							

Run Demo with GigaSpaces' XAP as WebSphere Caching Provider

Add GigaSpaces Jars to IBM Extension Classloader

WebSphere. software				Welcome admin		
View: All tasks	Cell=GIGASPACESNode03Cell,	Profile=ESB03				
= Welcome	Application servers			? _		
Guided Activities	A					
Servers	Application servers					
 Server Types WebSphere application servers 	Use this page to view a list of the application servers in your environment and the status of each of these servers. You can also use this page to change the status of a specific application server.					
 WebSphere MQ servers Web servers 	******					
± Applications	Name 🛟	Node 🗘	Host Name 🗘	Version 🗘		
Services	You can administer the fe	ollowing resources:				
★ Resources	server1	GIGASPACESNode03	GIGASPACES	ND 8.0.0.5 WESB 8.0.1.0		
E Security	Total 1					

Under the Servers -> Server Types -> . Click on "Websphere application servers".

Click on "server1"

Application servers			? =		
Application servers					
Use this page to view a list of the application servers in your environment and the status of each of these servers. You can also use this page to change the status of a specific application server.					
Preferences					

Name 🛟	Node 🗘	Host Name 🗘	Version 🗘		
You can administer the fo	llowing resources:				
server1	GIGASPACESNode03	GIGASPACES	ND 8.0.0.5 WESB 8.0.1.0		
Total 1					

Scroll down to find the Server Infrastructure Section. Expand "Java and Process Management". Then click on "Process definition"

WebSphere. software	Welcome admin	Help
View: All tasks	= <u>Service Component</u> Architecture	
Welcome	Common Event	Help
± Guided Activities	Intrastructure	Field h
Servers	E Service Monitor	For fie
Server Types WebSphere application servers NV-15-1	= <u>WebSphere Business</u> Integration Adapter Service	select marke cursor
 WebSphere MQ servers Web servers 	Server Infrastructure	Page More i
Applications	□ Java and Process	this pa
± Services	Management	
± Resources	Class loader	
Security	Process execution	
Environment	Administration	
Integration Applications		
System administration	Communications	
± Users and Groups	E Ports	
Monitoring and Tuning		
Troubleshooting ■	Communications Enabled <u>Applications (CEA)</u>	
Service integration	Performance	
• UDDI	Performance Monitoring	

Click on "Java Virtual Machine"

pplication serve r s	
<u>Application servers</u> > <u>server1</u> > Process definition Use this page to configure a process definition. A process definition defines the command or initialize a process.	l line information necessary to sta
Configuration	
General Properties Executable name Executable arguments Start command	 Additional Properties Java Virtual Machine Environment Entries Process execution Process Logs Logging and tracing
Start command arguments	

Click on "Custom properties"

plication servers > <u>server1</u> > <u>Pr</u>	ocess definition > Java Virtual Machine	
e this page to configure advance	d Java(TM) virtual machine settings.	
onfiguration Runtime		
General Properties		Additional Despertion
General Properties		Additional Properties
General Properties Classpath		Additional Properties
General Properties Classpath		Additional Properties
General Properties Classpath		Additional Properties

Add a new variable pointing to the directory with the XAP jars "ws.ext.dirs= C:\Gigaspaces\gigaspaces-xap-premium-9.7.0-

ga\lib\required;C:\temp\custom\GigaSpacesDynaCacheIntegration.jar" Applicatio Application servers > server1 > Process definition > Java Virtual Machine > Custom properties Use this page to specify an arbitrary name and value pair. The value that is specified for the name and value pair is a string that can set inter configuration properties. New... Delete 66 # \$ Select Name 🛟 Value 🗘 You can administer the following resources: HttpSessionIdReuse true com.ibm.ejs.j2c.J2CServerListener.deferEndpointActivation true off com.ibm.security.jgss.debug com.ibm.security.krb5.Krb5Debug off com.ibm.ws.management.event.pull notification timeout 120000 com.ibm.ws.runtime.enableRestartableCULibraries true ws.ext.dirs C:\Gigaspaces\gigaspaces-xap-premium-9.7.0-ga\lib\required;C:\temp\custom\GigaSpacesDynaCacheIntegration.jar

Stop and clean the WebSphere application server

View: All tasks			Cell=GIGASPACESNode03Cell, Profile=	ESB03			
= Welcome			Object cache instances				
Guided Activities							
Servers			Object cache instances > Demo	Cache Instanc	e > Custom p	properties	
Server Types			Use this page to specify custom p that you configure. For example,	properties that most databas	t your enterpr se vendors ree	ise information system (EIS) r quire additional custom proper	equires for the resource ties for data sources tha
WebSphere application servers			Preferences				
WebSphere MQ servers		New		•			
Web servers		Open		F3	L		
Applications		Show In	А	lt+Shift+W ▶			
Services	-	_				Value 🗘	Description 🗘
E Resources		Сору		Ctrl+C			
= Schedulers	E.	Paste		Ctrl+V	ectContents	true	
 Object pool managers 	×	Delete		Delete			
∃ JMS		Rename		F2			
WebSphere Business Integration Adapters	**	Restart in Deb	10	Ctrl+Alt+D			
T Resource Adapters		Portart		Ctrl . Alt. D			
Asynchronous beans		Destant in Dest	01-	CUITAILTN			
Cache instances	69	Restart in Prot	ne				
 Object cache instances 		Stop		Ctrl+Alt+S			
Servlet cache instances	60	Publish		Ctrl+Alt+P			
🗄 Mail		Clean					

Total 7

De

Configure GigaSpaces' XAP as Alternative WebSphere Caching Provider

Expand "Resources" -> "Cache instances" and Click on "Object cache instances" Find and click on "Demo Cache Intance"

WebSphere. software						Welcome admin
Applications	•	Object ca	che instances			
 New Application 		Object	cache instances			
 Application Types WebSphere enterprise applications Business-level applications Assets 		An object cache instance is a location, in addition to the default shared dynamic cache, where Java(TM) Platform, Enterprise Edition (Java EE) applications can store, distribute, and share data. This gives applications greater flexibility and better tuning of the cache resources. Use the DistributedObjectCache programming interface to access this cache instance. See the DistributedObjectCache API documentation in the WebSphere (R) Application Server API documentation for more information.				
SCA modulesGlobal deployment settings		Scope: Cell=GIGASPACESNode03Cell, Node=GIGASPACESNode03				
± Services	=		Scope specifies the leven detailed information or	el at which the resource de what scope is and how it	efinition is visible. For works, <u>see the scope</u>	
Resources			settings help.			
 Schedulers Object pool managers JMS 	Node=GIGASPACESNode03					
WebSphere Business Integration Adapters		New Delete				
★ JDBC ★ Resource Adapters						
Asynchronous beans		Select	Name 🛟	JNDI name 🗘	Scope 🗘	Cache size 🗘
Cache Instances Object cache instances		You c	an administer the followin	g resources:		
 Servlet cache instances 			Demo Cache Instance	cache/demo	Node=GIGASPACESNode03	2000
± Mail		Total	1			
Remote artifacts	-	Total	1			

Choose "GigaSpaces XAP" from the dropdown choices of "Cache provider". Click "OK" and "Save"

juration	
neral Properties	Additional Properties
Scope alls:GIGASPACESNode03Call:podes:GIG	ASPACESNode03 Custom properties
Jemo Cache Instance	
NDI	
ache/demo	
escription	

Click on custom properties and add the following:

- com.ibm.ws.cache.CacheConfig.cacheProviderName=com.ibm.ws.objectgrid.dynacache.Cache ProviderImpl
- xap.space.url=jini://*/*/mySpace?groups=myGroup

Ob	ject ca	che instances					
	Object cache instances > Demo Cache Instance > Custom properties						
	Use this page to specify custom properties that your enterprise information system (EIS) requires for the resource providers and resource factorie that you configure. For example, most database vendors require additional custom properties for data sources that access the database.						
	관 Preferences						
	New Delete						
	Select	Name 🛟	Value 🗘	Description 🗘	Required \Diamond		
	You c	an administer the following resources:					
		com.ibm.ws.cache.CacheConfig.cacheProviderName	com.ibm.ws.objectgrid.dynacache.CacheProviderImpl		<u>false</u>		
		com.ibm.ws.cache.CacheConfig.showObjectContents	true		<u>false</u>		
		xap.space.url	jini://*/*/mySpace?groups=myGroup		<u>false</u>		
	Total	3					

Start XAP Runtime Environment

Organize ▼	Burn New folder Name ^ >>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>	Date mc ▲ 1/20/20: 5/15/20: 3/20/20: 3/20/20: 1/20/20:
 ✓ Favorites ■ Desktop Downloads ✓ Dropbox ③ Recent Places ④ OneDrive ➢ Libraries ☑ Documents 	Name advanced_scripts com.atomikos.spring.jms.tm0.epoch com.j_spaces.examples.benchmark.messages.MessagePOJO.1.ser com.j_spaces.examples.benchmark.messages.MessagePOJO.2.ser sem esm.sh	Date mc • 1/20/20: 5/15/20: 3/20/20: 3/20/20: 1/20/20:
Desktop Downloads Downloads Compose Compose Compose Libraries Documents Documents Compose Compose Compose Compose Compose Compose C	 advanced_scripts com.atomikos.spring.jms.tm0.epoch com.j_spaces.examples.benchmark.messages.MessagePOJO.1.ser com.j_spaces.examples.benchmark.messages.MessagePOJO.2.ser esm esm.sh 	1/20/20: 5/15/20: 3/20/20: 3/20/20: 1/20/20:
 Downloads Dropbox Recent Places OneDrive Libraries Documents 	com.atomikos.spring.jms.tm0.epoch com.j_spaces.examples.benchmark.messages.MessagePOJO.1.ser com.j_spaces.examples.benchmark.messages.MessagePOJO.2.ser sem esm esm.sh	5/15/20: 3/20/20: 3/20/20: 1/20/20:
 Dropbox Recent Places OneDrive Libraries Documents 	 com.j_spaces.examples.benchmark.messages.MessagePOJO.1.ser com.j_spaces.examples.benchmark.messages.MessagePOJO.2.ser esm esm.sh 	3/20/20: 3/20/20: 1/20/20:
 Recent Places OneDrive Libraries Documents 	com.j_spaces.examples.benchmark.messages.MessagePOJO.2.ser Image: sign of the system	3/20/20: 1/20/20:
 CneDrive Libraries Documents 	issmesm.sh	1/20/201
🗦 Libraries 🗈 Documents	esm.sh	
Libraries Documents	22194	1/20/20:
Documents	🚳 gs	1/20/20:
	gs.sh	1/20/20:
J Music	🚳 gs-agent	1/20/20:
Pictures	gs-agent.sh	1/20/20:
P Hdapter #4 [gsm113/20856] [gsm113/20856] [gsm113/20856] [gsm113/20856] [gsm113/20856] [gsm113/20856] [gsm113/20856] [gsm113/20856] [gsm113/20856] [gsm113/20856] [gsm113/20856] arted successfu [gsm113/20856] arted Successfu [gsm113/20856] [gsm113/20856	Zones: N/A Process Id: 20056 Managed by GSA with Id: 3 GigaSpaces XMP: Edition: XMP Premium 9.7.0 GA Build: 10496 Home: C:\Gigaspaces\gigaspaces-xap 2014-07-08 13:15:32,267 INFO [org.jini.rio.jsb] - 5 ba9-a5f8-3b9ad2f9ac5e] 2014-07-08 13:15:32,267 INFO [com.gigaspaces.grid.9 11y with groups [myGroup] and locators [] 2014-07-08 13:15:32,592 GSM INFO [com.gigaspaces.grid.9 2014-07-08 13:15:32,592 GSM INFO [com.gigaspaces.grid.9 2014-07-08 13:15:32,694 GSM INFO [com.gigaspaces.grid.9 2014-07-08 13:15:32,592 GSM INFO [com.gigaspaces.grid.9 2014-07-08 [com.gigaspaces.grid.9 2014-07-08 [com.gigaspaces.grid.9 2014-07-08 [com.gigaspaces.grid.9 2014-07-08 [com.gigaspaces.grid.9 2014-07-08 [com.gigaspaces.grid.9 201	-premium-9.7. Service-Id: [gsm] - GSM st id.gsm] - Reg id.gsm] - Reg



Run gs-ui from the same directory

Deploy a new Data Grid called "mySpace" with any SLA

🐎 🗞 📶 🖑 🗘 🍞 📆 🗔 🕐			
Hosts Deployed Processing Units 👌 🗙 Space Browser			
- 🏀 Processing Units			
	S Deplo	yment Wizard	
	Data	Grid name:	mySpace
	Space	e Schema:	default 🔻
	Se	cured Space	
	User	r Login Details Name:	Password:
	Clus	ter Info	
	Clus	ter schema:	partitioned-svnc2backup 👻

	· · · · · · · · · · · · · · · · · · ·	
😗 🗔 🔀 🍸 🌾 💩 📠 🍕 📢		
Hosts Deployed Processing Units Space Browser * ×		
Grid Tree >	Service View ?	
Spaces	Data Types List	
localhost:mySpace_container1 mySpace	Sample Rate: every 5 seconds 🔻 Start Stop 🞯 Stopped	
Iocalhost:mySpace_container2	Data Type Name	Instance Count Te
- ImpSpace	java.lang.Object	0
S Clusters		
🖻 🌮 mySpace [Space Cluster]		
B_FO_Backup		
replGroupmySpace_0		
Derations		
Data Types	1 data type instance(s)	Query Delete Clear
Transactions	Data Turger Info (Natife Turgelater Info)	
2 Query	y bata types into (tobily templates into)	
Statistics	Data Type Name:	
Connections	Super Data Types List:	
Benchmark	FIFO Enabled Partial Replication Enabled Id: Routing Field:	

Confirm that there are no entries in the cache using the "Space Browser" tab

Test Demo using XAP as Caching Provider

Open an Internet Browser and go to

http://localhost:9082/GigaDynaCacheTestWeb/DynaCacheTestServlet

Contemporary Conte						
🕓 GigaSpaces 🗍 WebEx 🕥 GitHub 🗏 QVC 👶 Amazon Web Services						
Write Ope	eration					
Id	Name	AddressLinel	City	ZipCode		
Submit	Submit					
Read Operation						
Person ID:						
Submit						
Id Name	AddressLinel C	ity ZipCode				
Submit Id Name	AddressLinel C	ity ZipCode				

Confirm the previous object you created is not in the cache by entering the ID in the "Read Operation"

Read Operation	
Person ID: 1 Submit	
Id Name AddressLinel	City ZipCode

Enter some data into the tabled textboxs under "Write Operation" and click "Submit"

Id	Name	AddressLinel	City	ZipCode
1	GigaSpaces	110 42nd Street	New York	10017

Confirm the data was written to the cache under "Read Operation" and clicking "Submit"

Write	Operation			
Id	Name	AddressLinel	City	ZipCode
Subm	it			
Read	Operation			
Person Subm	ID: 1			
Id	Name	AddressLinel	City	ZipCode
-	Cincles	110	Now	10017

Check the gs-ui to confirm that a new entry is in the Data Grid

눩 📴 💰 🛠 🏹 🔀 📰 🕐								
Hosts Deployed Processing Units Space Browser + x								
Grid Tree ?	Service View *							
Spaces	Data Types List							
E-E localhost:mySpace_container1	Sample Rate: every 1 second Start Stop O Started	Q						
E Social Street Space_container2	Data Type Name	Instance Count						
🐵 🐵 mySpace	java.lang.Object	0						
🗟 Clusters	com.ibm.ws.objectgrid.dynacache.DynaCacheSpaceEntry	1						
🗄 🔅 mySpace [Space Cluster]								
B- & LB_FO_Backup								
🖶 🛞 replGroupmySpace_0								
Image: A state of the state								
i⊟ ∯ Operations								
Data Types	2 data type instance(s) Query Delete	2 Clear						
Transactions	Data Tyrnes Info V Notify Tamplater Info							
- Query	Why been types and the place a							