

Metadata Catalog Service (MCS)

Notice: The metadata catalog service is no longer supported

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Installation

Environment

Set the environment variables for Java:

1. export JAVA_HOME=<Location of Java SDK install folder.>
2. export PATH=\$JAVA_HOME/bin:\$PATH

Set the environment variables for Ant:

1. export ANT_HOME=<Location of ANT install folder.>
2. export PATH=\$ANT_HOME/bin:\$PATH

Set the environment variables for MCS:

1. export MCS_HOME=<Location of MCS Install Directory>
2. Also source \$MCS_HOME/setenv.sh

Set the environment variables for Tomcat (5.5):

1. export CATALINA_OPTS=-Dmcs.home=\$MCS_HOME.

Build configuration

1. In \$MCS_HOME build.xml file
Set the tomcat.dir property <property name="tomcat.dir" value="<location-where-tomcat-is-installed>" />

Axis2 (1.4.x) Installation

Set the environment variables:

1. export AXIS2_HOME=<Location of Axis download folder>
2. export PATH=\$AXIS2_HOME/bin:\$PATH

Setting Classpath

1. export CLASSPATH=.:\$AXIS2_HOME/lib/activation-1.1.jar:\$AXIS2_HOME/lib/axiom-api-1.2.7.jar:\$AXIS2_HOME/lib/axiom-impl-1.2.7.jar:\$AXIS2_HOME/lib/axis2-adb-1.4.1.jar:\$AXIS2_HOME/lib/axis2-kernel-1.4.1.jar:\$AXIS2_HOME/lib/geronimo-stax-api_1.0_spec-1.0.1.jar:\$AXIS2_HOME/lib/XmlSchema-1.4.2.jar:\$AXIS2_HOME/lib/backport-util-concurrent-3.1.jar:\$AXIS2_HOME/lib/neethi-2.0.4.jar:\$AXIS2_HOME/lib/wstx-asl-3.2.4.jar:\$AXIS2_HOME/lib/commons-httpclient-3.1.jar:\$AXIS2_HOME/lib/commons-codec-1.3.jar:\$AXIS2_HOME/lib/wsd4j-1.6.2.jar:\$MCS_HOME/lib/mcs-client.jar:\$AXIS2_HOME/lib/log4j-1.2.15.jar:\$AXIS2_HOME/lib/commons-logging-1.1.1.jar:\$CLASSPATH

MySQL Driver Jar

1. cp <Path to MYSQL JDBC Type 4 Driver>.jar to \$CATALINA_HOME/common/lib

Apache Database Connection Pool

1. `cp $MCS_HOME/lib/commons-*.jar $CATALINA_HOME/common/lib`

Compiling MCS

1. `cd $MCS_HOME`
2. `ant compile`

Deploying the Service.

1. `ant deploy`
2. Restart the Tomcat Server

Building Client JAR

1. `ant client-jar`

Changing the MCS Properties file

This file is in `$MCS_HOME/etc/mcs.properties`.

1. Set `mcs.rest.serviceurl` to the URL of the deployed webservice.
2. Set `mcs.db.host` to the hostname or IP of the machine hosting the database.
3. Set `mcs.db.user` to the database user name.
4. Set `mcs.db.pass` to the database password.
5. Set transport-protocol to `https` if using secured transport, `http` otherwise.
6. Set `port` to the port number of Tomcat server on which SSL has been enabled.
7. `certificate.type` to type of certificate
8. `certificate.path` Path to certificate file.
9. `certificate.password` Password to access certificate file.
10. Optionally specify values for `truststore type`, `file`, `password`.

Security Setup

Tomcat Security

In `$CATALINA_HOME/conf/server.xml` set:

1.

```
<Connector acceptCount="100" clientAuth="want" disableUploadTimeout="true" enableLookups="false" maxHttpHeaderSize="8192"
maxSpareThreads="75" maxThreads="150" minSpareThreads="25" port="8443" scheme="https" secure="true" sslProtocol="TLS" keystoreFile="
Path-To-Keystore-File" keystorePass="Password-Of-Keystore-File" truststoreFile=" Path-To-Keystore-File " truststorePass=" Password-Of-
Keystore-File" />
```

Note: Trust Store attributes are optional.

Importing an existing key and certificate in a key store

The Key tool utility does not allow importing existing certificates into a key store. To import existing key and certificate in a key store we have provided a utility code.

1. Convert the certificate and key file in to DER format using following commands.

```
openssl pkcs8 -topk8 -inform PEM -in key.pem -outform DER -nocrypt -out key.der
openssl x509 -in -inform PEM -out -outform DER
```

2. Run the server utility as follows

```
java edu.isi.pegasus.mcs.common.util.ServerKeystoreBuilder
```

The utility creates a new key store file at the location.

Performance Results

These results are for MCS 7.0.1.

Add

Number of Collections	DAI - With Security	DAI - Without Security	REST - With Security	REST - Without Security	Local
100	7.869766667	2.126633611	0.137329722	0.212024722	0.099633611
2000	157.934	40.39004472	2.919456944	5.646172222	2.087169444
4000	317	80.85753472	5.644044722	16.91395083	4.208694444

Simple Queries

100 Collections

Threads	DAI - With Security	DAI - Without Security	REST - With Security	REST - Without Security	Local
1	5.27565286204167	18.0342	52.5172788956713	68.2194038301739	1472.52747252747
2	11.0910855399972	36.4132	103.465423452025	135.872782340259	3889.17748917749
3	16.5167920719398	56.25	154.474651176521	203.3634277993	6481.30605027157
4	21.0263486431434	65.979	201.173449593018	269.678488502521	9148.71173694703
5	24.8780973231167	75.70022	242.696652899719	330.571169464161	12167.537746806
6	27.833616823875	81.41112	286.607807767162	394.061129257609	15294.0021522022
7	30.2133431989147	88.8566	327.828712983502	461.14204605723	18158.1863629033
8	32.6897538052916	100.1251	369.388185303179	526.471832446465	21036.0451826145
9	35.0065907470233	102.544	417.017784421916	616.96143888007	23088.5811933883
10	35.9563489923233	107.169	477.079245479635	720.838867263906	26744.5866919551
11	36.5741230522768	112.172	548.288048350314	854.157612798696	29526.5476665407
12	38.6790045528411	125.3154	616.264793046647	1007.61442831251	33084.1260370457

2000 Collections

Threads	DAI - With Security	DAI - Without Security	REST - With Security	REST - Without Security	Local
1	3.97851601352695	18.348623853211	39.2915938172857	67.9895492241078	351.52536513698
2	9.8352594049668	39.0434358223523	75.2485664190714	135.857689066317	739.232458116265
3	15.0501672240802	58.6701434159061	112.373356659331	204.245950955698	1095.47064595823
4	19.5802484244018	68.9803837033843	138.417956261222	271.750064448892	1497.86533388186
5	23.0840258541089	74.9175906502847	162.864668632526	333.326379898472	2092.51236614264
6	26.3417846559104	82.9493087557603	184.51777376249	394.858176223427	2674.88484528419
7	28.0890825188454	88.5515496521189	212.476273417582	455.112829875714	3139.0039675441
8	29.6928644335158	99.4560994560994	220.504584674917	526.519183049694	4132.20849209061
9	32.6185442464512	103.633572159672	236.975342398757	622.884721905049	4849.04719346144
10	33.4140840364213	110.283981251723	245.679603518898	725.378274103844	5552.82734071501
11	34.2596656143381	119.112073632918	267.622334978156	831.059048133814	6480.70044563498
12	38.0710659898477	120.185285648708	269.971732308822	982.231317143985	7151.16292516617

4000 Collections

Threads	DAI - With Security	DAI - Without Security	REST - With Security	REST - Without Security	Local
1	4.8602673147023	18.7265917602996	39.2840522046097	68.0926452710099	352.756892230576
2	10.2354145342886	39.0434358223523	75.8980337462877	135.733629574262	758.015870801215
3	15.1108126259234	56.0747663551401	110.446710708282	203.152039695655	1095.15475566951

4	19.8597405821386	68.5665309620741	137.648148659671	269.037748729217	1527.19937557
5	23.2493257695526	76.6753565404079	160.54592028104	332.03591879807	2082.02920647487
6	26.1191322643836	84.6959181272791	188.388727006108	393.770060132843	2761.53851103749
7	29.2223282442748	93.2445290199809	206.009242978513	459.667090742335	3319.0230271869
8	31.2843700354393	97.7995110024449	225.007814724261	529.529449727407	4089.07841868005
9	32.3134000877647	108.739428111155	237.222577949148	623.620410415509	4702.5874799569
10	33.8409475465313	102.737966815636	249.954084470926	713.484397854609	5661.6028874258
11	33.8712612146066	117.95671670891	269.854363634971	846.236305711448	6272.63508018113
12	36.6090836288754	128.216543495681	256.963728059084	953.192046787801	7433.2888022189

Complex Queries - All Attributes

100 Collections

Threads	DAI - With Security	DAI - Without Security	REST - With Security	REST - Without Security	Local
1	5.25762355415352	19.723865877712	50.1161301317665	63.8472598919511	202.66762380004
2	11.3976349907394	40.2414486921529	99.7773574954435	128.75364313568	417.338195975577
3	16.9715255515745	59.2690154757984	148.008861520999	192.590991303771	642.782863434073
4	22.3917150654257	70.531188009698	195.384800540013	251.844711560445	857.024758791525
5	26.6014045541604	80.205325633622	234.194771418486	311.441922245368	1060.10610591662
6	29.3961540031845	90.316106372303	280.666357501578	383.013980727247	1215.38859583718
7	33.0623123376404	94.412331406551	316.842368512796	435.840647011727	1425.55979697838
8	34.5619009045497	99.4020346353964	354.602028230279	498.931456714879	1586.81444678914
9	35.4718633676374	95.4457078890001	393.484324516735	559.103107486485	1776.03013816467
10	35.6741522929561	110.448420587585	446.141146951268	634.620348095236	2042.91372581494
11	37.0909648248908	114.070233325477	492.622771438307	727.776125909262	2250.98281477059
12	38.4594840019229	118.895264830945	554.046906630398	831.374195915748	2520.32938293716

2000 Collections

Threads	DAI - With Security	DAI - Without Security	REST - With Security	REST - Without Security	Local
1	5.3835800807537	19.9203187250996	37.5945052065295	63.3388088590815	172.884277786649
2	11.2866817155756	40.6091370558375	72.8929473946365	129.835230469591	340.986085142732
3	16.7847817978366	58.083252662149	108.730161793562	190.833541962277	520.461828414267
4	21.3106020245071	71.1269170926872	140.835914612136	252.646950773554	668.033397009387
5	26.347684038573	79.2644261255548	164.54928524708	315.514974329234	813.848293102132
6	29.2338300377603	88.8011840157868	192.234131723935	379.697816008641	919.628062030292
7	31.1942959001782	94.2488940180804	206.514637406736	435.444050940482	1041.15506314005
8	32.4313367791628	100.605203175351	225.176446668684	500.986822588701	1193.60733644507
9	34.7497801325639	105.59937422593	247.845792122008	557.732673790867	1392.85515188688
10	35.5751614222949	110.350915912602	273.128180763428	621.410543940311	1546.42936617775
11	36.1253340100613	116.441322234518	284.534854494587	740.929944088865	1716.81443866112
12	37.9381660585143	119.082075666735	293.674093817378	817.2752225773	1883.61763977349

4000 Collections

Threads	DAI - With Security	DAI - Without Security	REST - With Security	REST - Without Security	Local
1	5.43625985322098	20.0803212851405	37.9366664697219	63.6207875786037	172.312451839713
2	11.2485939257592	41.6449765747006	73.8786941669221	129.176939635801	340.342212509157

3	16.9939577039274	61.0790634543603	109.005954578062	191.05653187185	519.070705686849
4	21.917808219178	71.8132854578096	142.622780958229	252.610610709934	670.308466980954
5	26.5688931399117	80.5152979066022	165.712161792038	314.033080695763	813.230814004866
6	30.6018361101666	87.890625	192.281105870979	381.136082956862	925.185755608366
7	31.4445228774947	98.6908358509567	203.754810248321	435.765438384448	1047.84670542837
8	33.4081536775069	95.4511558538404	230.513819954601	507.391550084476	1181.8166298038
9	33.7781484570475	103.759687439953	248.517798239237	566.426047530588	1319.01657861822
10	35.8044361696414	108.748844543526	266.820495790566	636.871116080296	1576.25448903732
11	35.5840489354193	120.212607421389	283.095923202371	718.979643411692	1692.23002224074
12	37.1033612037979	113.591543740632	305.054094131842	814.818641792486	1953.39497733526

Complex Queries - With Conditions

100 Collections

Threads	DAI - With Security	DAI - Without Security	REST - With Security	REST - Without Security	Local
1	5.51419906258616	20.1816347124117	152.999478931947	197.235123972581	721.169182237035
2	11.4662462376379	39.7219463753724	295.930687948702	382.499780109278	1378.82225189361
3	17.1151469050109	59.2300098716683	424.868464341686	547.809228228537	2008.10709831349
4	22.4861218466727	69.960647135986	508.337846478352	651.737852455296	2622.58059610186
5	26.6723567694441	77.8089013383131	580.786374805927	740.288042196371	3162.80618841631
6	30.0225168876657	84.0336134453781	640.77840863373	817.580258885771	3700.20412915151
7	33.0110822919122	88.2803351049455	653.988442451434	838.401401731716	4326.36546783686
8	33.4142584906152	92.9219600725952	650.809377133363	837.217520383586	4939.44322265021
9	35.7355568790947	95.8353052531945	678.081651615055	883.50544815575	5463.86586845619
10	34.676468548443	105.920982946721	707.272690045522	969.321203600395	6105.84668382854
11	36.7055968451387	111.13662456946	753.536295428014	1099.76065298377	6768.72938480385
12	37.9092021955746	109.037216522167	786.429086461806	1180.7820899973	7435.46717909479

2000 Collections

Threads	DAI - With Security	DAI - Without Security	REST - With Security	REST - Without Security	Local
1	5.43330616680249	20.1816347124117	110.058338234492	187.056245458106	370.329628399609
2	11.2170499158721	39.3894633185622	212.327377916592	373.859367855726	724.527653177347
3	16.7753960857409	59.171597633136	310.225479926326	502.086601104798	1088.70565278385
4	21.5154978820681	69.9912510936133	374.415026830774	646.80363169538	1375.48976343132
5	26.7379679144385	77.0060064685045	431.919305964851	718.29013993632	1711.44222032815
6	30.1621214025386	84.9858356940509	465.445656784904	805.1534118123	1930.57233982487
7	31.0884116359483	91.580226147089	454.785681539405	825.76924795723	2204.10690148215
8	33.0587050285389	95.6365809922295	477.706677279047	861.735509576992	2505.43724395465
9	34.9899565865353	100.452657034786	471.962567913092	899.342030763287	2854.83964866962
10	35.7430077741041	103.28977947632	439.614956903501	948.851005485638	3177.85517628067
11	35.8587579830189	116.424516501491	451.883911286706	1088.33735935608	3574.86369632612
12	36.167727837848	112.883627954376	425.553552978737	1190.6491786407	3822.69337571427

4000 Collections

Threads	DAI - With Security	DAI - Without Security	REST - With Security	REST - Without Security	Local
1	5.44514021236046	20.4498977505112	109.944399853774	192.979486788965	397.803429063933

2	11.2660188705816	40.8371618172537	220.401100445003	388.445231508673	787.257382936792
3	16.822429906542	58.8235294117647	312.978666566661	529.009288715626	1191.70006242031
4	22.015823873409	72.1045515998197	373.683961563566	658.427297967224	1468.60928542239
5	26.4214753751849	77.0416024653312	439.532796645609	732.978129005182	1808.57167236639
6	31.0719834282755	85.9393650035808	471.863394931936	840.913131786992	2074.62710392934
7	31.6977714525988	88.1691408007197	463.450879210129	833.53415913604	2368.69215290501
8	33.5570469798657	93.800381064048	474.211889384059	882.089700824846	2684.74365176798
9	34.573276138037	101.174119410442	501.844216043247	890.4632257068	2998.50791288427
10	36.1709438807805	97.4943940723408	468.614284477625	976.823027023305	3471.51271597855
11	35.8470722422195	113.636363636363	452.16492143169	1073.93667154515	3792.61170228458
12	38.1169183530314	108.650545139019	434.154734027989	1194.47860121313	4170.89206428043