IBM Software Group

Tivoli Asset Discovery for z/OS

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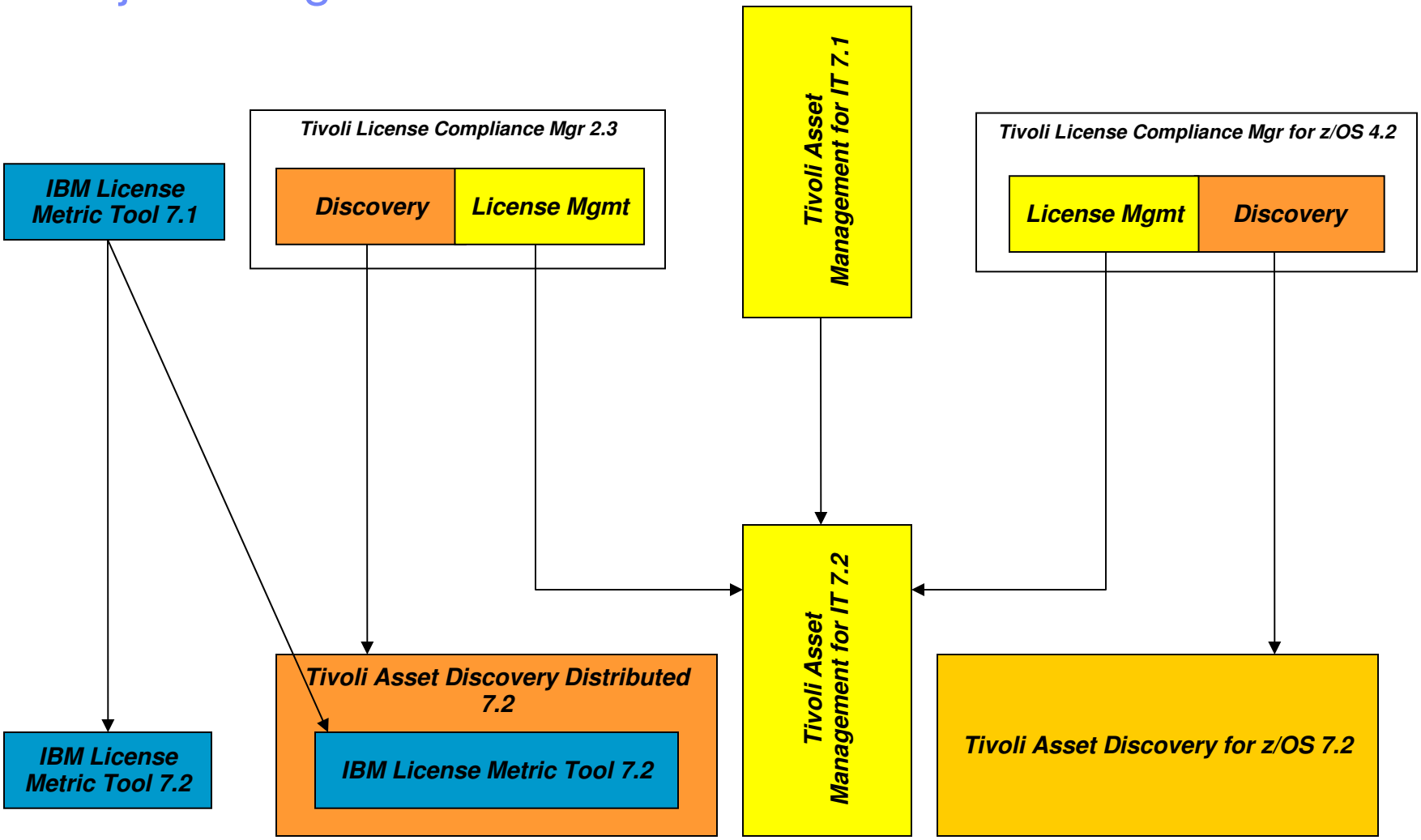
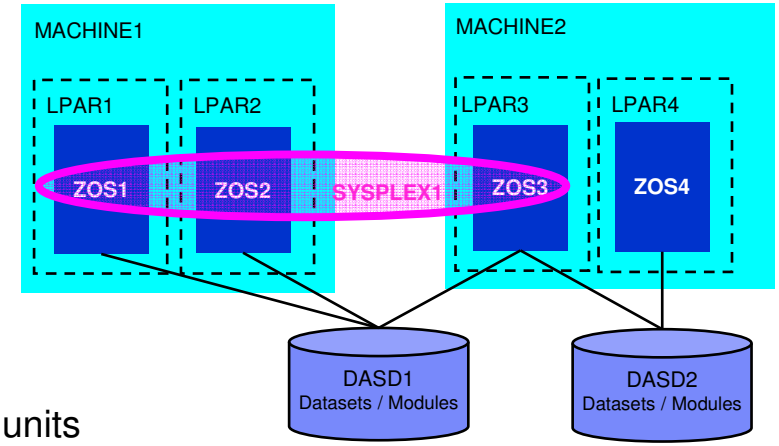
May 2010

Tivoli Asset Management Portfolio Road Map – Major changes in 2009

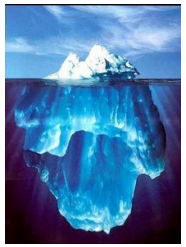


z/OS Asset Management

- Assets – “stuff” that is deployed & used
  - Software: IBM products, ISV products and customer applications
  - Hardware
- General Requirements
  - Tivoli Asset Management for IT (TAMIT)
    - License contract management
    - Financial management
    - Lifecycle: Plan, Acquire, Deploy, Manage, Retire



- Why is a specialized tool needed for z/OS ?
  - z/OS assets are **SHARED** by many users and business units
  - z/OS has different architectural characteristics than distributed operating systems
    - Products can be installed on one z/OS image and used from others.
    - Products can be deployed across different datasets with no hierarchical root directory etc
    - Products normally have numerous modules that can be used independently
      i.e. not sufficient to just discover & monitor the main product module
    - Large sites have over 6 million modules used by many thousands of jobs/users
- z/OS Requirements
  - Discovery for TAMIT (tip of the z/OS ice berg)
  - Get the best value from your z/OS software budget (details under the surface)
  - Reduce unexpected outages from z/OS asset upgrades (details under the surface)

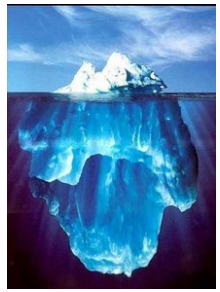


Case Study: Mergers and Acquisitions of z/OS Systems

A Company merger or a Service Provider acquiring a new client's environment, face special challenges for managing z/OS systems due to the SHARED environment.

1. In order to be able to manage and support an environment, it is critical to know what products are being used, where the products are deployed and who is using them.
   - Without an independent tool gathering this information, you will need to rely on educated guesswork to know what is happening in the shared environment.
2. The number one priority initially is to keep everything going smooth and stable, but you can't have a "change freeze" forever.
   - Performing simple changes can be error prone until you know what is "normal" in the new environment.
3. After the dust settles, the next priority is managing the environment more efficiently. For example:
   - Having multiple versions of a product deployed is both costly from a support prospective and license costs.
   - Reducing the number of systems where products are used also improves support and license costs.
   - License negotiations with vendors are a lot more effective with accurate knowledge about product usage
   - Structuring your support teams to best service a merged environment. For example if one site has a lot more CICS than another site, may be it would be more effective to have all of the CICS support done from one site.
4. With the focus on managing a new environment, often companies inadvertently have product license compliance violations.
   - There are many cases where an audit has resultant in a company having to pay millions of dollars in license fees. This generally gets escalated to top management since the extra money was not already budgeted for. It is better to be "audit ready" !

Scenarios

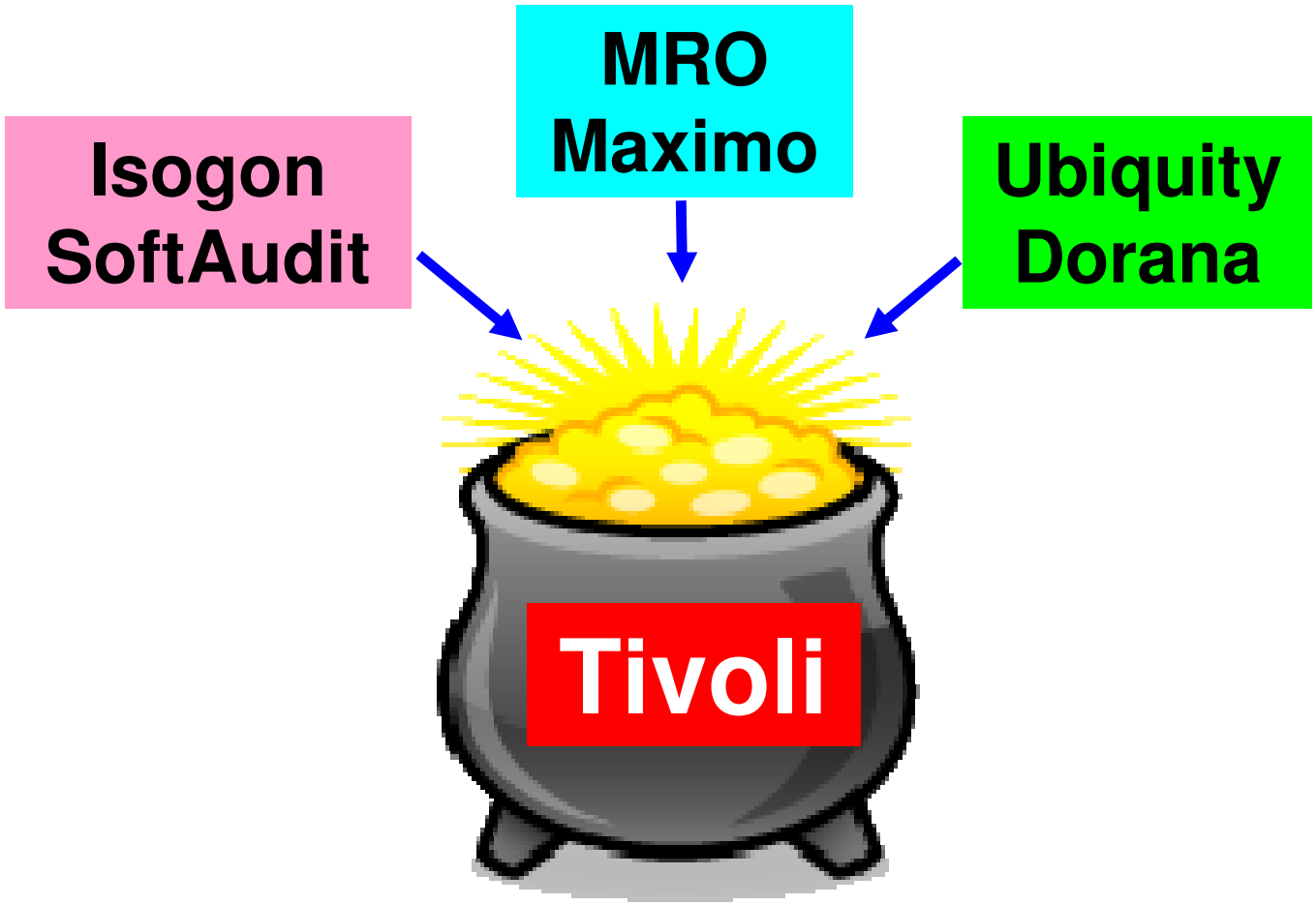


- **Asset management for IT**
  - Tivoli Asset Management for IT e.g. contacts, financial, procurement, lifecycle
  - Product inventory verification
  - Audit trail of product use in a z/OS environment

- **Get the best value from your z/OS software budget**
  - Understanding product usage trends is extremely important for contract renewal negotiations e.g.
    - Which products should be included in an Enterprise License Agreement (ELA)
    - Product LPAR capacity restricted licenses
    - Assess what would be impacted by a competitive product replacement
  - Drop products that are no longer being used
  - Consolidate product versions
  - Consolidate similar products e.g. inherited from company mergers
  - Consolidate product machine/system coverage
  - Sub-capacity license optimization
  - Prove to management that your budget is fully utilized to avoid funding cuts or justify increases

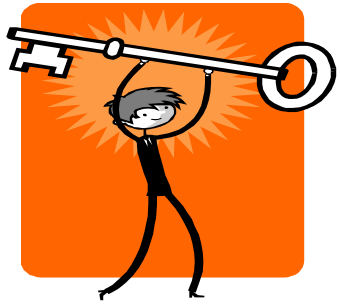
- **Reduce unexpected outages from z/OS asset upgrades**
  - See who would be impacted by an upgrade
  - See which products a job is using
  - See where different maintenance levels are deployed
  - See what needs to be replicated Disaster Recovery systems

Leveraging the Best Technologies



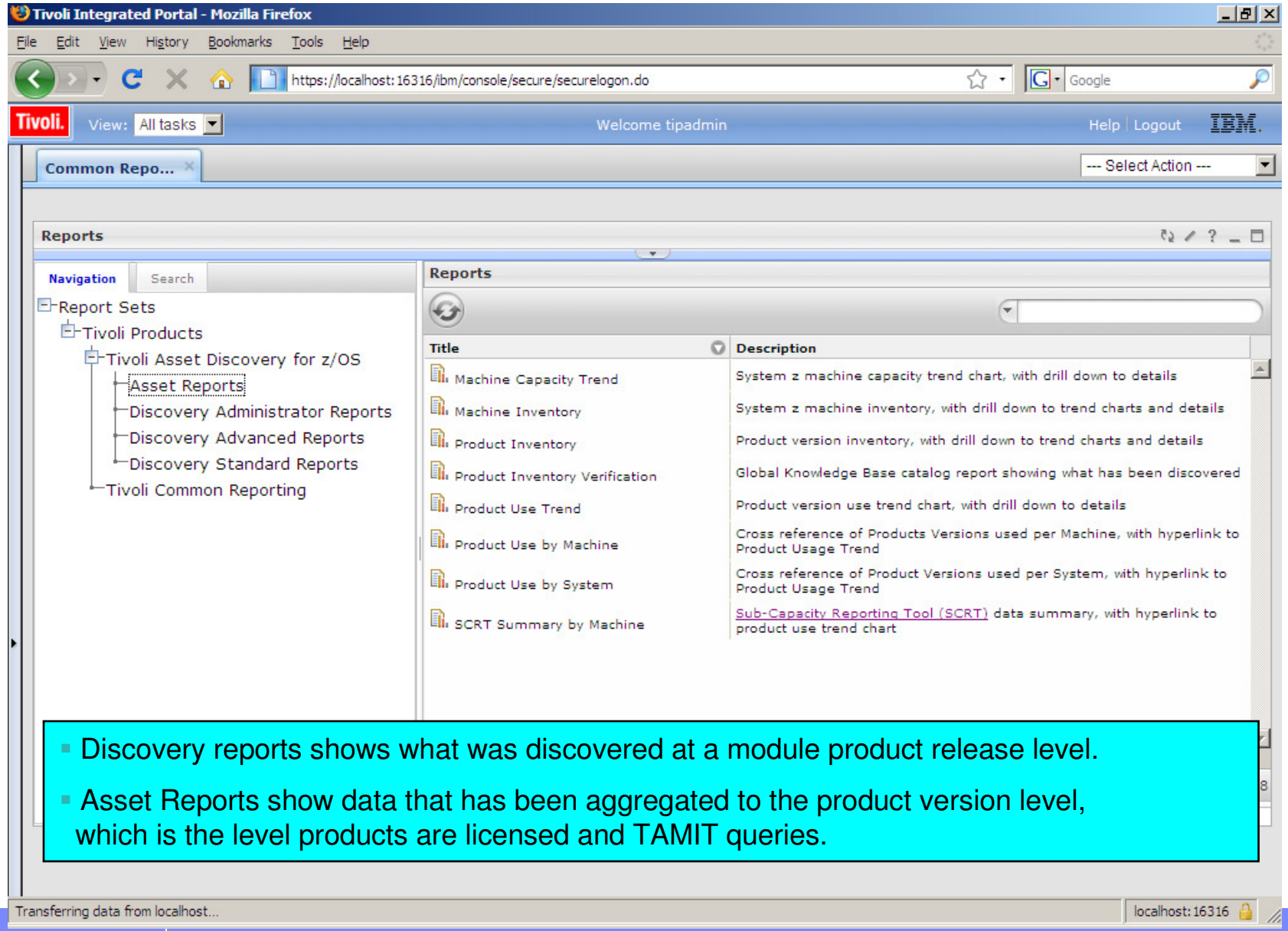
Tivoli Asset Discovery for z/OS (TADz)

- TADz enables you to understand z/OS product and application usage.
  - Discovery of products (IBM & ISV), tagged applications and hardware
  - Application Tagger
  - Monitoring
  - Interactive web reporting
  - Bolt-on integration with Tivoli Asset Management for IT (TAMIT)



- Value to customers:
  - **Asset management for both z/OS and distributed assets** in a consistent and proven manner (TADz + TAMIT)
  - Since z/OS products are **SHARED** by many users and business units, it is very hard to determine how to **get the best value from your software budget.** TADz removes the guesswork !
  - **Reduce unexpected outages from product and application upgrades**. TADz assists change control and operations support since you can see exactly where (systems, datasets) products are deployed and who (jobs/userid) is using them.

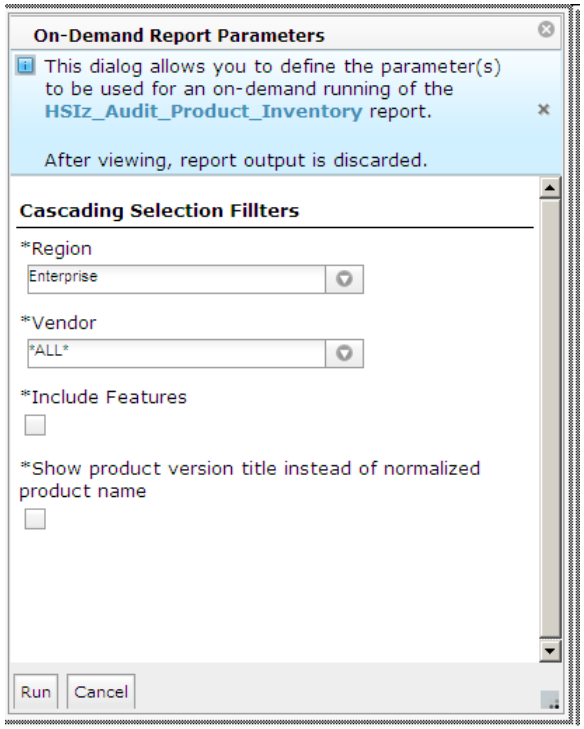
TADz interactive web reporting

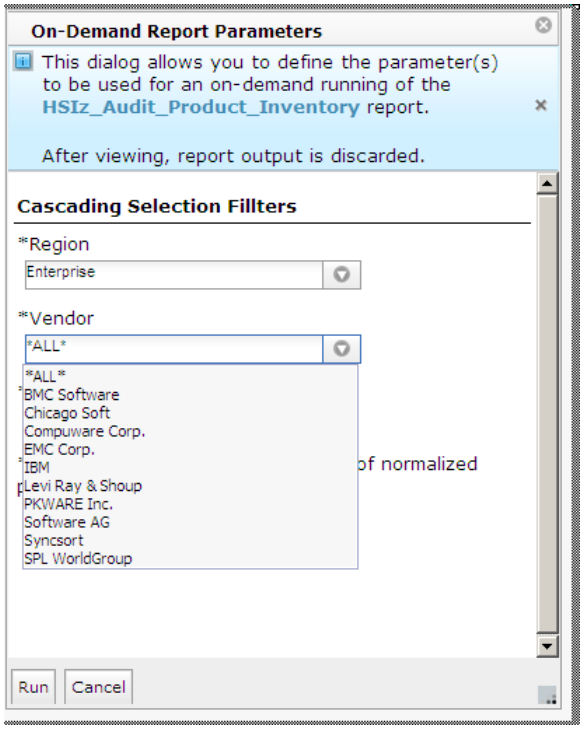


- Discovery reports shows what was discovered at a module product release level.
- Asset Reports show data that has been aggregated to the product version level, which is the level products are licensed and TAMIT queries.

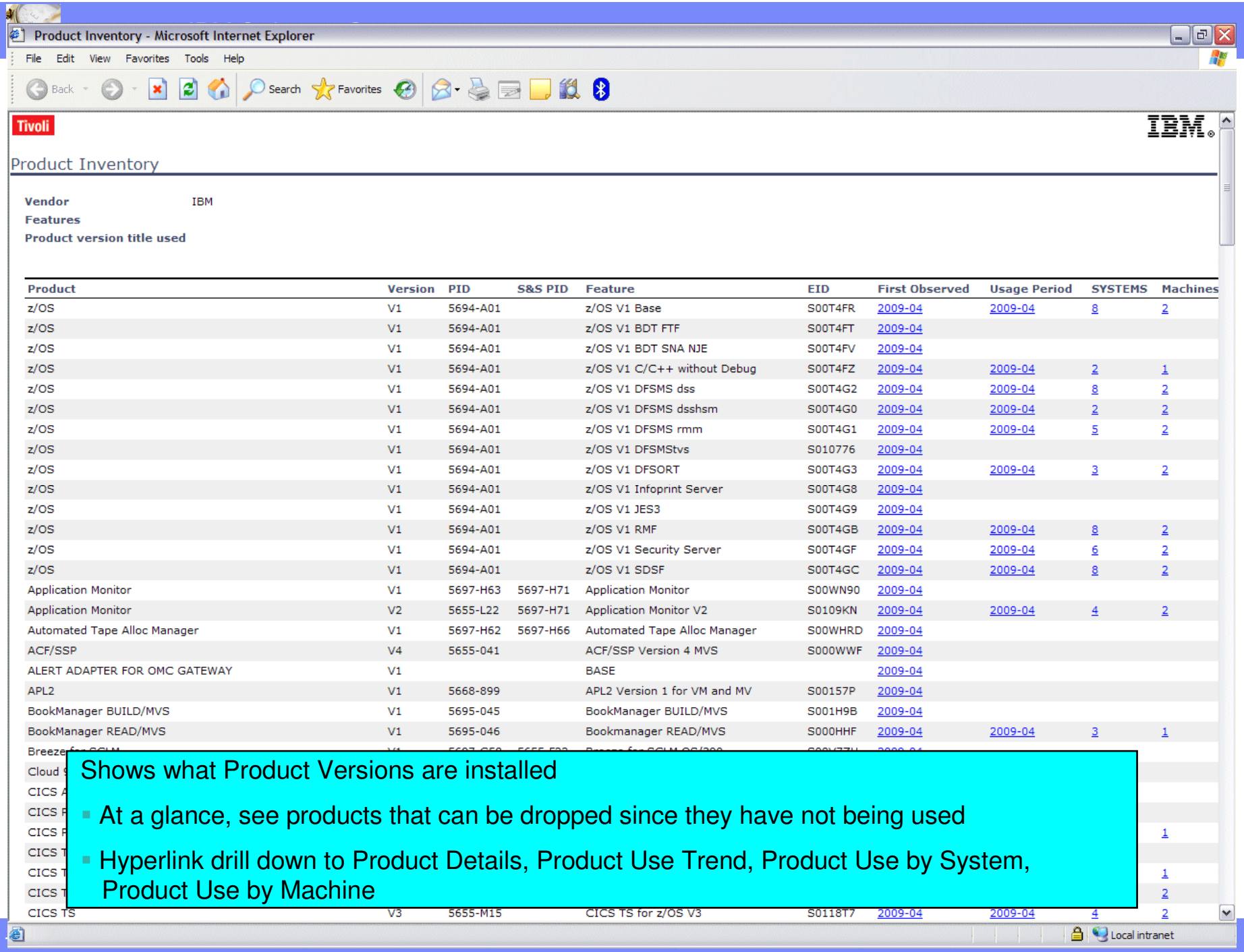
Report Parameters and Hyperlinks

- When the reports are invoked directly by the user, parameters can be specified
  - Where possible dynamic drop down lists are provided for easy selection



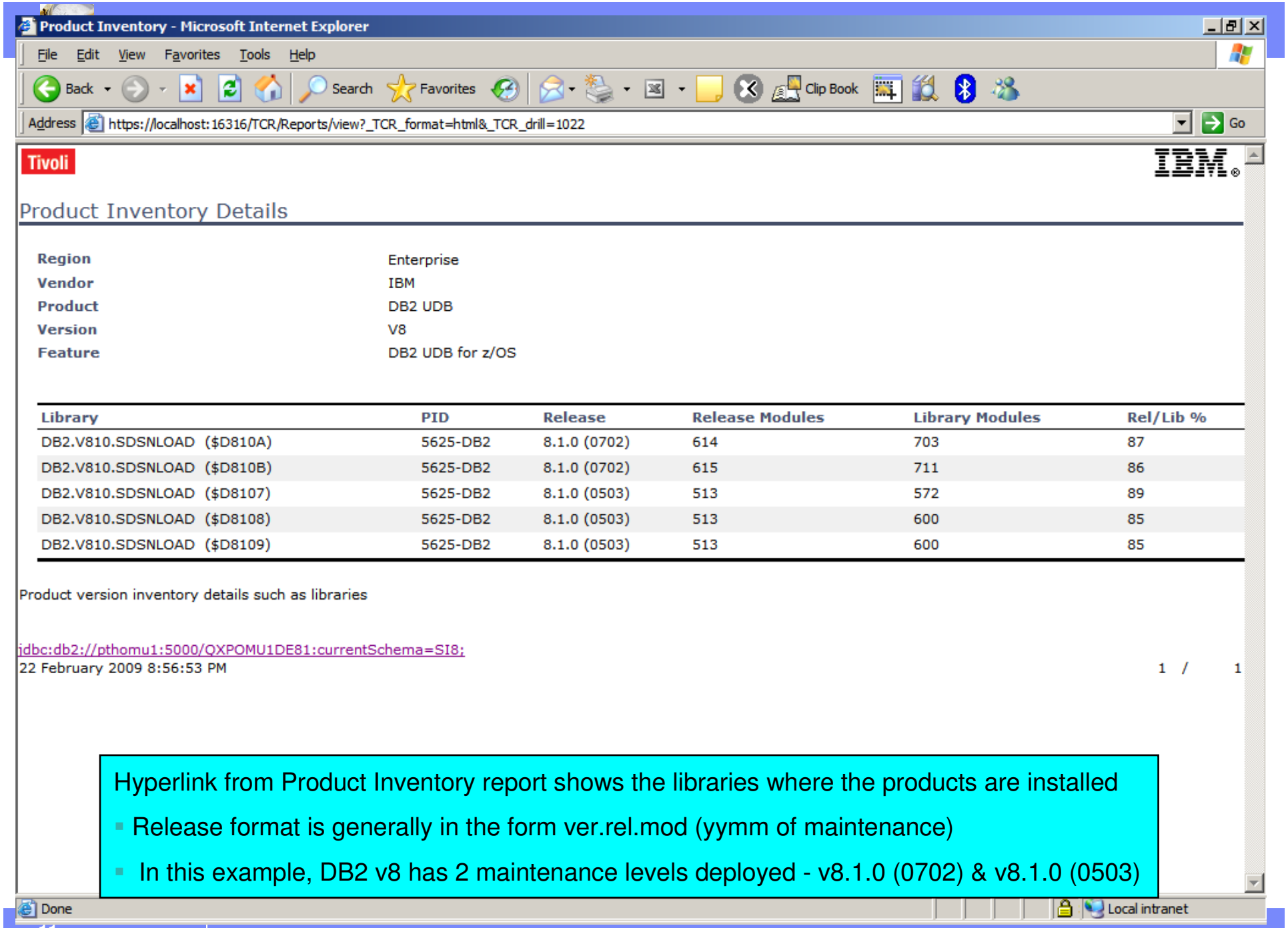


- Most reports also have context sensitive hyperlinks between each other, for convenient drill through without the need to specify report parameters



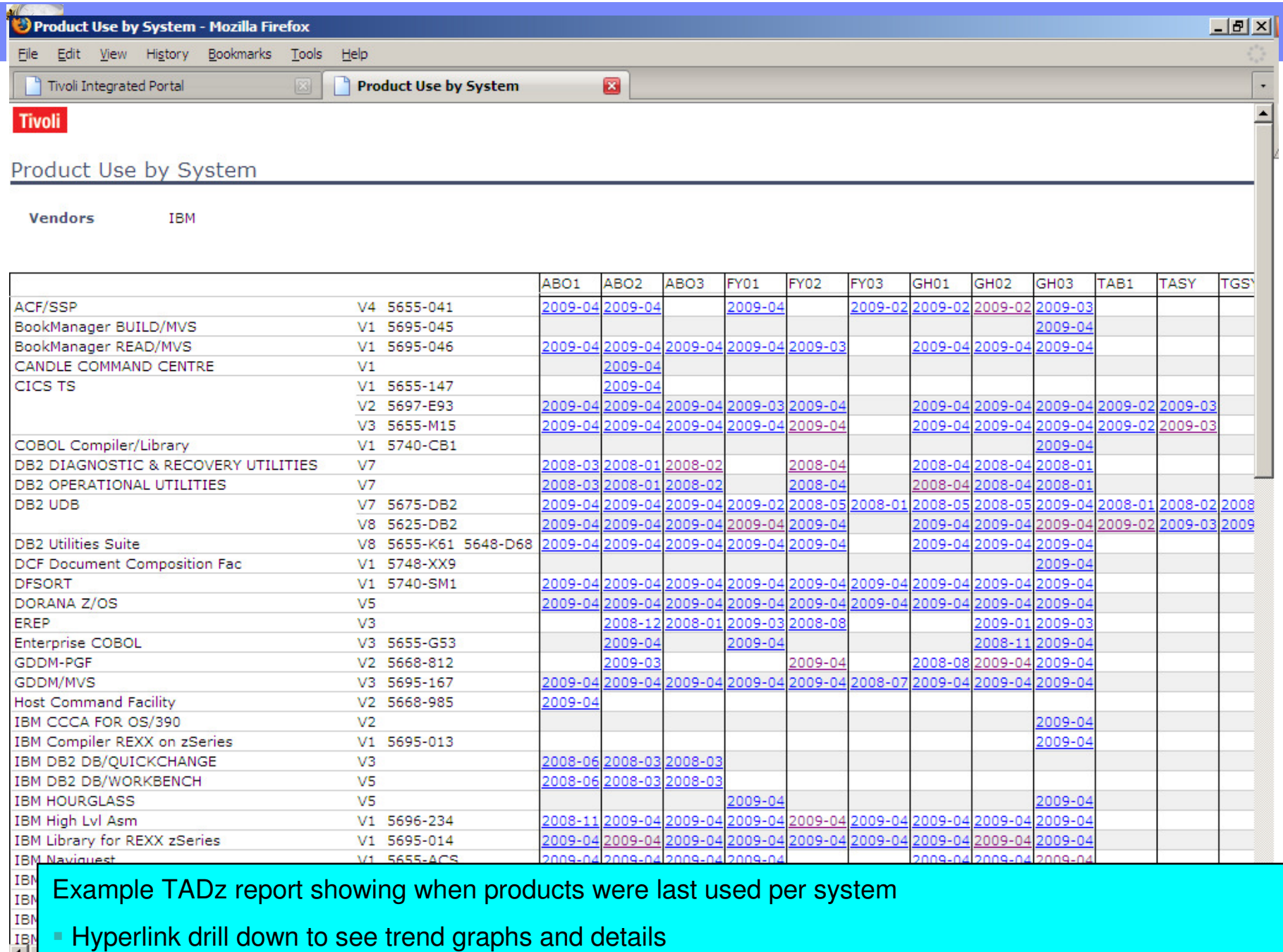
Shows what Product Versions are installed

- At a glance, see products that can be dropped since they have not being used
- Hyperlink drill down to Product Details, Product Use Trend, Product Use by System, Product Use by Machine



Hyperlink from Product Inventory report shows the libraries where the products are installed

- Release format is generally in the form ver.rel.mod (yymm of maintenance)
- In this example, DB2 v8 has 2 maintenance levels deployed - v8.1.0 (0702) & v8.1.0 (0503)



			ABO1	ABO2	ABO3	FY01	FY02	FY03	GH01	GH02	GH03	TAB1	TASY	TGSY
ACF/SSP	V4	5655-041	2009-04	2009-04		2009-04		2009-02	2009-02	2009-02	2009-03			
BookManager BUILD/MVS	V1	5695-045									2009-04			
BookManager READ/MVS	V1	5695-046	2009-04	2009-04	2009-04	2009-04	2009-03		2009-04	2009-04	2009-04			
CANDLE COMMAND CENTRE	V1			2009-04										
CICS TS	V1	5655-147		2009-04										
	V2	5697-E93	2009-04	2009-04	2009-04	2009-03	2009-04		2009-04	2009-04	2009-04	2009-02	2009-03	
	V3	5655-M15	2009-04	2009-04	2009-04	2009-04	2009-04		2009-04	2009-04	2009-04	2009-02	2009-03	
COBOL Compiler/Library	V1	5740-CB1									2009-04			
DB2 DIAGNOSTIC & RECOVERY UTILITIES	V7		2008-03	2008-01	2008-02		2008-04		2008-04	2008-04	2008-01			
DB2 OPERATIONAL UTILITIES	V7		2008-03	2008-01	2008-02		2008-04		2008-04	2008-04	2008-01			
DB2 UDB	V7	5675-DB2	2009-04	2009-04	2009-04	2009-02	2008-05	2008-01	2008-05	2008-05	2009-04	2008-01	2008-02	2008
	V8	5625-DB2	2009-04	2009-04	2009-04	2009-04	2009-04		2009-04	2009-04	2009-04	2009-02	2009-03	2009
DB2 Utilities Suite	V8	5655-K61 5648-D68	2009-04	2009-04	2009-04	2009-04	2009-04		2009-04	2009-04	2009-04			
DCF Document Composition Fac	V1	5748-XX9									2009-04			
DFSORT	V1	5740-SM1	2009-04	2009-04	2009-04	2009-04	2009-04	2009-04	2009-04	2009-04	2009-04			
DORANA Z/OS	V5		2009-04	2009-04	2009-04	2009-04	2009-04	2009-04	2009-04	2009-04	2009-04			
EREP	V3			2008-12	2008-01	2009-03	2008-08			2009-01	2009-03			
Enterprise COBOL	V3	5655-G53		2009-04		2009-04				2008-11	2009-04			
GDDM-PGF	V2	5668-812		2009-03			2009-04		2008-08	2009-04	2009-04			
GDDM/MVS	V3	5695-167	2009-04	2009-04	2009-04	2009-04	2009-04	2008-07	2009-04	2009-04	2009-04			
Host Command Facility	V2	5668-985	2009-04											
IBM CCCA FOR OS/390	V2										2009-04			
IBM Compiler REXX on zSeries	V1	5695-013									2009-04			
IBM DB2 DB/QUICKCHANGE	V3		2008-06	2008-03	2008-03									
IBM DB2 DB/WORKBENCH	V5		2008-06	2008-03	2008-03									
IBM HOURGLASS	V5					2009-04					2009-04			
IBM High Lvl Asm	V1	5696-234	2008-11	2009-04	2009-04	2009-04	2009-04	2009-04	2009-04	2009-04	2009-04			
IBM Library for REXX zSeries	V1	5695-014	2009-04	2009-04	2009-04	2009-04	2009-04	2009-04	2009-04	2009-04	2009-04			
IBM Naviquest	V1	5655-ACS	2009-04	2009-04	2009-04	2009-04			2009-04	2009-04	2009-04			

Example TADz report showing when products were last used per system

- Hyperlink drill down to see trend graphs and details
  e.g. which jobs/userids are using the product and the datasets where the product is installed.

Product Usage Trend - Mozilla Firefox

File Edit View History Bookmarks Tools Help

https://localhost:16316/TCR/Reports/view?_TCR_format=html&_TCR_drill=1451

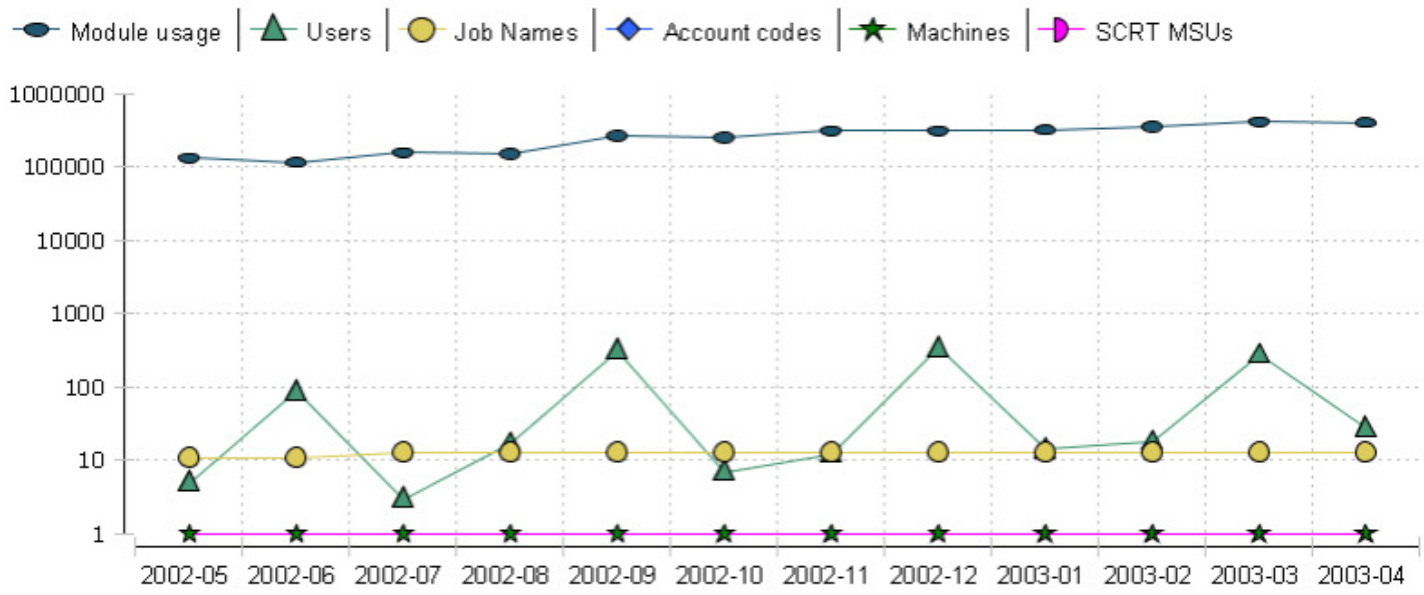
Tivoli Integrated Portal | Product Usage Trend | Product Inventory | Machine Capcity Trend | **Product Usage Trend**

Tivoli

IBM

Product Usage Trend

Region	Enterprise
Machine	2097 1F503 Z90
Vendor	SPL WorldGroup
Product	SYSQL
Version	V2



Detect trends with ongoing usage monitoring
e.g. this product is used most at end of quarter → avoid changes to this product at end of quarter !

Product Usage Trend - Microsoft Internet Explorer

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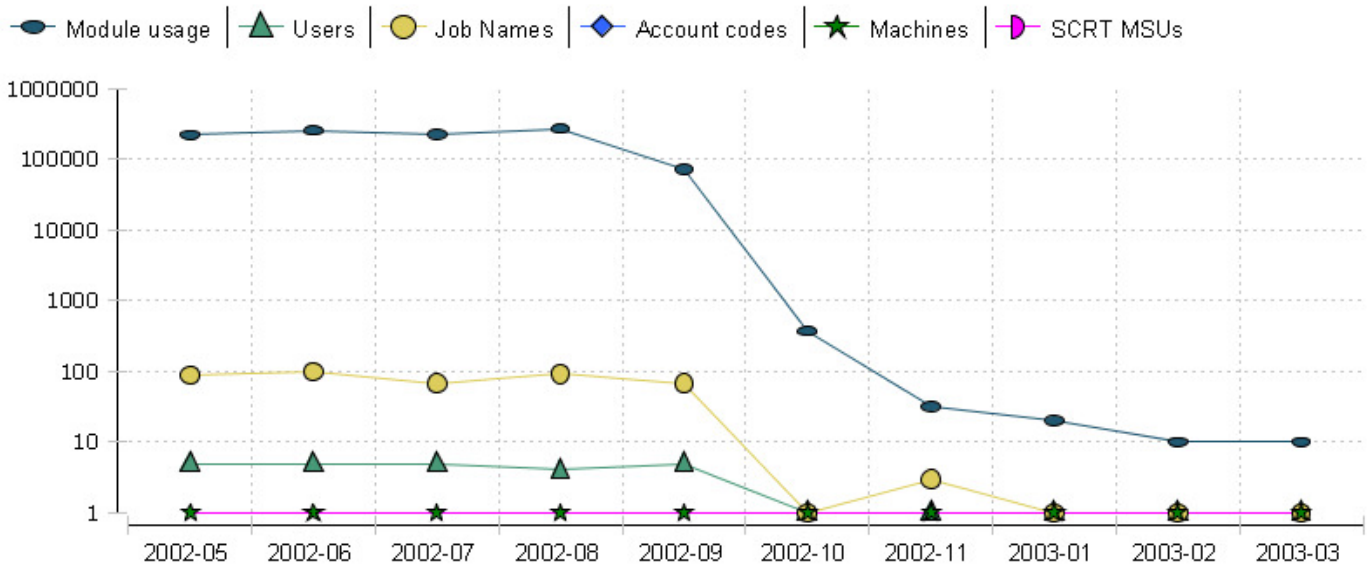
Tivoli IBM

Product Usage Trend

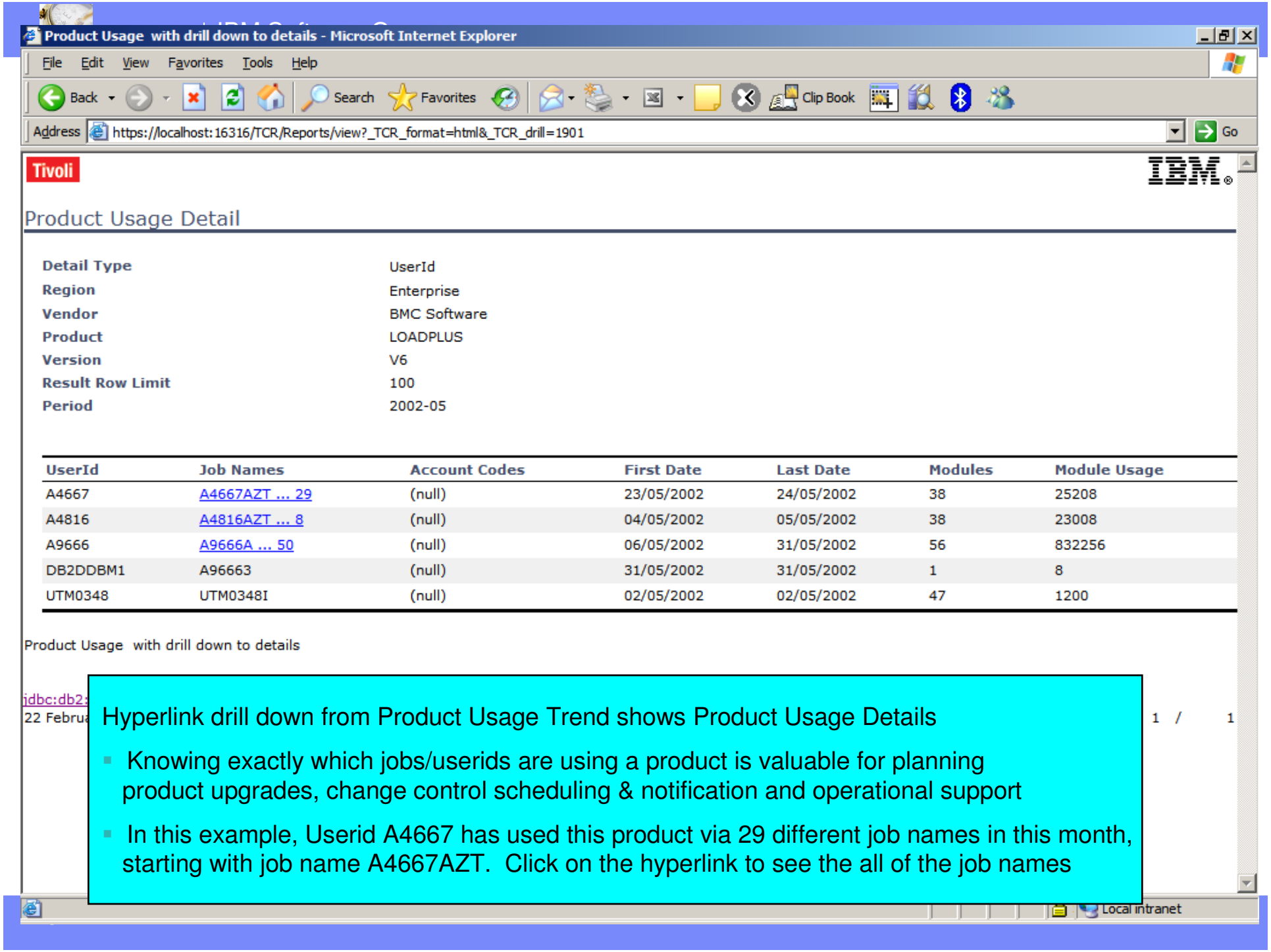
Region	Enterprise
Vendor	BMC Software
Product	LOADPLUS
Version	V6



Period	Module usage	Users	Job Names	Account codes	Machines	SCRT MSUs
2002-05	220420	5	88	0	1	0
2002-06	257748	5	100	0	1	0

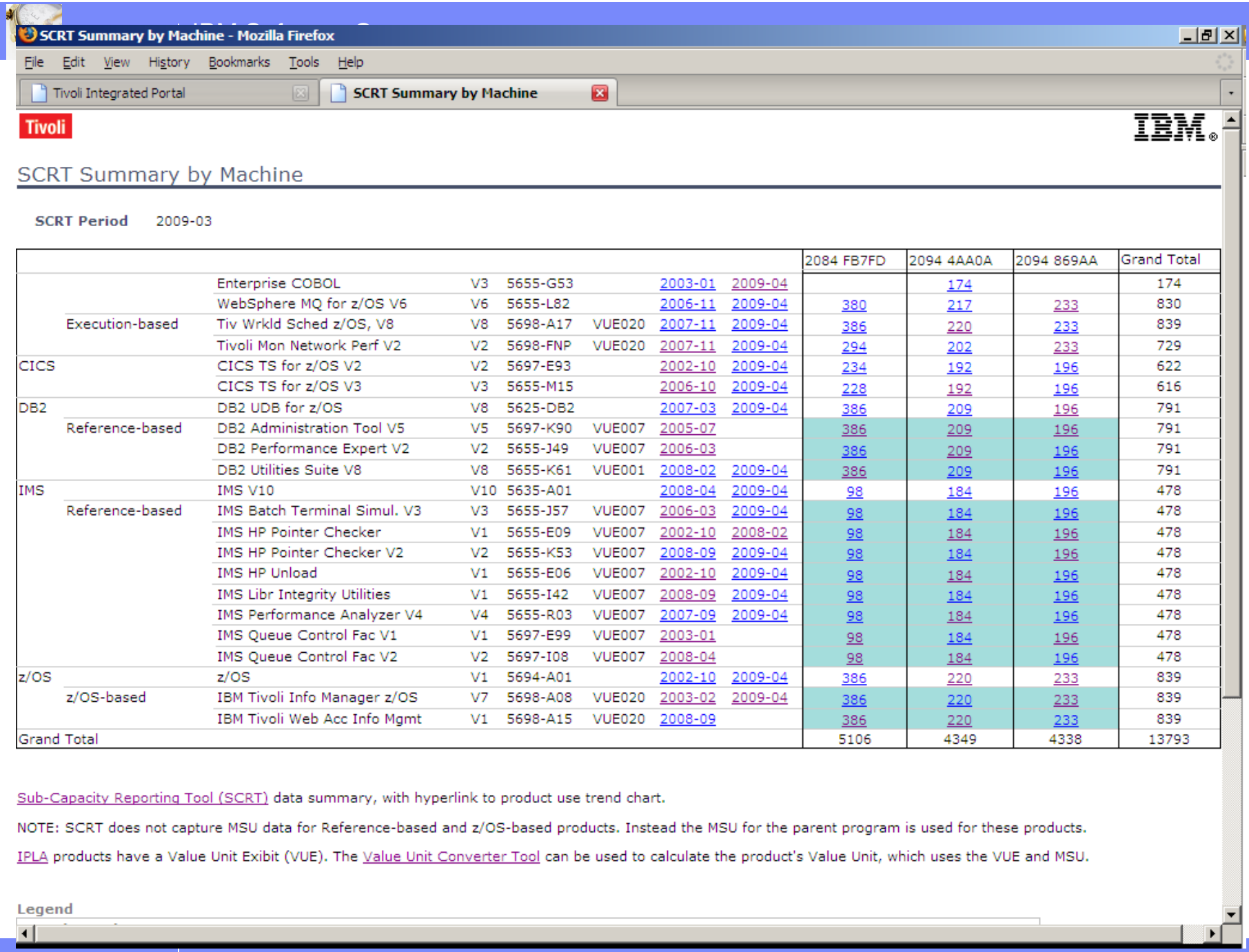
TADz Product Usage Trend reports highlight products that can potentially be dropped / consolidated.

- Hyperlink drill down to see who is using the product



Hyperlink drill down from Product Usage Trend shows Product Usage Details

- Knowing exactly which jobs/userids are using a product is valuable for planning product upgrades, change control scheduling & notification and operational support
- In this example, Userid A4667 has used this product via 29 different job names in this month, starting with job name A4667AZT. Click on the hyperlink to see the all of the job names



SCRT Summary by Machine

SCRT Period 2009-03

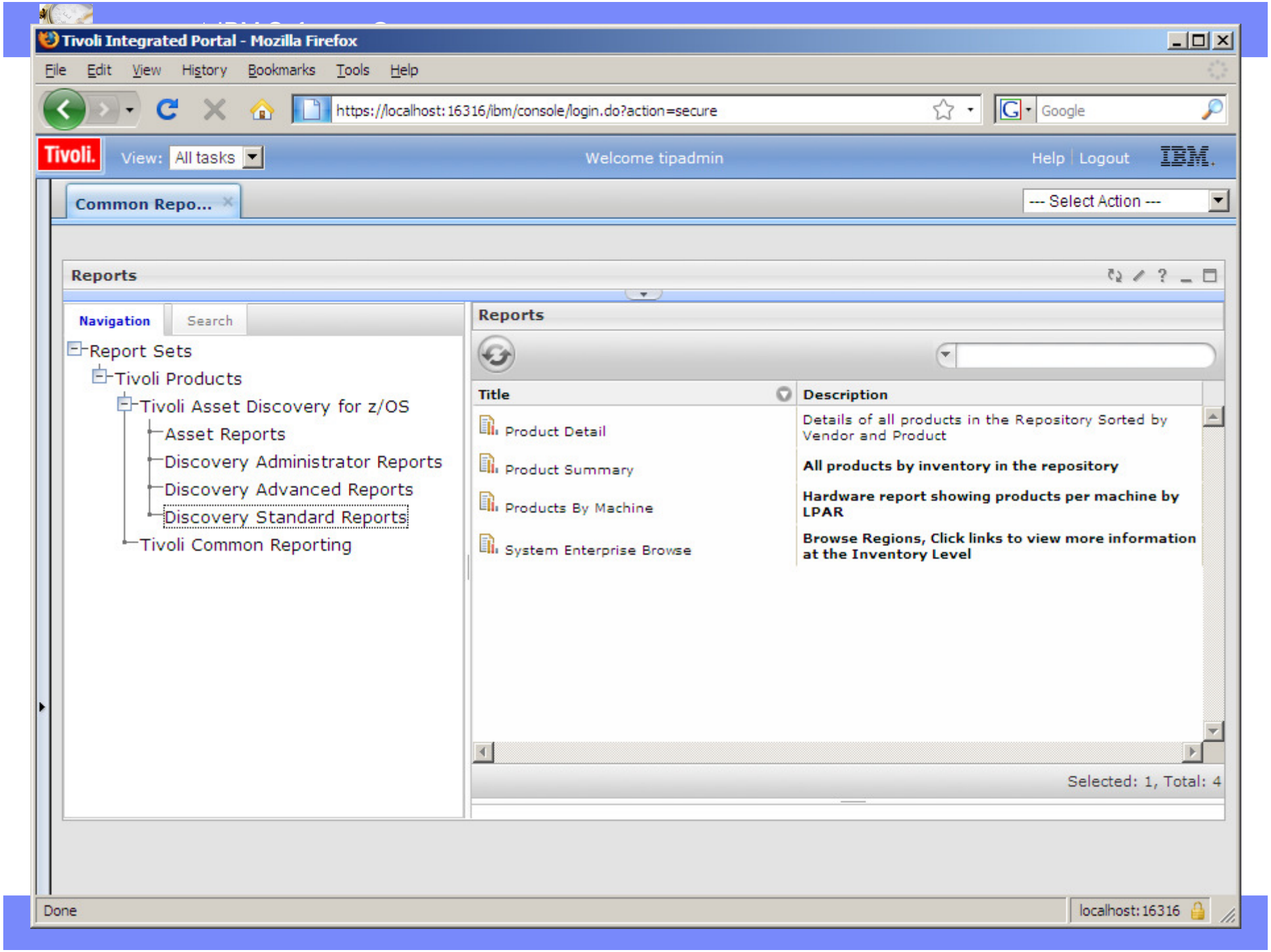
								2084 FB7FD	2094 4AA0A	2094 869AA	Grand Total
		Enterprise COBOL	V3	5655-G53		2003-01	2009-04		174		174
		WebSphere MQ for z/OS V6	V6	5655-L82		2006-11	2009-04	380	217	233	830
	Execution-based	Tiv Wrkld Sched z/OS, V8	V8	5698-A17	VUE020	2007-11	2009-04	386	220	233	839
		Tivoli Mon Network Perf V2	V2	5698-FNP	VUE020	2007-11	2009-04	294	202	233	729
CICS		CICS TS for z/OS V2	V2	5697-E93		2002-10	2009-04	234	192	196	622
		CICS TS for z/OS V3	V3	5655-M15		2006-10	2009-04	228	192	196	616
DB2		DB2 UDB for z/OS	V8	5625-DB2		2007-03	2009-04	386	209	196	791
	Reference-based	DB2 Administration Tool V5	V5	5697-K90	VUE007	2005-07		386	209	196	791
		DB2 Performance Expert V2	V2	5655-J49	VUE007	2006-03		386	209	196	791
		DB2 Utilities Suite V8	V8	5655-K61	VUE001	2008-02	2009-04	386	209	196	791
IMS		IMS V10	V10	5635-A01		2008-04	2009-04	98	184	196	478
	Reference-based	IMS Batch Terminal Simul. V3	V3	5655-J57	VUE007	2006-03	2009-04	98	184	196	478
		IMS HP Pointer Checker	V1	5655-E09	VUE007	2002-10	2008-02	98	184	196	478
		IMS HP Pointer Checker V2	V2	5655-K53	VUE007	2008-09	2009-04	98	184	196	478
		IMS HP Unload	V1	5655-E06	VUE007	2002-10	2009-04	98	184	196	478
		IMS Libr Integrity Utilities	V1	5655-I42	VUE007	2008-09	2009-04	98	184	196	478
		IMS Performance Analyzer V4	V4	5655-R03	VUE007	2007-09	2009-04	98	184	196	478
		IMS Queue Control Fac V1	V1	5697-E99	VUE007	2003-01		98	184	196	478
		IMS Queue Control Fac V2	V2	5697-I08	VUE007	2008-04		98	184	196	478
z/OS		z/OS	V1	5694-A01		2002-10	2009-04	386	220	233	839
	z/OS-based	IBM Tivoli Info Manager z/OS	V7	5698-A08	VUE020	2003-02	2009-04	386	220	233	839
		IBM Tivoli Web Acc Info Mgmt	V1	5698-A15	VUE020	2008-09		386	220	233	839
Grand Total								5106	4349	4338	13793

Sub-Capacity Reporting Tool (SCRT) data summary, with hyperlink to product use trend chart.

NOTE: SCRT does not capture MSU data for Reference-based and z/OS-based products. Instead the MSU for the parent program is used for these products.

IPLA products have a Value Unit Exibit (VUE). The Value Unit Converter Tool can be used to calculate the product's Value Unit, which uses the VUE and MSU.

Legend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--- Select Action ---
Reports
Navigation
Search
Report Sets
Tivoli Products
Tivoli Asset Discovery for z/OS
Asset Reports
Discovery Administrator Reports
Discovery Advanced Reports
Discovery Standard Reports
Tivoli Common Reporting
Reports
Title
Description
Product Detail
Details of all products in the Repository Sorted by Vendor and Product
Product Summary
All products by inventory in the repository
Products By Machine
Hardware report showing products per machine by LPAR
System Enterprise Browse
Browse Regions, Click links to view more information at the Inventory Level
Selected: 1, Total: 4
Done
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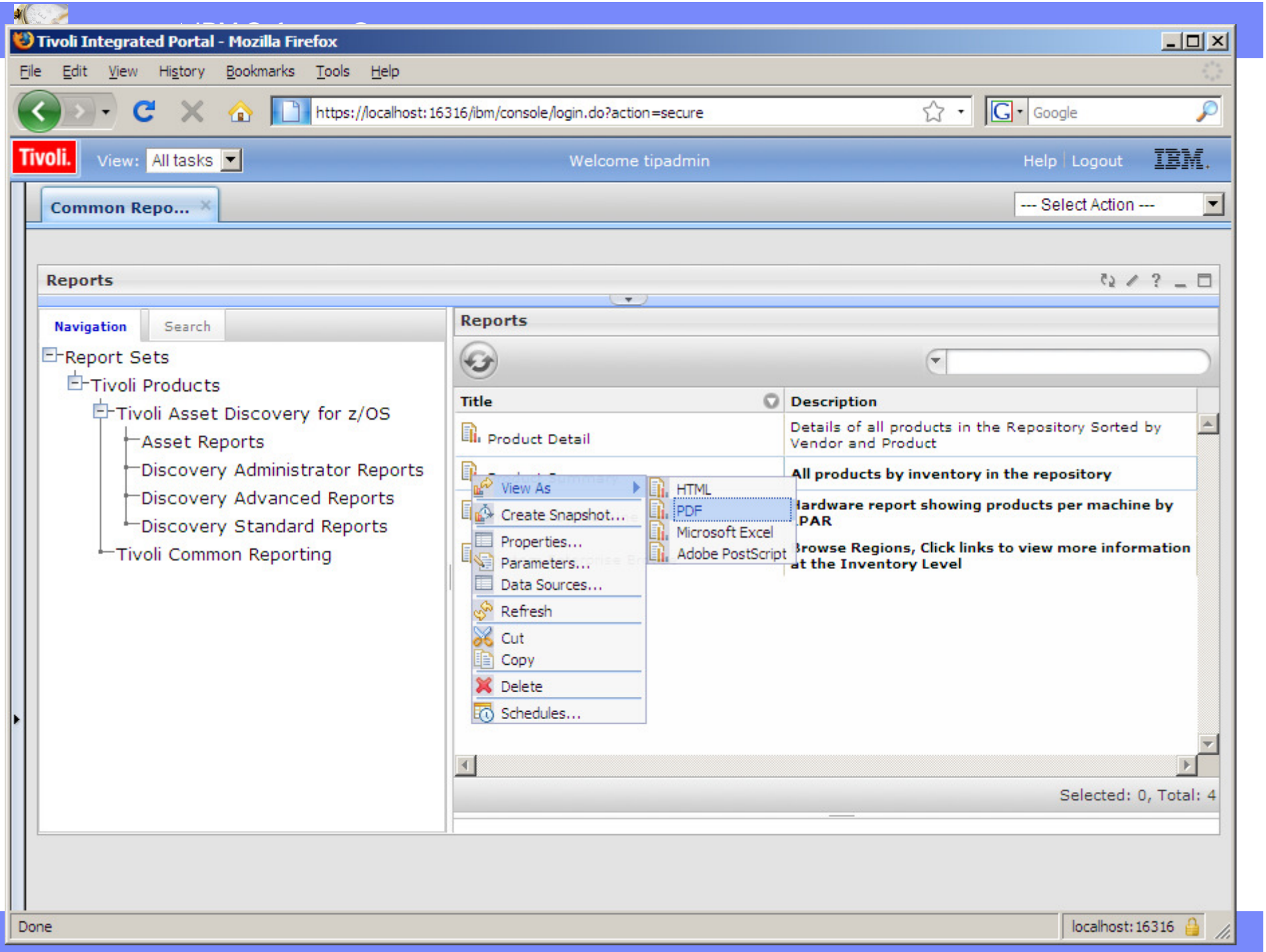
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Common Repo...
--- Select Action ---
Reports
Navigation
Search
Report Sets
Tivoli Products
Tivoli Asset Discovery for z/OS
Asset Reports
Discovery Administrator Reports
Discovery Advanced Reports
Discovery Standard Reports
Tivoli Common Reporting
Reports
Title
Description
Product Detail
Details of all products in the Repository Sorted by Vendor and Product
All products by inventory in the repository
View As
Create Snapshot...
Properties...
Parameters...
Data Sources...
Refresh
Cut
Copy
Delete
Schedules...
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PDF
Microsoft Excel
Adobe PostScript
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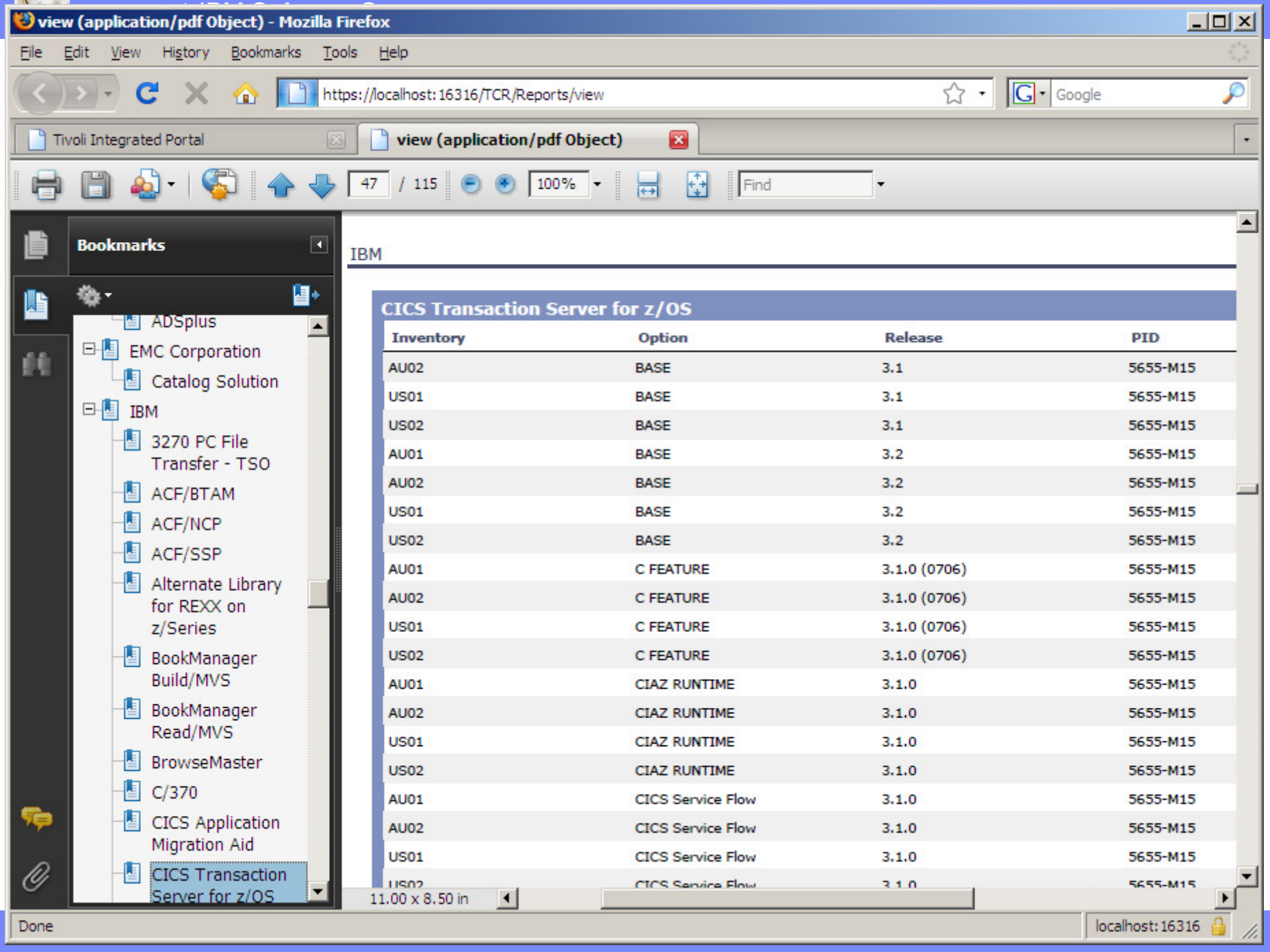
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Catalog Solution
IBM
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ACF/BTAM
ACF/NCP
ACF/SSP
Alternate Library for REXX on z/Series
BookManager Build/MVS
BookManager Read/MVS
BrowseMaster
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US01 BASE 3.1 5655-M15
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AU01 BASE 3.2 5655-M15
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AU02 CIAZ RUNTIME 3.1.0 5655-M15
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AU01 CICS Service Flow 3.1.0 5655-M15
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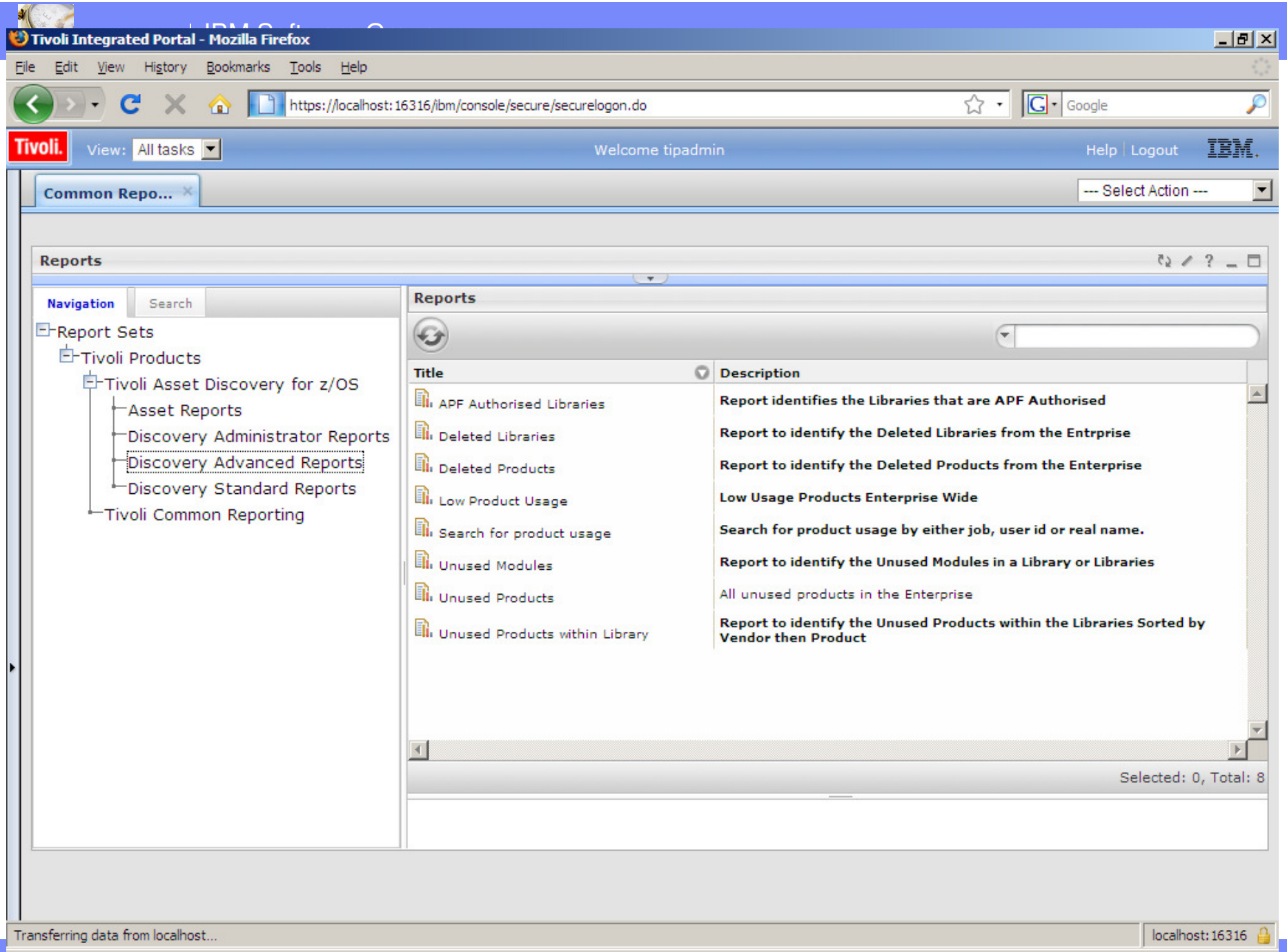
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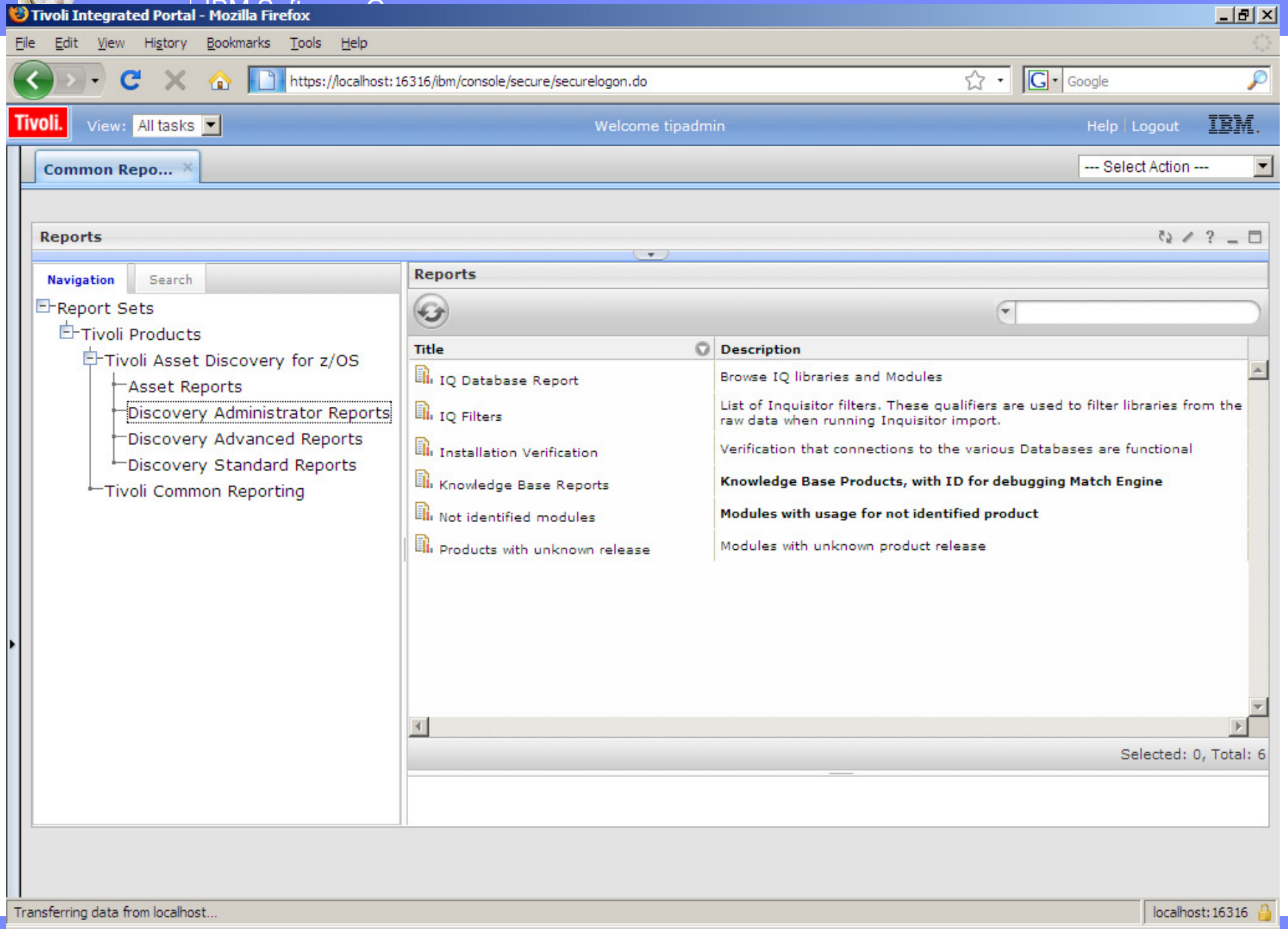
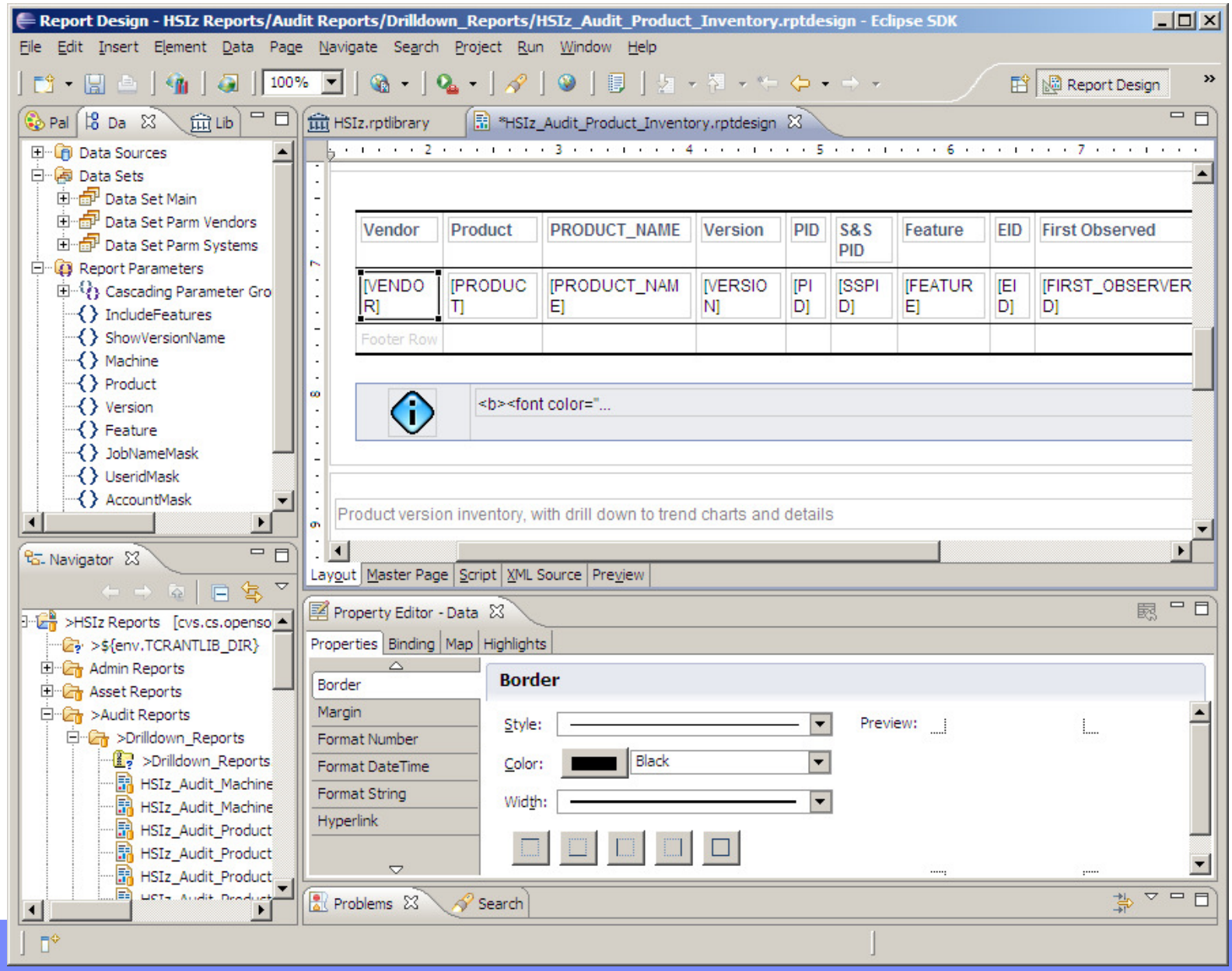
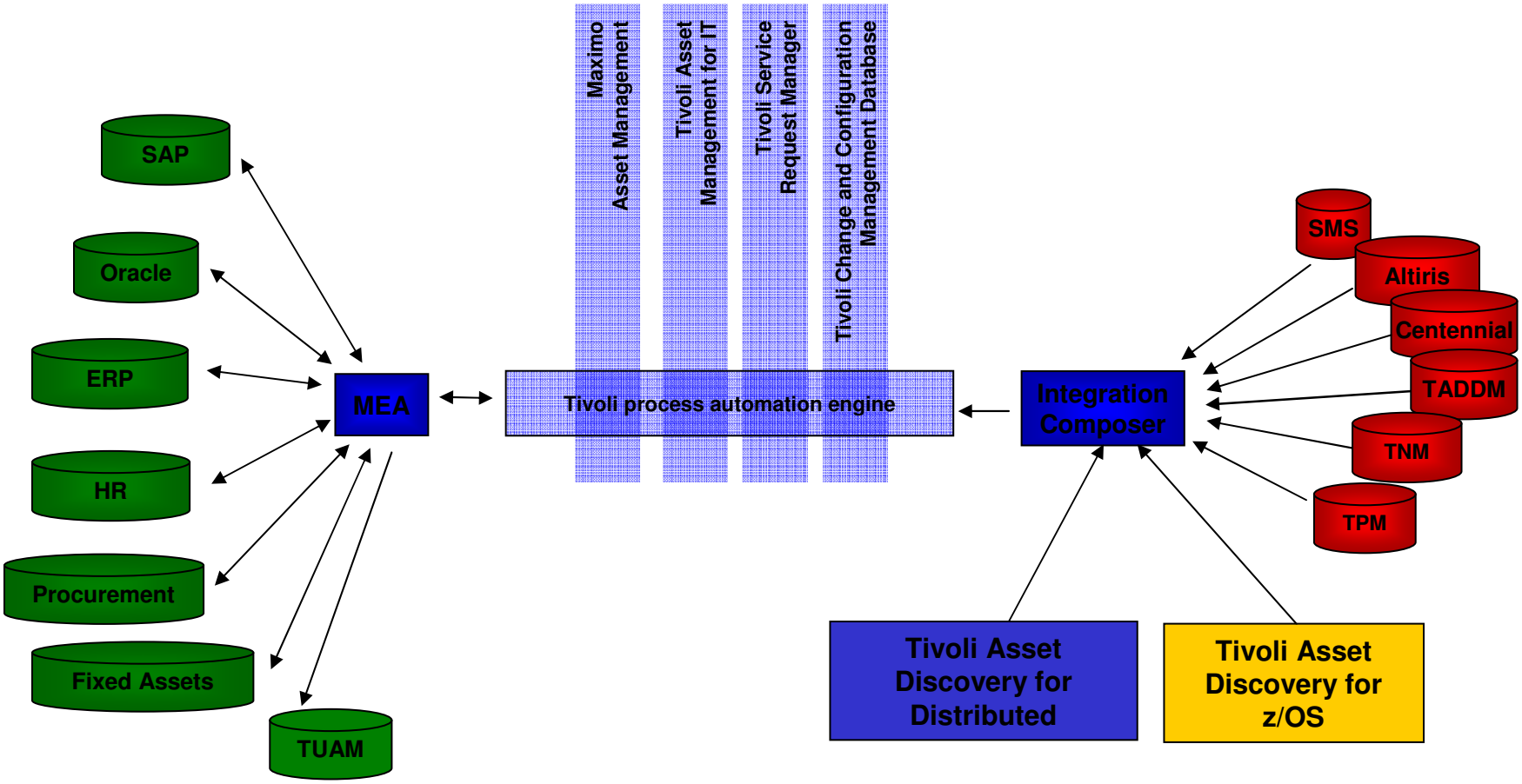
Tivoli.
View: All tasks
Welcome tipadmin
Help | Logout
IBM.
Common Repo...
--- Select Action ---
Reports
Navigation
Search
Report Sets
Tivoli Products
Tivoli Asset Discovery for z/OS
Asset Reports
Discovery Administrator Reports
Discovery Advanced Reports
Discovery Standard Reports
Tivoli Common Reporting
Reports
Title
Description
APF Authorised Libraries
Report identifies the Libraries that are APF Authorised
Deleted Libraries
Report to identify the Deleted Libraries from the Entrprise
Deleted Products
Report to identify the Deleted Products from the Enterprise
Low Product Usage
Low Usage Products Enterprise Wide
Search for product usage
Search for product usage by either job, user id or real name.
Unused Modules
Report to identify the Unused Modules in a Library or Libraries
Unused Products
All unused products in the Enterprise
Unused Products within Library
Report to identify the Unused Products within the Libraries Sorted by Vendor then Product
Selected: 0, Total: 8
Transferring data from localhost...
localhost:16316


Tivoli Integrated Portal - Mozilla Firefox
File Edit View History Bookmarks Tools Help
https://localhost:16316/ibm/console/secure/securelogon.do
Google
Tivoli.
View: All tasks
Welcome tipadmin
Help | Logout
IBM.
Common Repo...
--- Select Action ---
Reports
Navigation
Search
Report Sets
Tivoli Products
Tivoli Asset Discovery for z/OS
Asset Reports
Discovery Administrator Reports
Discovery Advanced Reports
Discovery Standard Reports
Tivoli Common Reporting
Reports
Title
Description
IQ Database Report
Browse IQ libraries and Modules
IQ Filters
List of Inquisitor filters. These qualifiers are used to filter libraries from the raw data when running Inquisitor import.
Installation Verification
Verification that connections to the various Databases are functional
Knowledge Base Reports
Knowledge Base Products, with ID for debugging Match Engine
Not identified modules
Modules with usage for not identified product
Products with unknown release
Modules with unknown product release
Selected: 0, Total: 6
Transferring data from localhost...
localhost:16316

Customers can add/clone/change TCR reports via BIRT



TAMIT Interfaces



Tivoli Asset Management for IT - Capabilities

Contract Management

- Contract Terms & Conditions
- Notifications
- Software Contracts
- Software License Management

Procurement

- Procure based on standards
- Create and route purchase orders
- Use catalogs
- Integrate with ERP systems

Financial Management

- Purchase/Lease Cost Tracking
- Work/Service Cost Tracking
- Total Cost of Ownership

Asset Discovery

- Desktop Discovery
- Server Discovery
- Software License Usage (Distributed & z/OS)
- Deep Network Device Discovery
- Storage Device Discovery

IT Asset Management

Asset Management

- Software Asset Management
- Hardware Asset tracking
- Installs, moves, adds, changes
- Reconciliation/Audit
- Extend beyond IT (data center facilities, power, etc.)

Work Management

- Work planning and scheduling
- Skills, labor, and inventory management
- Service plans and cost management

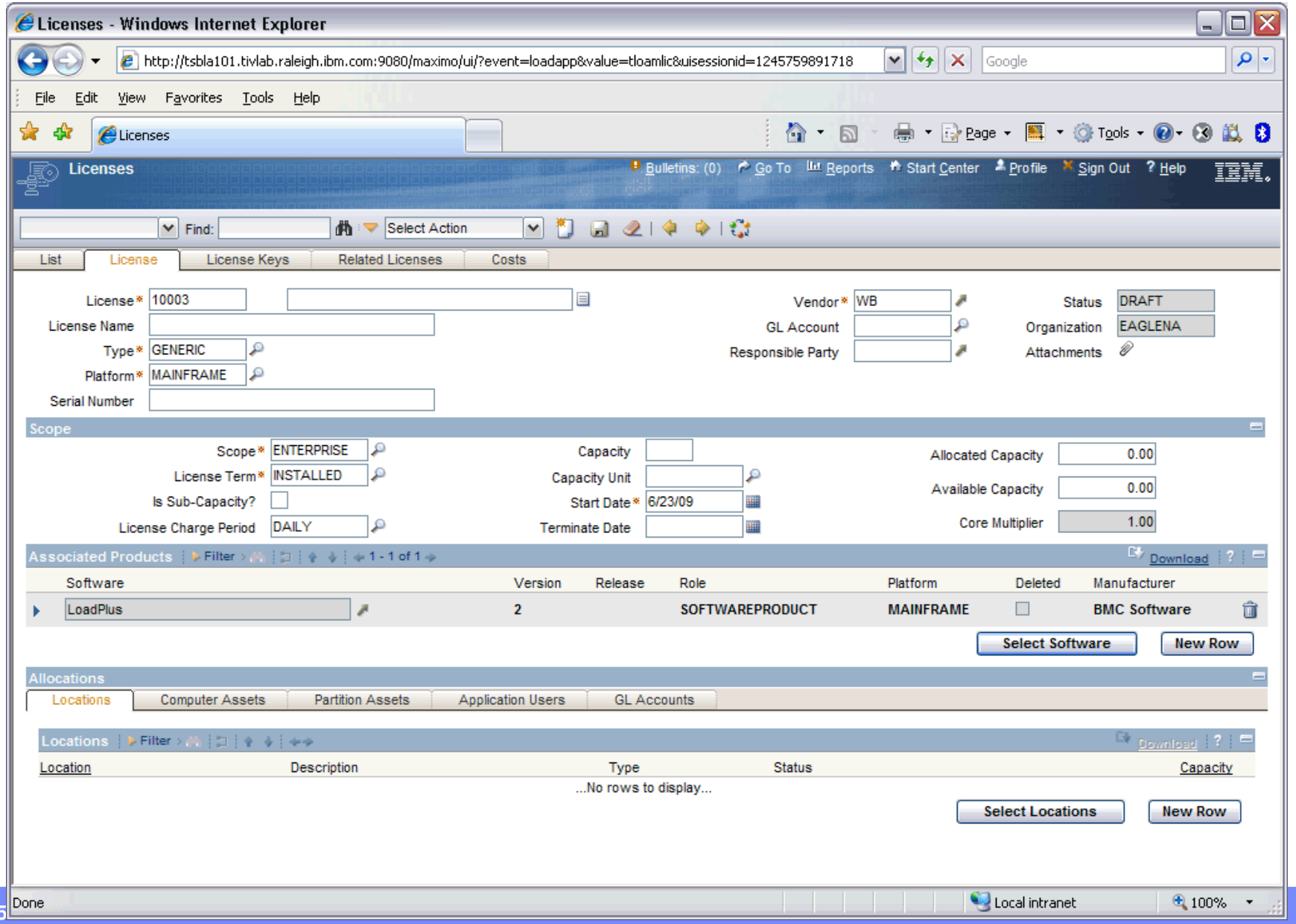
Service Management

- Tivoli CCMDB
- Support service desk with asset configuration data
- Service Impact Management

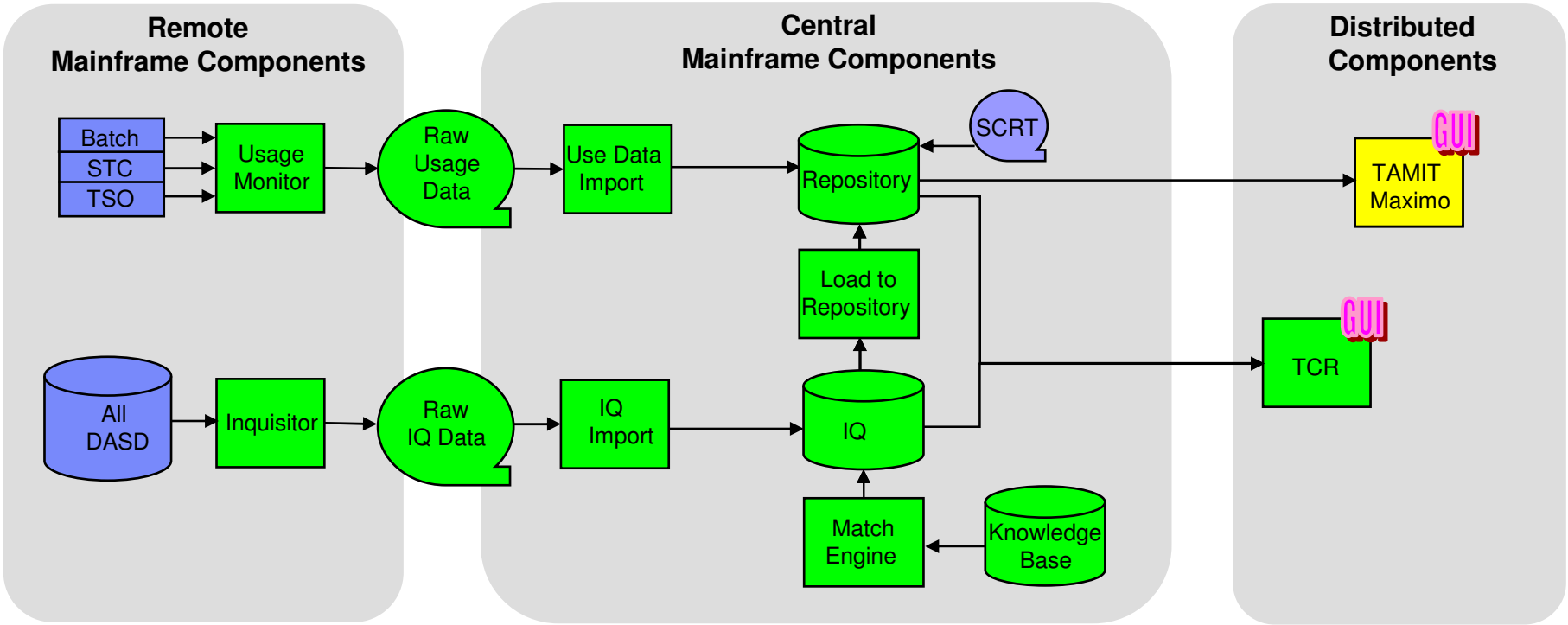
Easy Configuration

- UI, dashboards, KPIs, reports
- Process workflows with alerts & escalations
- New applications

Sample Mainframe Software License in TAMIT



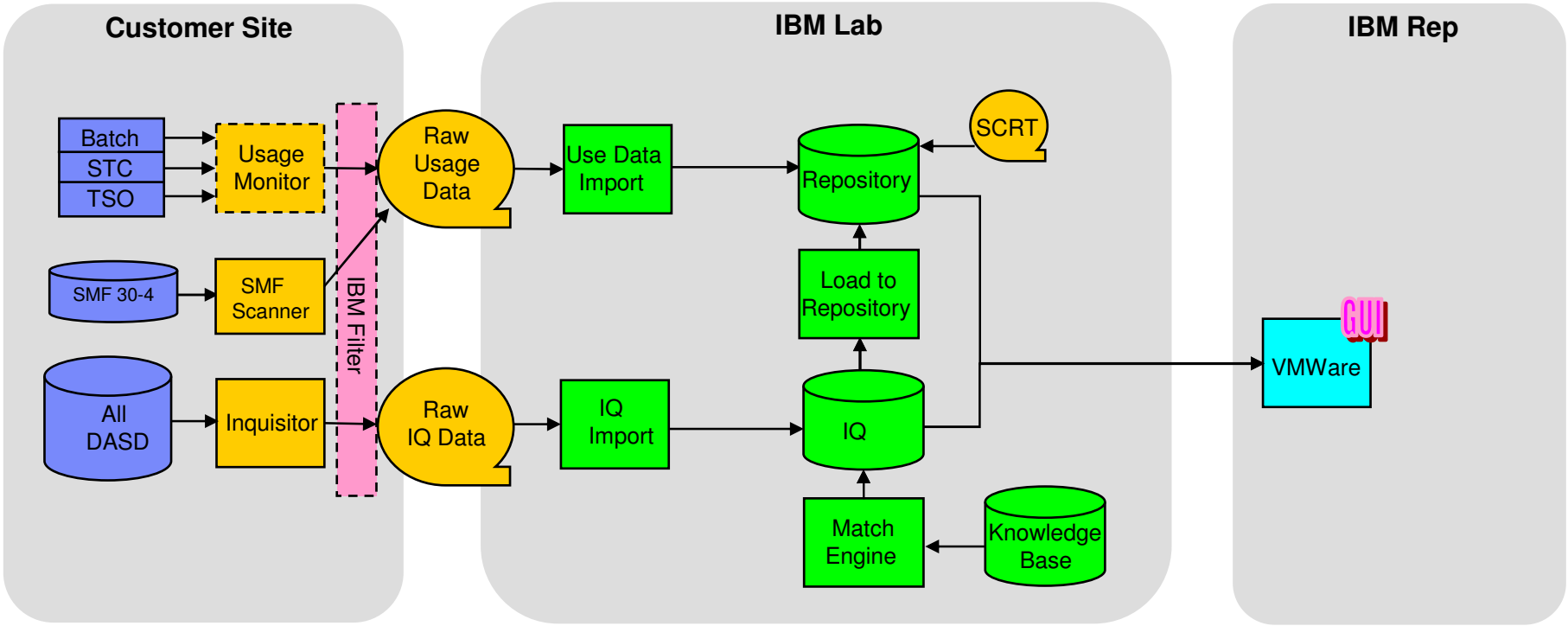
TADz Core Architecture



- TADz uses DB2 on a central z/OS
  - One subsystem/database with several schemas
  - Designed to keep overhead on production (remote) LPARs as low as possible
- Tivoli Common Reporting (TCR) queries the TADz database on z/OS via JDBC.
  - Server: 2 GB RAM - Windows, zLinux, Linux, HP-UX, AIX. Client Web Browser: Internet Explorer, Firefox
  - Report formats: HTML, PDF, Excel
  - Customers can add their own reports using Business Intelligent Reporting Tool (BIRT)
- Optional integration with Tivoli Asset Management for IT (TAMIT)

TADz Quick PoC – Customer gathers raw data only and sends to IBM lab for processing

1 week average time to value, with minimal customer resources e.g. 4 hours customer time



- **1 to 2 elapsed days for customer**
- Install target libraries and run simple batch jobs to capture raw data
- Send raw data to IBM lab
- SMF 30-4 for historical usage data
- Optional filter for IBM modules only
- Output can be browsed to confirm it does not contain confidential data
- NO need to learn TADz
- NO need to set up DB2 or TCR

- IBM lab processes the raw data (IBM Rep arranges the engagement by contacting tadz@au1.ibm.com)
- 1 to 5 day turn around depending on resource availability
- Repository data is exported from DB2 on z/OS and imported into a VMWare image for a portable demo

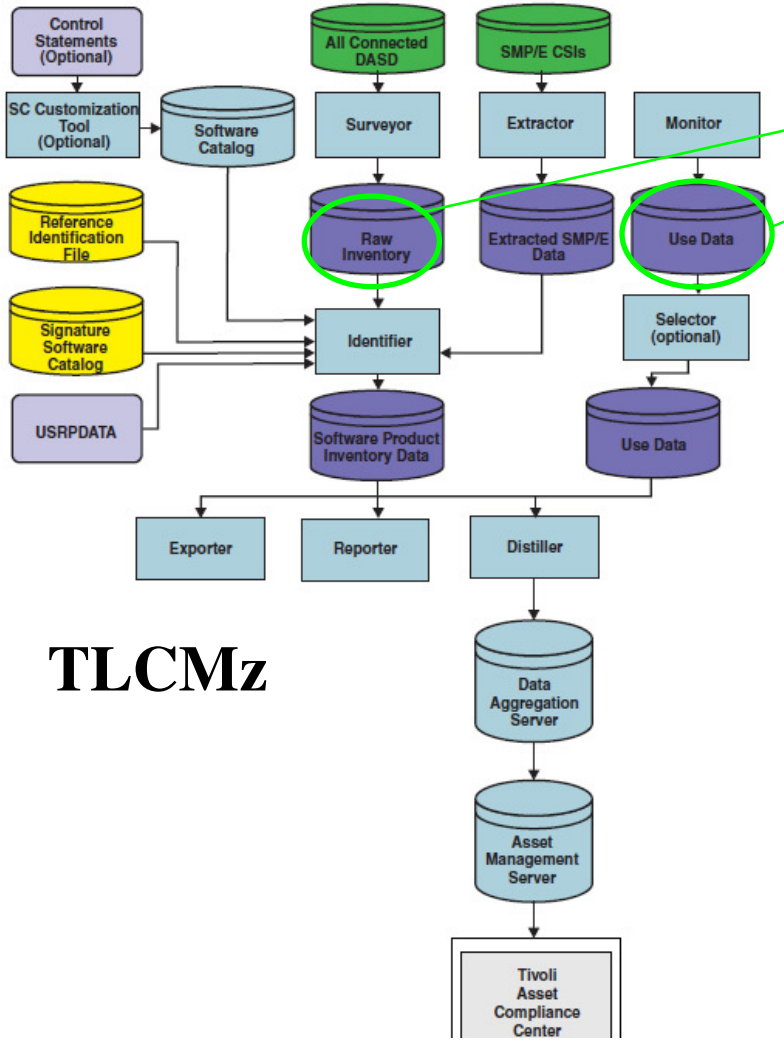
- Demonstration of TADz results with customer data

Note: SMF 30-4 data only covers products that are invoked directly via Job EXEC PGM
For PoC, this enables you to see historic usage trends ASAP for a subset of products.
To see usage for all products, the TADz Usage Monitor must be deployed.

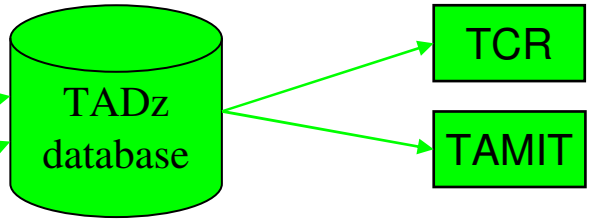
TADz is significantly BETTER than TLCMz

- Existing TLCMz customers have FREE upgrade entitlement to TADz
- Better reporting
  - TADz has interactive web reporting. See product usage trends and quickly hyperlink drill down to see the details such as where the product is deployed (datasets, LPARs) and who is using it (userids, job names, job account codes).
- Better scanning performance
  - The TADz inquisitor is over 90% quicker than the TLCMz Surveyor
- Better product identification quality
  - TADz does NOT use customer SMP/E data, which was an error prone part of TLCMz identification process
  - Superior Knowledge Base
- Better product usage data collection
  - TADz Usage Monitor aggregates data daily and this is further aggregated monthly when imported into the TADz database. Whereas TLCMz monitor has no aggregation, which means higher volume data that the reporting component churns through for each report.
  - SMF data can be leveraged to see historical trends before TADz's Monitor is deployed
- Better longevity
  - TADz is the IBM strategic technology that has replaced TLCMz
  - TLCMz v3.2 end of services is September 2010
  - TLCMz v4.1 end of services is April 2011
  - TLCMz v4.2 end of service has not been announced yet but is likely to be in 2012.

Easy Migration from TLCMz to TADz



TLCMz



Upgrading from TLCMz to TADz can be done in 2 phases for very quick time to value

1. Import TLCMz raw data from production into the TADz central database.
   - No need to wait for TADz code to be rolled out to production.
   - Benefit from better reporting and better discovery quality asap
2. Roll out TADz code to production LPARs to replace TLCMz Monitor & Surveyor
   - To be done later when convenient for customer change control schedule
   - Better performance

TADz Improved Scanning Performance

- Inquisitor scanning time is significantly quicker that TLCMz Surveyor, since load modules are NOT read to determine a hash signature.
  - Match Engine exploits DB2 and only needs the module name / size, which can be determined by reading load module dataset directories and HFS directories.
- Output file is automatically zip compressed to reduce the output size.
- The following benchmark statistics were gathered by scanning an environment that has:
  - 846 DASD volumes
  - 6,127 load module datasets
  - 2,186,756 load modules

MASSIVE IMPROVEMENT

	TLCMz Surveyor	TADz Inquisitor	Percentage
Total CPU time (seconds)	11,777	236	2 %
Total Elapsed time (seconds)	18,052	2,130	12 %
Total DASD output (tracks)	2,340	135	6 %

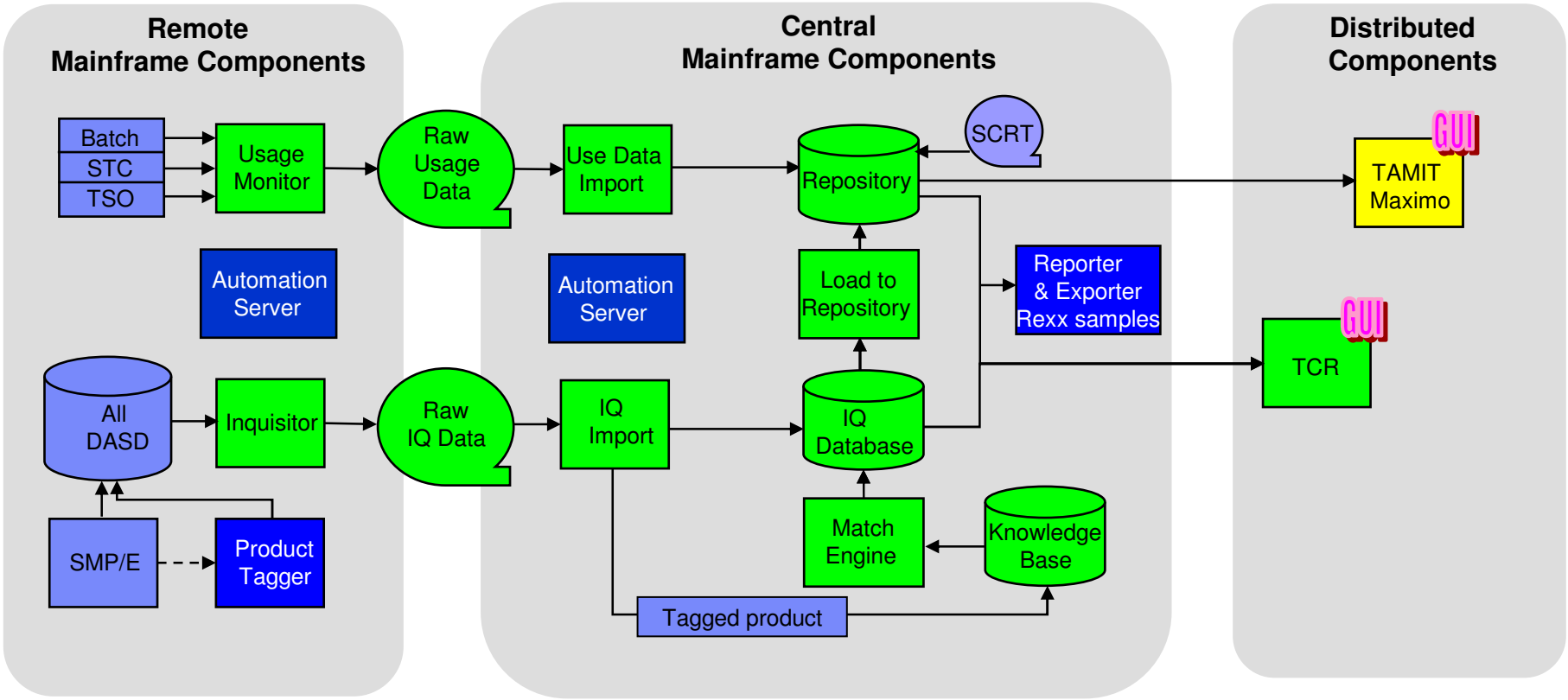
TADz Improved Usage Monitoring

- The TADz Usage Monitor runs as a Started Task on all z/OS images.
- Tracks when load modules are loaded into memory by job name, userid and job account code.
- Aggregated daily e.g. if the same job + userid + account code is run 100 times in a day, the statistics are aggregated.
  - TLCMz Monitor records each instance (high volume data) and the TLCMz Reporter churned through the data to perform the aggregation
- Output is zipped compressed and imported into the TADz repository
- False usage is not counted for:
  - Modules that could not be accessed due to security violation
  - Modules that were not found e.g. if a product is uninstalled and a job gets a s806 abend, usage for this product module will not be counted. Whereas it is counted in TLCMz.

Only IBM can do it !

- TADz is based on proven code that has evolved over 15 years
  - This is specialized technology that has needed time to make robustness and perform well.
  - Other vendors entering into this market are still naive to the pitfalls
- The TADz knowledge base has been growing for over 15 years
  - 278 Vendors
  - 1,685 Product Versions
  - 8,360 Product Releases
  - 1,569,160 Product Module signatures
- Other vendors may be able to create a knowledge base for recent products. However being able to detect old products is just as important as being able to detect new ones.
  - Production z/OS systems are rarely built from scratch (unlike distributed). When a new product release is installed, it is common for the old release to remain installed indefinitely since it is hard to determine when it is no longer being used.
  - Getting rid of old products reduces support issues and reduces possible compliance violations. For example, an application may have a STEPLIB to an old product and this can make troubleshooting problems very hard.
- Some vendors are claiming CCMDB discovery of z/OS Configuration Items (CI) but they do not come close to IBM's coverage:
  - The IBM z/OS Discovery Library Adapter (z/OS DLA) provides specialized discovery for configuration items e.g. discovers IMS subsystems, transactions, databases etc
  - TADz provides specialized discovery of z/OS software products e.g. discovers IMS product module deployment & usage. The information gathered is needed for the scenarios previously explained, which go beyond CCMDB scope. In addition, the top level discovery data that TADz has gathered, can also be used in CCMDB via TAMIT.

Questions ?



- Get the best value from your z/OS software budget
- Reduce unexpected outages from z/OS asset upgrades
- Optional integration with Tivoli Asset Management for IT

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