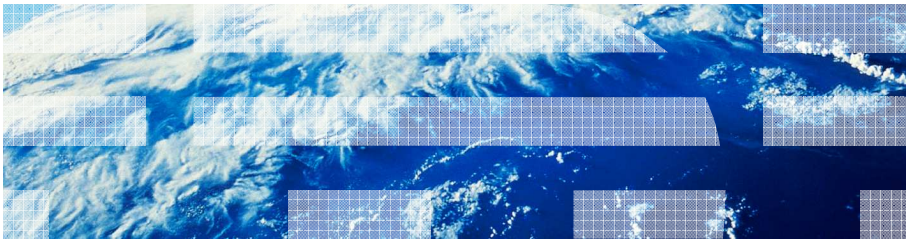
CICS Transaction Server V4.2

CICSPlex System Manager enhancements



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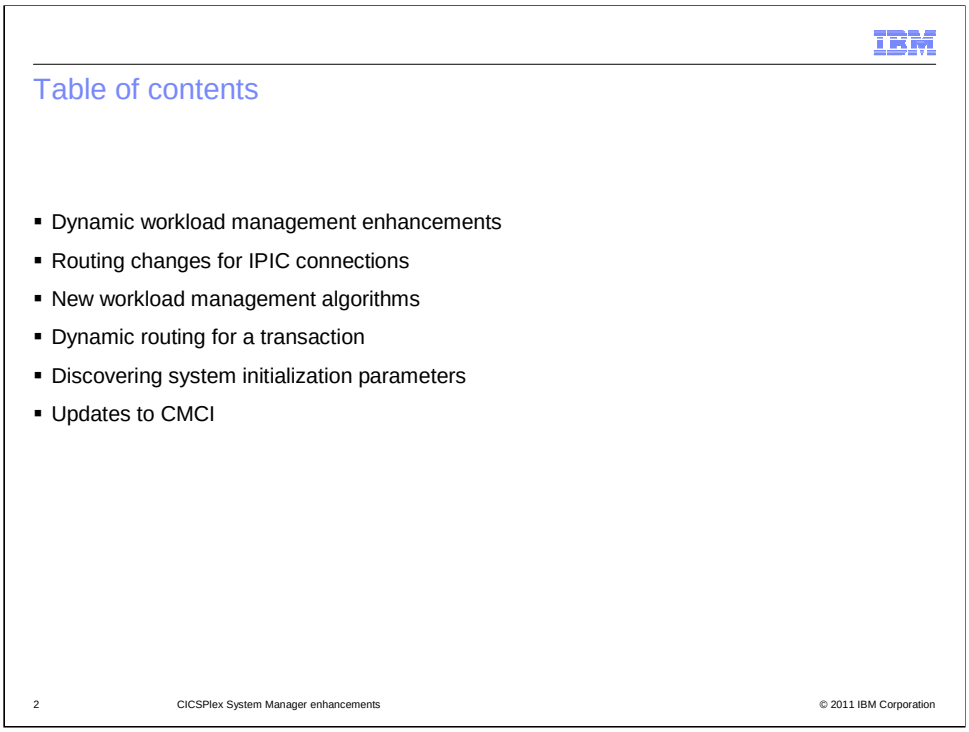
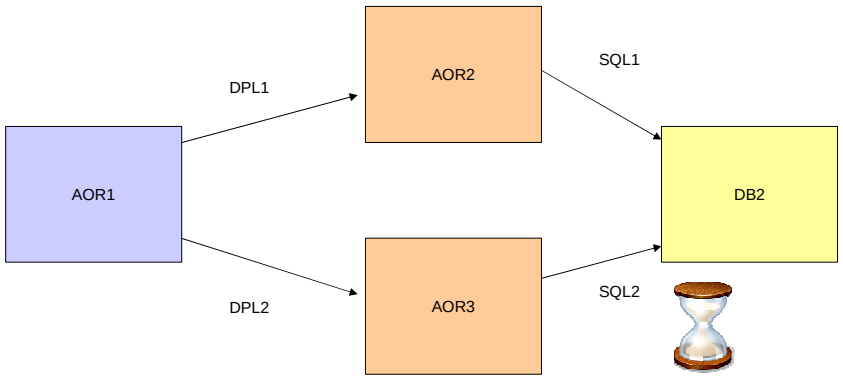
CICSPlex SM System Manager has been enhanced to improve the management of different workloads in CICS.



This module provides an overview of the enhancements to system management. These enhancements include dynamic workload management, routing changes for IPIC connections, new workload management algorithms, dynamic routing for transactions, discovering system initialization parameters, and some updates to the CICS management client interface.

Improvements to dynamic workload management

- Resolves problems with multiple DPLs in a single UOW
- Known as the UOW affinity problem



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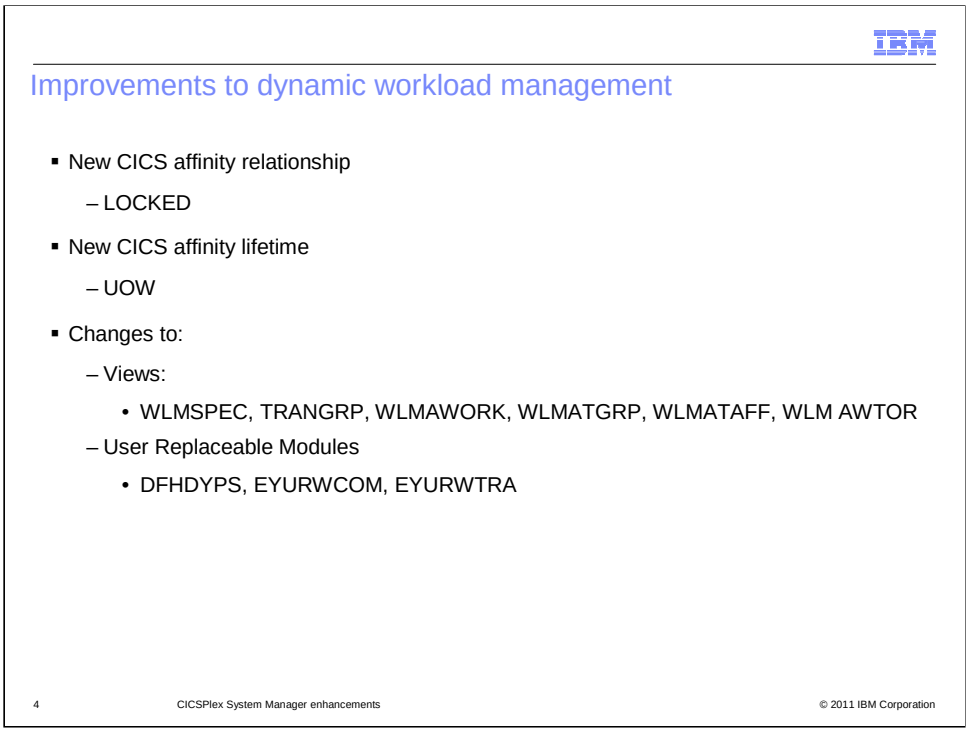
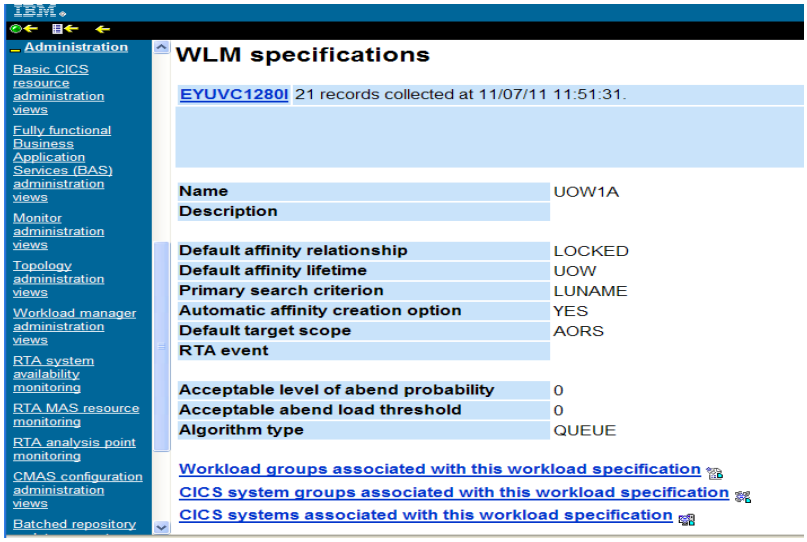
When using dynamic workload management, problems can occur during the use of multiple dynamic program link (DPL) requests in a single unit of work (UOW). When multiple invocations of the same dynamically-routed program in a unit of work access a common resource and one program link locks the resource, if the subsequent program link is routed to a different region, a deadlock can occur.



To prevent this problem, work must not be routed away from the region that locked the resource. CICS TS 4.2 introduces a new type of CICS affinity associated with a unit of work, and extends CICSPlex SM workload management (WLM) to manage these unit of work affinities for DPL requests. The new affinity is restricted to programs that are dynamically linked. Programs with this type of affinity are routed to the same target region for the duration of a unit of work. These affinities are defined with an affinity relation of LOCKED and an affinity lifetime of UOW.

In CICSPlex SM, you can create transaction groups and WLM specifications incorporating this new type of affinity using the TRANGRP and WLMSPEC resource tables. CICSPlex SM workload management administration views are updated with new fields and field values to configure unit of work affinities. The Active workloads detailed view is also improved by the addition of new fields to display extra workload-related object counts. The dynamic transaction routing user-replaceable modules DFHDYPDS, EYURWCOM, and EYURWTRA also support the improvements to dynamic workload management.

Affinity properties on a WLM specification



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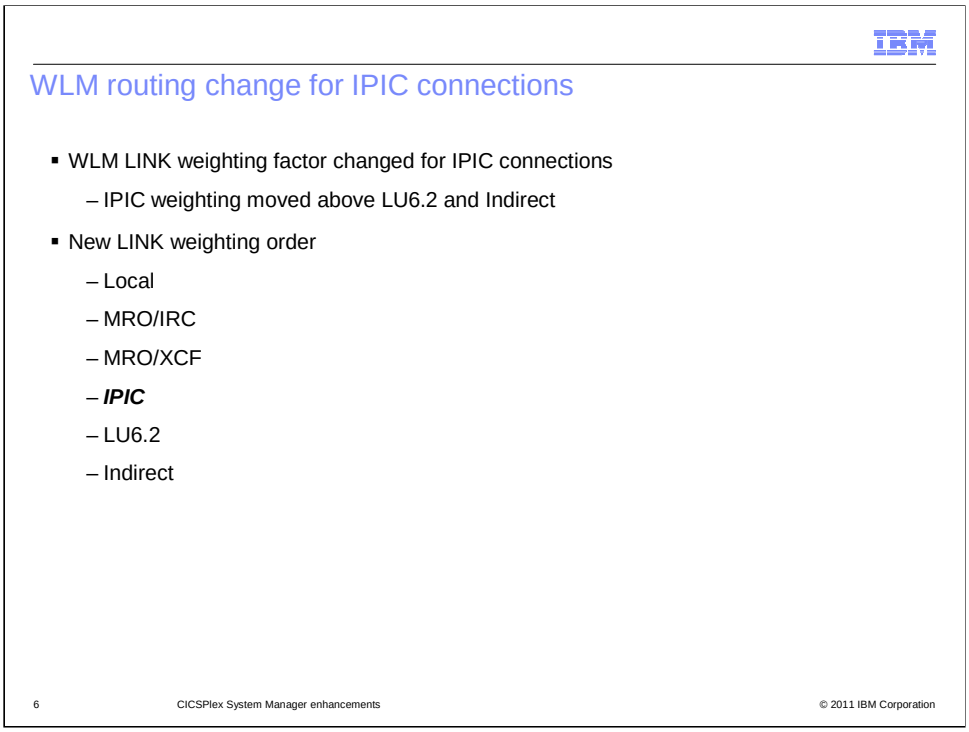
This screen capture shows the enhanced view for a workload management specification. The affinity relationship is set to LOCKED and the lifetime is set to UOW.



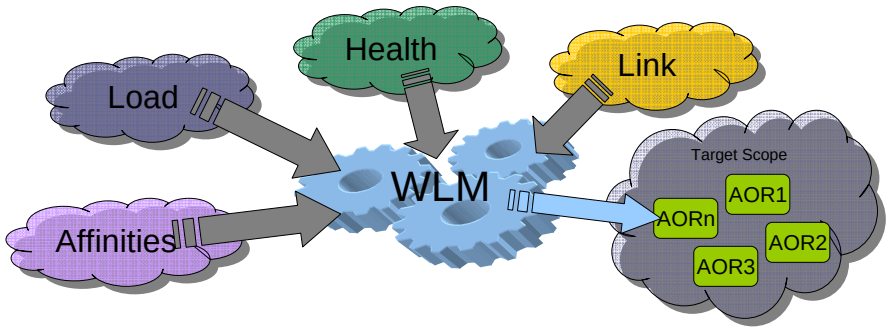
Workload management can use the type of connection between routing regions and target regions as a weighting factor when making dynamic routing decisions. The weighting applied to IP interconnectivity (IPIC) connections has been decreased to make target regions using this type of connection more attractive in decisions to route work requests.

In CICSPlex SM workload management, the dynamic routing process makes an evaluation of the viability or health of a target region when making workload routing decisions. These decisions are based on routing algorithms containing weighting factors. Two of the four routing algorithms, the QUEUE and GOAL algorithms, use the type of connection between routing and target regions as a significant weighting factor. The weighting applied to IPIC connections is altered to make this type of connection relatively more attractive than in previous releases of CICS TS.

In CICS TS 4.2 the relative connection weights put links in an order of priority where local is most weighted and indirect is least weighted. CICSPlex SM uses the weighting factor of the link as a multiplier against the task load and other factors to determine an overall routing weight. At the end of the evaluation, the region with the lightest weight is normally selected as the target region. No differentiation is made between the different types of IPIC links that are possible.

CICSPlex SM workload management

- Provide CICS with the best target region at the moment the request is made from all possible regions
- It's not about evenly distributing work



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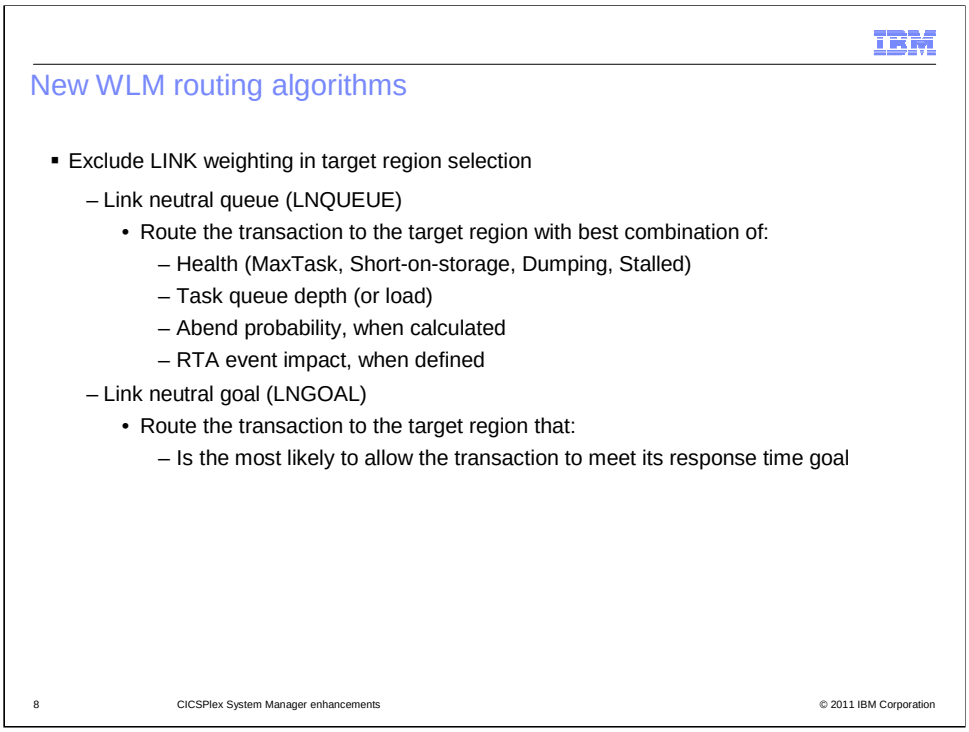
Workload management is about providing CICS with the best target region at the moment the request is made from all the possible candidate regions. Dynamic routing decisions are based on the most current load data for a potential routing target region. A routing decision is based on a combination of factors. The number of tasks in the region is factored as a percentile value, calculated by dividing the target region MAXTASKS setting with the current task count. The health status of the region is factored by assigning arithmetic weights, depending on whether the region is short-on-storage, taking a transaction dump, taking a system dump, running at its MAXTASKS limit, or in a CICSPlex SM stall. The speed of the link between the router and the target is factored by assigning arithmetic weights, depending on whether the target region is linked to the target by an MRO connection, an XCF connection, an LU6.2 connection, an IPIC connection, or if the target region is the router itself. If any outstanding real-time analysis (RTA) events are associated with the workload, this is factored by assigning arithmetic weights depending on the severity of the events outstanding. These events are factored in only when the event name is specified in the WLM specification for the workload or any Transaction Group definitions associated with it. Regardless of any other factors, if the routing request has an outstanding affinity associated with it, that affinity always overrides the route decision.

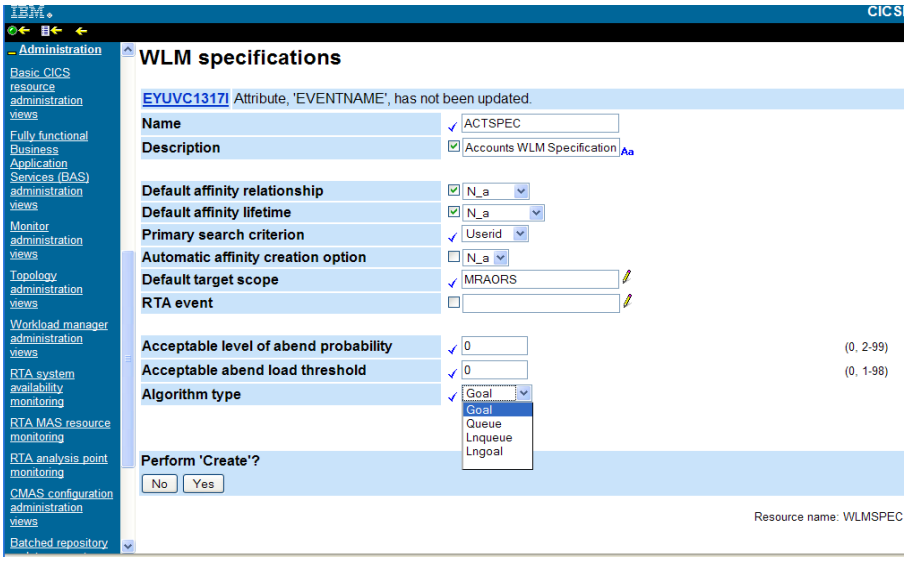


CICSPlex SM has two new workload management routing algorithms that exclude the connection type as a weighting factor in decisions to direct work requests to a target region. Links between router regions and target regions can be different types. In previous CICS releases, workload management directed work requests to a target region using one of two weighting algorithms; the queue algorithm or the goal algorithm. In both of these algorithms the type of links between the router and the target are significant weighting factors, which are used along with other factors when distributing work from a router to a target. Link weighting can have a strong impact on the routing behavior in some situations and can prevent CICS transaction routing across system-boundaries in a single-site parallel sysplex environment.

Two new algorithms are introduced; the link neutral queue and the link neutral goal. These algorithms correspond to the existing QUEUE and GOAL algorithms but exclude the connection type as a weighting factor. The link neutral queue algorithm selects the target region that has the shortest queue of work waiting to be processed, relative to the maximum number of tasks permitted in the target region, is the least affected by conditions such as short-on-storage, system dumps, and transaction dumps, and is the least likely to cause the transaction to stop.

The link neutral goal algorithm selects the target region that is the most likely to allow the transaction to meet the response time goal set for it and other transactions in its z/OS workload management class. The link neutral goal algorithm reverts to the link neutral queue algorithm when multiple target regions are achieving the same best response time goals, or when the target and routing regions are managed by different CMASs.

Specifying algorithm type on a WLM specification



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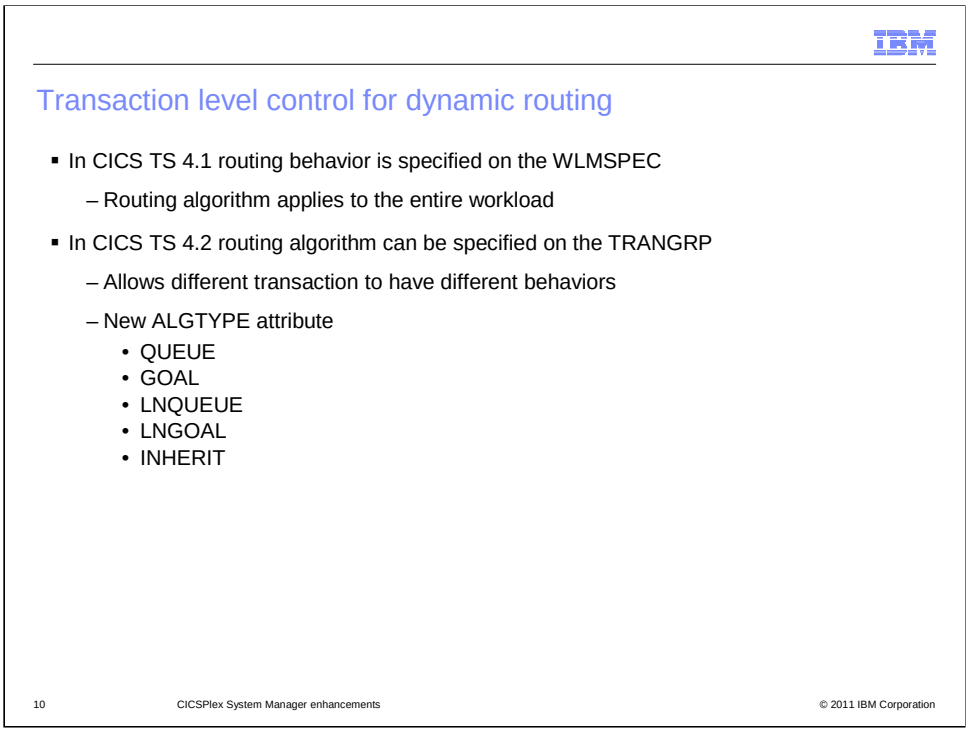
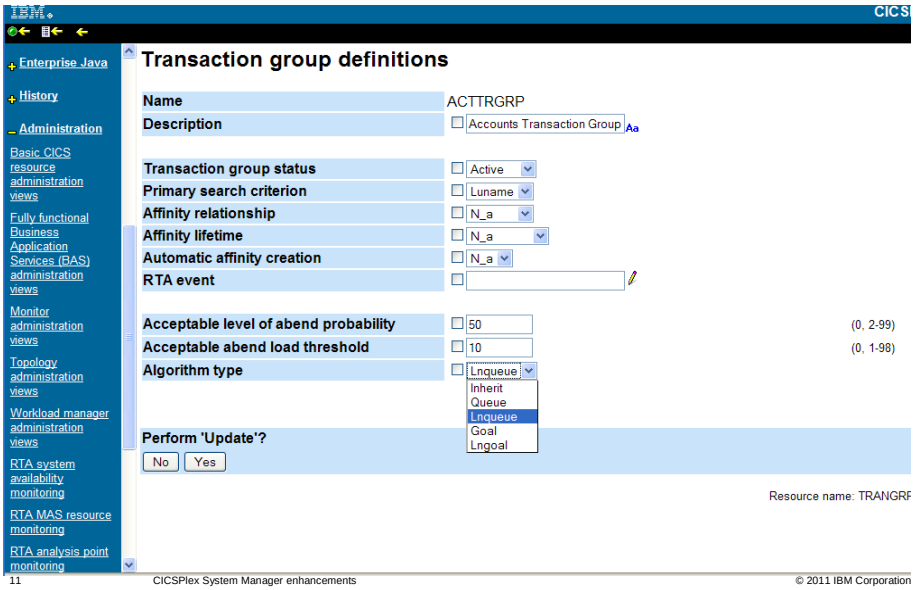
You can specify the new algorithms in the same way as GOAL and QUEUE when defining a workload specification. The screen capture shows the new options on the Algorithm type field.



You can now use workload routing to control dynamic routing behavior at the transaction level. You can specify an alternate dynamic routing algorithm for specific transactions in a workload that is different from the algorithm defined in the parent workload management specification. A workload specification controls the default routing behavior for all the transactions that workload management is called on to evaluate in a routing region or routing system group. You can override certain routing characteristics by supplying associated pairs of workload management definitions and transaction group definitions to specify a specialized routing evaluation to be applied to one or more transactions. However, before CICS TS 4.2 you have not been able to specify alternate workload routing characteristics in this way. Workload routing is the directing of transactions amongst a group of target regions according to the availability and activity levels of those target regions. The criteria used to select a target region is determined by the choice of routing algorithm, each of which contains a different combination of weighting factors.

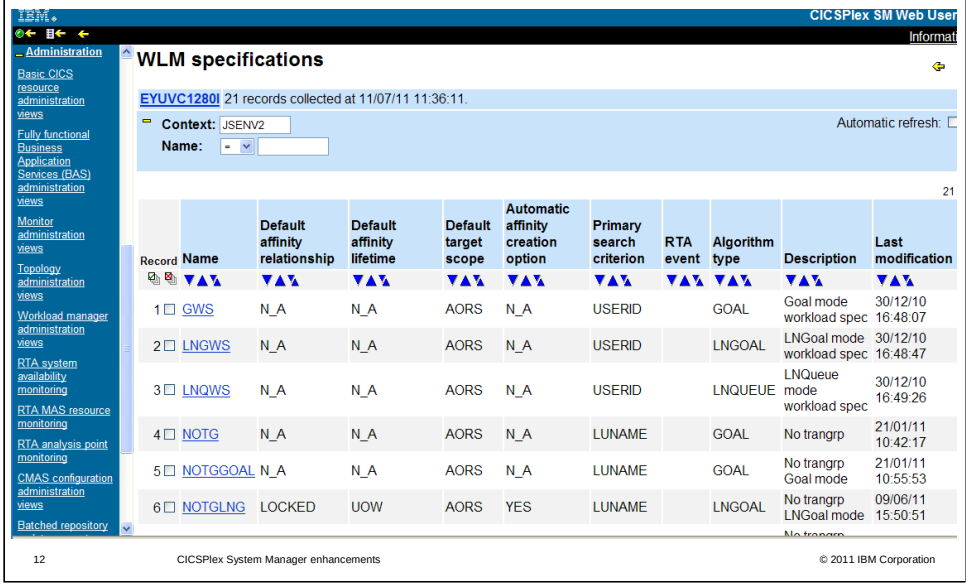
In CICS TS 4.2 you can now specify one of four routing algorithms in a transaction group and this overrides the default algorithm associated with the workload specification. Specifying an alternate routing algorithm in this way also means that you can change workload routing characteristics for specific target regions dynamically without stopping your routing region.

Specifying algorithm type on a transaction group



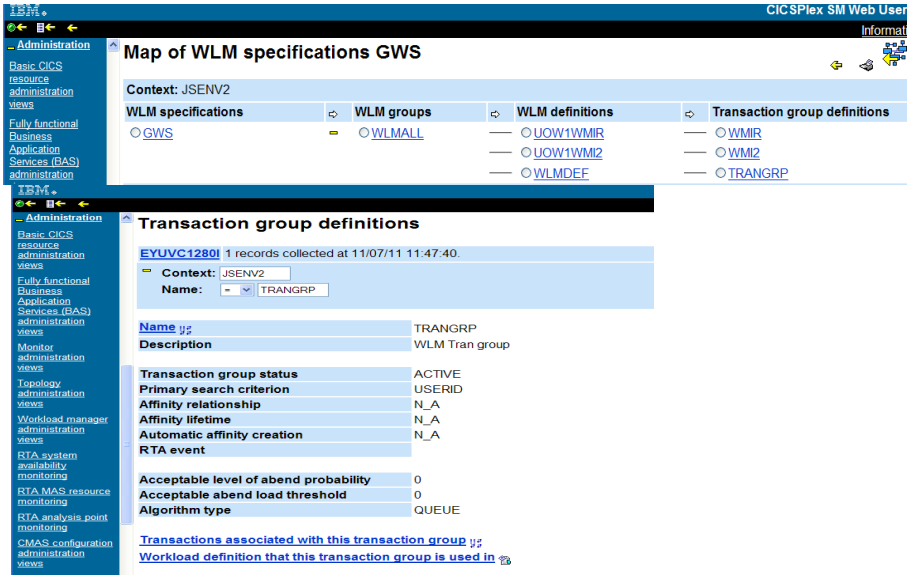
This screen capture shows the algorithm types that you can specify for a transaction group.

Algorithm types specified on WLM specifications



This screen capture shows the algorithm type for a set of workload management specifications. The first workload management specification in the list is called GWS and has an algorithm type of GOAL.

Algorithm type specified on a transaction group



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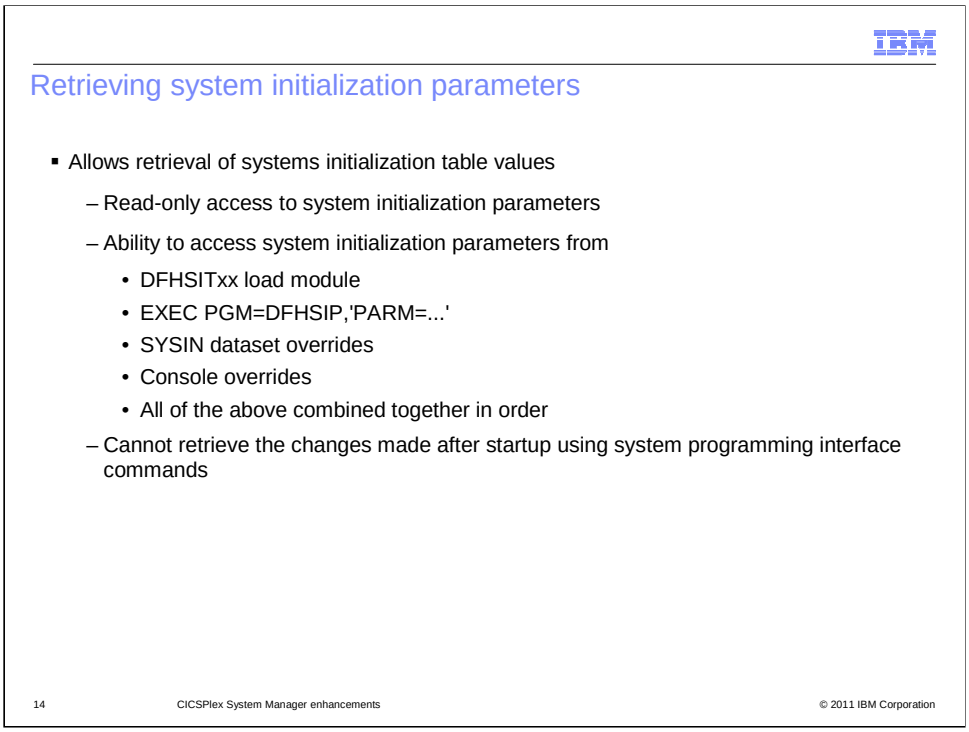
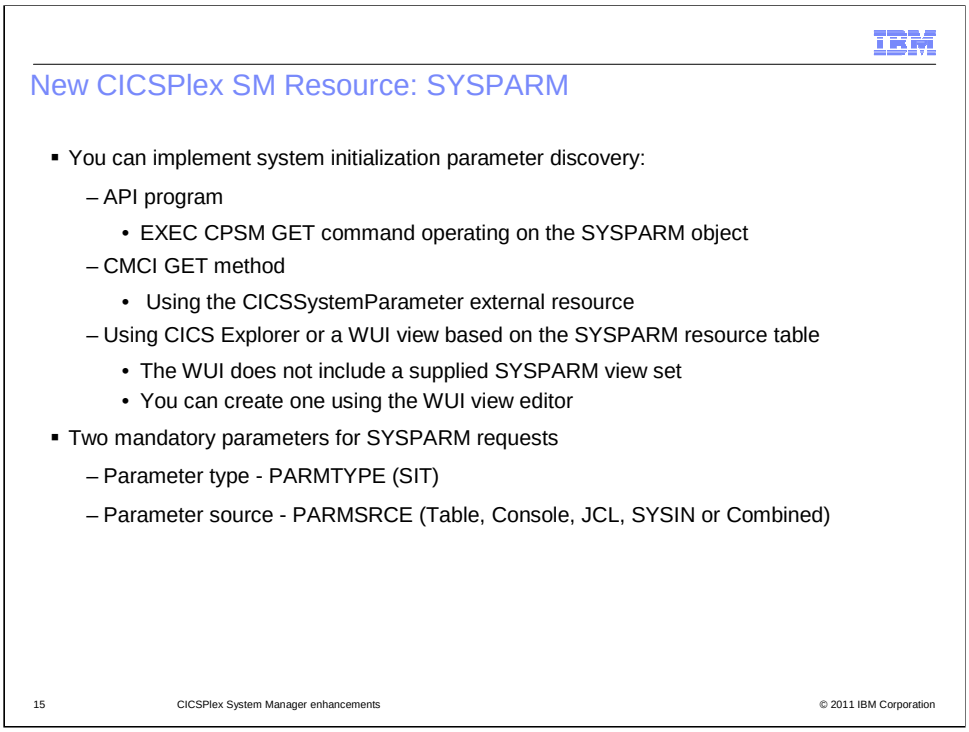
These screen captures show the relationship between the workload management specification GWS and its transaction group definitions. The transaction group definition has an algorithm type of QUEUE that overrides the parent workload management specification.



You can now use the CICSPlex SM API to discover information about CICS system initialization parameters and system initialization parameter overrides. The new API capability is implemented using the new CICSPlex SM resource SYSPARM. When you retrieve parameters you can retrieve the current values of the parameters in the system initialization table including any override values. You can retrieve the original parameter values as specified at system startup. You can also retrieve the values from a single override source. You cannot, however, retrieve changes in the values of parameters that were made after startup using system programming interface commands. In common with many other CICSPlex SM operations, you can control which CICS regions the retrieval operates on by specifying context and scope.

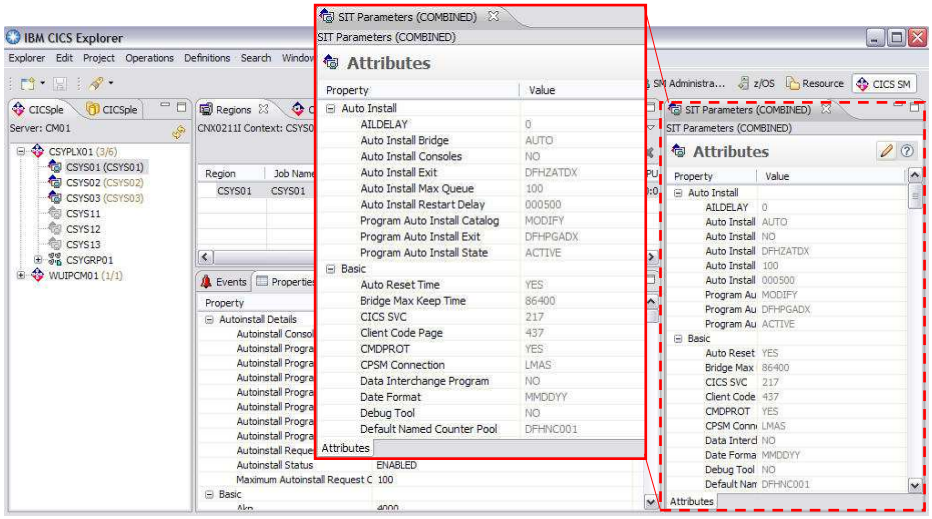


The API capability is implemented using the new CICSPlex SM resource SYSPARM. The SYSPARM resource has two required parameters, parameter type and parameter source, associated with the GET operation. You use these parameters to specify which parameters to retrieve according to their source.

You can implement system initialization parameter discovery in three ways. You can use an EXEC CPSM GET command operating on the SYSPARM object in an API program. You can use the CMCI GET method operating on the equivalent CMCI external resource. You can also use CICS Explorer or the web User Interface view to view the system initialization parameters. In CICS Explorer, select the region and right-click. Select Show SIT parameters in the menu and click the parameter source. The WUI does not include a supplied SYSPARM view set, but you can create one using the WUI view editor.

When you use EXEC CPSM GET command or CMCI, you can define a parameter expression using PARMSRCE and PARMTYPE to specify which parameters to retrieve. In the CICS Explorer and Web User Interface, you can use the parameter source and type as filters to control the displayed records.

CICS Explorer combined view of parameters



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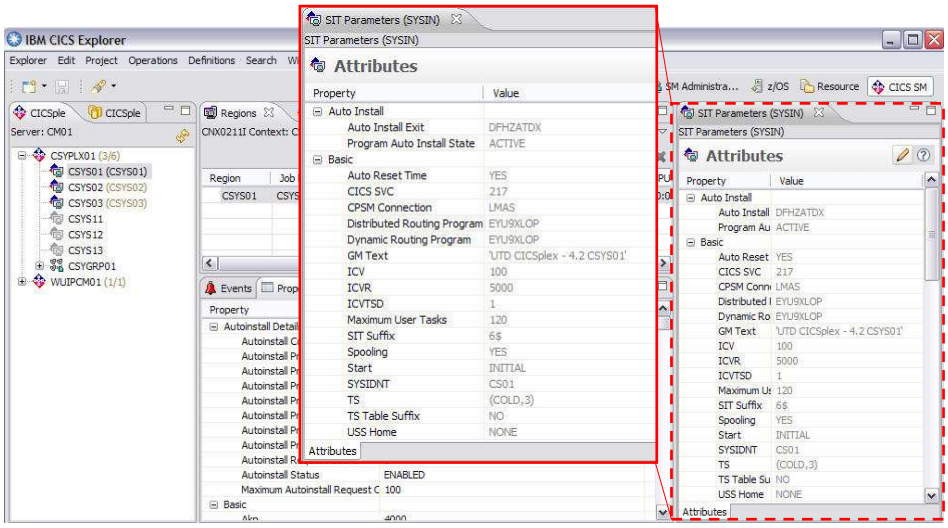
This screen capture of CICS Explorer shows a combined view of all the system initialization parameters for a CICS region.

CICS Explorer view of SYSIN parameters



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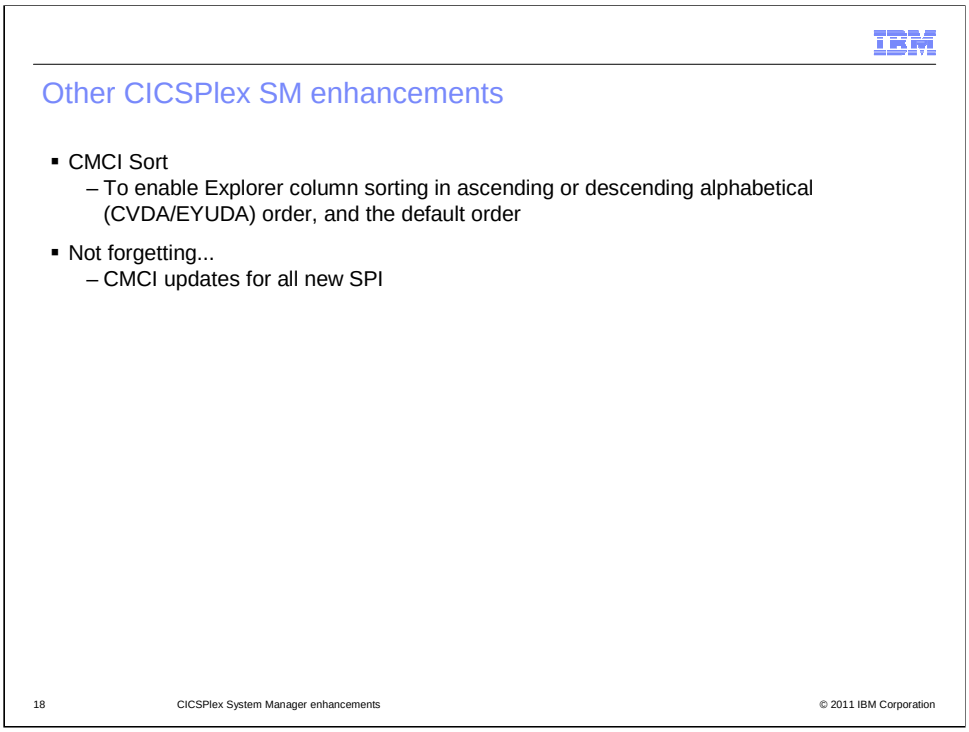
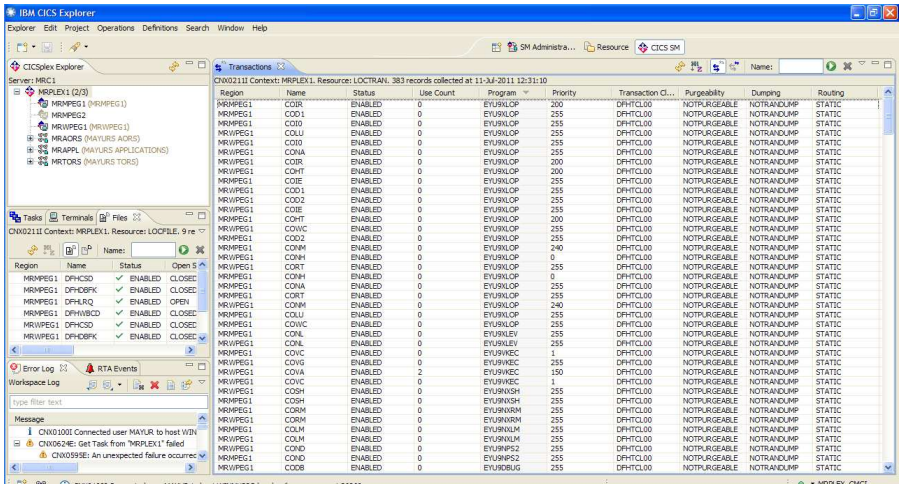
This screen capture of CICS Explorer shows the system initialization parameters where the parameter source is SYSIN.



The CICS management client interface (CMCI) has been enhanced to support column sorting in CICS Explorer. You can sort in ascending and descending alphabetical order by CVDA and EYUDA. The interface has also been enhanced to support all new system programming interface commands.

CICS Explorer view of sorting transactions by program



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This screen capture of CICS Explorer shows a list of transactions sorted by program in descending order.

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