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Resource Capacity Planning Guide

Stat Server 8.5.0

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Resource Capacity Planning Guide

Resource Capacity Planning (RCP) represents Genesys's latest methodology for distributing contact-center interactions. Stat Server is the principle element at the core of resource capacity planning, feeding the capacities of resources to Multimedia and Universal Routing servers - information that is needed to make intelligent routing decisions. Together with the business-priority planning that you define, RCP enables you to better manage agent workload and interaction delivery.

New in This Release

NEW Stat Server 8.5 no longer supports Configuration Wizard and Resource Capacity Wizard, described in the [Genesys 8.1 Resource Capacity Planning Guide](#).

NEW Starting with RTME release 8.5.0, Genesys Administrator Extension (GAX) interface replaces the Resource Capacity Wizard functionality.

This short video demonstrates how to create Capacity Rules using GAX:

[Link to video](#)

GAX help provides more details on how to set [Capacity Rules](#).

Capacity Rules

A major element of Resource Capacity Planning is a **capacity rule**, which defines a resource's ability to handle multiple interactions. For RCP methodology, the term *resource* is synonymous to a Person object that is configured as an Agent and defined in the Configuration Layer. A *capacity rule* is a set of logical expressions that specify the boundaries of a resource's ability to handle one interaction or more than one simultaneous interaction of differing media types.

Even though the capacity planning tools enable you to define rules for all Genesys-provided media types, it makes sense to use only the media types that your set of Genesys solutions supports. The Multimedia 8.0 and higher releases, for example, support chat, email, sms (short message service), and open-media media types for capacity planning.

Important

Interactions categorized under the webform media type, which was available in prior releases, are now processed as email interactions.

Applying a Capacity Rule to Resources

You can directly associate a capacity rule to an agent (a Person object, that is) using Genesys Administrator or Genesys Administrator Extension (GAX). In such a case, the capacity rule describes the agent's ability to receive interactions.

In most cases, you can also associate a capacity rule to a Place object (except for those environments in which Stat Server monitors interactions that are distributed from a SIP Cluster). Refer to [Capacity Planning for New Agent-Place Model](#) for more information.

Lastly, you can associate a capacity rule to a Tenant object. The capacity rule applies to all agents belonging to the tenant where no capacity rule is directly assigned to those agents (or their corresponding places). (In single-tenant environments, the tenant is the entire contact center.)

A capacity rules only affect the *distribution* of interactions. Capacity rules do not preclude the agent from initiating any number of interactions of any media type on his or her own prerogative.

Media Rules

A capacity rule consists of a set of media types and expressions. For every media type, a *media rule* within the capacity rule expresses the boundaries of the agent's ability to receive interactions of that particular media type.

By means of media rules, you might define an appropriate workload for an agent for every media that the agent is enabled to handle. While defining a rule for a specific media, you might consider the simultaneous workload for another media.

A media rule might be thought of as a logical expression that is applied against the current number of agent interactions per medium. These logical expressions (media rules) define when the system

considers that agents are no longer available for a new interaction for that particular medium. Media rules are evaluated in runtime for agents, and the Universal Router Server uses these results to make intelligent routing decisions. Consequently, agents may have several simultaneous interactions. If capacity is reached for one particular media type, the agent might still be available for interactions of other media types.

How to Use Capacity Rules

A useful application of resource capacity planning might be to create capacity rules and apply them to the following:

- Agents or collections of agents (not agent groups) of different abilities. You can create different capacity rules for such cases and assign the different rules to agents who have different abilities. (At present, Stat Server does not support capacity rules for GroupAgents or GroupPlaces objects.) For example, you could create a Seasoned capacity rule and assign it to agents who can handle more chat interactions, for example, than less-qualified agents. (To the latter, you would assign any of the NewHire, AvgWorkload, or 1ChatOnly capacity rules that you might create.)
- Expert agents—preserving their time by setting an artificially low setting of capacity, to prevent from overloading them.

Important

Whether Stat Server considers (in its determination of resource capacity) the interactions that are initiated or received while the agent-associated directory number (DN) is in after-call work (ACW) status is configurable. Review the description of the `capacity-treat-acw-as-interaction` Stat Server configuration option in the *Framework Stat Server Deployment Guide* for more information.

Genesys Resource Allocation Prior to Resource Capacity Planning

The routing-allocation model that Genesys used prior to resource capacity planning depended on the state of an agent and the status of the agent's DN as determined by Stat Server. This dependency focused heavily on the Genesys telephony model, which is described in the “Genesys Telephony Model” section of the *Reporting Technical Reference Guide*.

The Genesys router, at the point of interaction distribution, selects a target—an agent—from a pool of potential participants that consists only of *ready* agents. *Ready*, from the router's default perspective, signifies that an agent has either of the following:

- No monitored interactions currently in progress or
- *All* monitored DNs in *Ready* state. (Other DNs assigned to the agent can reside in a less-than-Ready state, such as *Monitored* or *NotMonitored* as determined by the ranking that is provided in Stat Server's Status Priority tables.)

However, if you have set the router's *useAgentState* configuration option to *false*, *Ready* signifies that an agent has either of the following:

- No monitored interactions currently in progress.
- *At least one* monitored DN in *Ready* state. (Other DNs that can be assigned to the agent can reside in a less-than-Ready state, such as *Monitored* or *NotMonitored* as determined by the ranking that is provided in Stat Server's Status Priority tables.)

As a result of this ready-agent view, Genesys software, prior to resource capacity planning, supported a one-at-a-time model of interaction distribution. With few exceptions, this model is still well suited for environments that distribute live voice interactions. It does not, however accommodate situations in which an agent can receive and handle additional live voice calls while the agent is already actively involved in one - as might be preferable in rare situations in which a high-priority call, for example, enters the contact center and no other qualified agent is “ready” to handle it. (Given this scenario, the agent could place one call on hold and accept the second call.)

This ready-agent view is also not well suited for non-telephony-related media, such as e-mail, and is not particularly effective in blended media environments, such as those that distribute voice, e-mail, and chat interactions. To accommodate the distribution of multiple media, the 6.1 release of Universal Routing Server extended its strategy language to project the DN model onto interactions of nontelephonic types. This projection required DN configurations for media types such as *email* and *chat* - and not just one DN, but a separate DN for each of the interactions that agents could potentially handle simultaneously, for each media type, and for each agent. The number of interactions that an agent can simultaneously handle held a one-to-one correspondence to the number of DNs that are configured for that agent.

This “Media DN” model, however, did not depict reality; it did not allow the distribution of a voice interaction, for instance, to a particular agent if that agent was already participating in an e-mail interaction, nor could one specify that the agent was able to accept and participate in a predefined number of interactions simultaneously.

Capacity Planning

How Stat Server Handles Invalid Rules

If a capacity rule is invalid or missing, then the capacity rule for the next object in the chain of precedence prevails. If no rule applies at all to an object (because of invalidity or because no rule was assigned to the object), then the inherent Default capacity rule applies to the object. Refer to [Capacity Rule Inheritance](#) to learn which links contribute to the chain of precedence.

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New Agent-Place Model=

Capacity Planning for New Agent-Place Model

Stat Server 8.1.0 and lower releases (8.1.0⁻) always checked which place a DN belonged to as part of its algorithm for determining capacity. With this information, Stat Server 8.1.0⁻ was then able to link an agent, who was logged in to the DN, to the place. In a SIP Cluster environment, however, you do not create DN objects in Configuration Server (where Stat Server looks for DNs). Instead, DNs are managed within the SIP Cluster solution. Given this DN-less model and the independence that *Agent* and *Place* objects gained in the 8.1.2 and higher releases (8.1.2⁺), there is no theoretically correct way that the model used by Stat Server 8.1.0⁻ can associate an agent with a place. And, with multiple and different types of clients (multiple types of T-Server, SIP Server, and Interaction Server) - each potentially reporting different kinds of associations between agents and devices - there is no single entity in which Stat Server 8.1.0⁻ can maintain a one-to-one constraint of agent to place. So, the model in Stat Server 8.1.2⁺ was improved primarily for scalability but also to address this SIP Cluster environment.

Stat Server 8.1.2⁺ does not require that a DN be assigned to a particular place for the purposes of agent or agent-group reporting. In the 8.1.2⁺ release, when Stat Server receives the *EventAgentLogin* TEvent, Stat Server tries instead to identify the agent in configuration by matching the *AgentID* attribute of the TEvent with the *EmployeeID* attribute of an agent (*Person* object) in configuration. If Stat Server succeeds in finding a match, Stat Server then is able to link the configured agent to the DN. Any agent-state changes or interactions occurring at the DN can then be attributed to the agent for determining capacity. In this model, there is no association at all between agent and place.

Capacity Rule Inheritance

Capacity rule inheritance in the Stat Server 8.1.2⁺ release also differs from that of the Stat Server 8.1.0 release.

In the 8.1.0 release, Stat Server is able to create an implicit relationship between an agent and a place as described above. You can assign capacity rules to both *Agent* and *Place* objects in configuration (to *Tenant* object as well), and Stat Server will determine which rule prevails:

- If the agent has an explicitly defined and valid capacity rule, then that rule overrides the capacity rule that might be assigned to the place.
- If no capacity rule is assigned to the agent, the capacity rule explicitly assigned to the place prevails.
- If no capacity rule is assigned to the agent or the place, then the capacity rule explicitly assigned to the tenant prevails.
- If no capacity rule is assigned to the agent, the place, or the tenant, the inherent default capacity rule of no more than one voice interaction prevails.

Stat Server 8.1.2⁺ does not associate agents with places as it did in prior releases. The reasoning behind this improved logic enables advanced configurations where:

- Two (or more) DNs could be associated with one place. This configuration allows two independent agents to log in to these DNs.
- One agent might be logged in to more than one DN. This configuration allows DNs to belong to different places.

In both cases, Stat Server aggregates information without having to determine which one agent should be associated with the one place.

The Capacity Vector

The Universal Routing Server (URS) requests four statistics from Stat Server in order to determine which contact center object has the capacity to receive a routed interaction. The statistics all share the same statistical category (*CurrentTargetState*), but they each differ in object: *Agent*, *Place*, *GroupAgents*, *GroupPlaces*

If an interaction appears on a DN, Stat Server 8.1.0⁻ reflects this information in the capacities of the corresponding *Place* and *GroupPlaces* objects. And, by association, this interaction would also be reflected in the capacities of corresponding *Agent* and *GroupAgents* objects. Stat Server 8.1.0⁻ returns one capacity vector only to URS when all four *CurrentTargetState* statistics are opened for the associated object.

In the 8.1.2⁺ release, however, Stat Server must send two capacity vectors - one vector for *Place* and *GroupPlaces* objects, the other for *Agent* and *GroupAgents* objects - because agents and places are not linked in this release.

| - | Voice Interactions =

Capacity Planning for Voice Interactions

Because many different types of telephony devices are continuously being developed, attention should be paid during capacity planning to some peculiarities in the ways that Genesys software routes voice interactions. Genesys software continually evolves to meet new capabilities. Whereas the initial release of capacity planning limited the number of voice interactions that the Genesys router could direct to a particular Genesys place to one, now the Genesys router can route more than one voice interaction to a Genesys place - under certain circumstances.

Tip

A *single-DN place* is a device that has only one directory number ascribed to it. *Multi-DN places* or *multiline DNs* are devices that have more than one directory number ascribed to them.

As a general rule, in regard to Genesys environments that uses a nonSIP (Sessions Initiated Protocol) Server, Genesys capacity planning enables routing to *single-* or *multi-DN places* where an agent performs a login to each DN. When DNs exist at a place to which the agent does not log in, Genesys software does not consider those DNs in its calculation of resource capacity.

Routing of more than one call to a *multiline DN* within a Genesys environment is currently unavailable in this release. Meridian and Meridian Link Symposium phones, for instance, present special examples of multiline DNs that occupy two DNs for each Genesys place - a Position DN and an Extension DN. For this particular configuration, the Genesys Stat Server logs DN status against the Position DN, but only the Extension DN is accessible to the Genesys router for directing calls. Ensure that you consider this when incorporating capacity planning into your routing strategies. IVR phones present additional examples of multiline DNs for which the Genesys capacity model is unable to direct more than one voice interaction at a time.

There are two exceptions to this general rule:

- The Genesys router can route calls to voice treatment port DNs (IVR DNs) without requiring that agent logins be simulated on these DN types.
- In a Meridian 1/Meridian Link Symposium model, it is the Position DN that the agent logs in to, not the Extension DN. However, the Genesys router routes calls - one at a time - to the Extension DN, given an agent login on the Position DN.

| - | Multimedia DNs=

Capacity Planning for **Multimedia DNs**

Prior to the 7.6 release, Genesys capacity planning, from the routing perspective, treated multiline DN devices (such as IP phones that have simultaneous video and multiline DN capabilities) as single-line, voice DNs. Genesys software permitted the routing of one and only one voice interaction, for instance, to these DNs, provided that no other voice interaction was already occurring at the DN. The presence of an interaction on a DN prevented the routing of another interaction to that DN, even though the DN was capable of handling an additional interaction of a different media type. Furthermore, each DN was associated with a single media type.

The Stat Server 7.6 release introduced support for the multimedia DN - a DN type that is controlled by SIP Server.

Tip

A multimedia DN is a single directory number that can receive simultaneous

interactions of more than one media type.

To specify the physical capacity of a multimedia DN, the *voice* configuration option was introduced in the Framework 7.6 release for Extension-type DN objects. Setting this option to true enables you to specify whether capacity for voice interactions applies to the multimedia DN. Multimedia DN capacity settings propagate to capacity rules for supported resources. Refer to the “Configuring DNs to handle instant messaging” procedure in the *Genesys Instant Messaging Solution Guide* for more information on this topic.

Unlike a single-media DN, a multimedia DN supports multiple media (for example, voice and chat) on each DN. Introduction of this multimedia DN to a Genesys contact-center environment enhances the resource capacity model by enabling the Genesys Universal Router Server (URS) to route multiple interactions to a single instance of such a DN. The model now enables URS to route one or more of chat and/or voice interactions to the same DN if the DN is configured as *multimedia*, its type is *Extension*, and the servicing T-Server is SIP-compliant.

To support this new functionality, the semantics of actions that are generated by Stat Server for statistic and status calculation of multimedia DNs have been updated. In addition to prior classifications, actions can now be *media-dependent* or *media-independent*. Furthermore, media-dependent actions can be further classified as *media-unique* or *media-common*.

An action is media-unique if only one action of a particular media type can exist on a device. For example, the *LoggedIn* action is media-independent. Generation of this action does not rely on the media channel to which an agent registers. Contrarily, the *CallInbound* action is media-dependent, because inbound interactions in the current capacity model are always associated with only one media type. Furthermore, the *CallInbound* action is media-common. In fact, all call-related actions are media-dependent and media-common. The *WaitForNextCall*, *NotReadyForNextCall*, and *AfterCallWork* actions that occur on multimedia DNs are classified as media-dependent and media-unique.

Prior classifications of actions ran along the following lines and are still applicable to multimedia DNs:

- Actions are either durable or instantaneous.
- Actions are either related to interactions or not.
- Actions are generated for either mediation DNs or regular (or multimedia) DNs.

Refer to the *Framework Stat Server User's Guide* for a complete listing of how Stat Server-generated actions are categorized.

Important

SIP Instant Messaging interactions and e-Services chat interactions use the same media type "chat", they cannot co-exist for the same Place/Agent. Such deployment is not supported by Genesys Capacity Model.

Genesys-Provided Capacity Rules

With the Multimedia 8.x release, Genesys supplies three out-of-box capacity rules for you to assign to Person, Place, or Tenant objects in Configuration Server. If you do not assign any capacity rule to these objects, then Stat Server's inherent Default capacity rule applies.

Default

Default Capacity Rule

Stat Server uses its inherent Default capacity rule when no capacity rule has been assigned directly or indirectly to an agent. This might occur when no capacity rule has been associated with the corresponding Person, Place, and Tenant objects in the Configuration Layer. This default rule is not accessible within the Configuration Layer and is uneditable as it is embedded within Stat Server logic.

The Default capacity rule allows an agent to receive one voice interaction only and no other interactions of any other media type. For example, if Configuration Layer has the voice, email, and chat media types, then each agent (who does not have an assigned capacity rule) can receive one voice interaction if he or she is not already working on an interaction of any type; the agent can receive no e-mail or chat interactions in this scenario. If you configure an additional media type at a later time—for example, fax—then the same applies: the Default capacity rule will allow the agent to receive one voice interaction, and no fax, chat, or e-mail interactions, before the software determines that capacity has been reached. To state it another way, the rule states that if an agent has at least one interaction that he or she is already working on, a new inbound interaction of any type cannot be distributed to him/her.

One Interaction

Default_One_interaction_of_any_type_only Capacity Rule

This capacity rule states that new e-mail, chat, or voice interactions cannot be distributed to an agent if he or she is already participating in any other interaction. This differs from the Default capacity rule just described in that three media rules for these media types are the only three comprising the capacity rule; whereas, the Default capacity rule will automatically formulate a media rule for each configured media type.

Important

This rule does not prevent an agent from participating in more than one interaction. The rule merely prevents the routing of new interactions to the agent under the stated circumstances.

Participation in an interaction includes those instances where the agent initiates customer contact, accepts an interaction that is transferred to him/her, and is involved in interactions other than voice, e-mail, and chat.

One Media

Default_One_media_allows_more_than_one_interaction Capacity Rule

This capacity rule prevents an agent from simultaneously handling more than one interaction of each media type, except e-mail, for which the rule allows for no more than five simultaneous interactions. Maximum capacity using this rule is one voice, five e-mail, and one chat interactions.

Voice Interactions

Default_Voice_interactions_always_allowed Capacity Rule

This capacity rule favors voice interactions over other interaction types in allowing agents to handle one voice interaction plus one interaction of any other type. Maximum capacity is reached when the agent participates in any of the following interactions:

- One voice interaction
- One voice and one chat interactions
- One voice and one e-mail interactions

Capacity Snapshots

Stat Server logs capacity snapshots, which correspond to the capacity rules that you define.

Stat Server logs a capacity snapshot whenever certain events take place, including:

- Any time that a place associated with a voice DN is added to your configuration
- When the state of readiness at a particular place for a particular media type changes from NotReady to Ready or from Ready to NotReady
- When the state of readiness at a voice DN that has an agent logged into it changes, even if, starting with Stat Server 8.1.2, the DN is not associated with any place
- When assigned capacity rules are added, altered, or deleted
- As the number of concurrent or assignable interactions for each media type changes at a particular place or agent

Capacity Snapshot Formats

The format of the capacity snapshot depends on whether there is an association between the agent and a place.

No association exists between the agent and a place

Stat Server logs the capacity snapshot only for the agent, as follows:

```
<date> <time> <loglevel>: Capacity snapshot for agent  
'<agentID>' ('<tenant>') (CR='<CapacityRuleName>')
```

An association exists between the agent and a place

8.5.0 and 8.1.2

Stat Server 8.1.2 and 8.5.0

Starting with release 8.1.2, Stat Server logs separate capacity snapshots for the agent and place, as follows:

- For the agent:

```
<date> <time> <loglevel>: Capacity snapshot for agent
```

'<agentID>'('<tenant>'), '<placeID>'('<tenant>')

(CR='<CapacityRuleName>')

- For the place:

<date> <time> <loglevel>: Capacity snapshot for place

'<placeID>'('<tenant>'), '<agentID>'('<tenant>')

(CR='<CapacityRuleName>')

8.1.0

Stat Server 8.1.0 and lower releases

Stat Server 8.1.0 and lower releases logs the capacity snapshot for the place and associated agent, as follows:

<date> <time> <loglevel>: Capacity snapshot for place

'<placeID>'('<tenant>'), agent '<agentID>'('<tenant>')

(CR='<CapacityRuleName>')

media_state current_number max_number routable

<nowiki>-----</nowiki>

[S N₁ N₂ N₃] <-- <mediatype>

where [S N₁ N₂ N₃] is a *capacity vector* relating to one particular media type.

See [Capacity Vector](#) for more information.

Capacity Vector

There are four dimensions of the capacity vector. They represent:

- The state of readiness, *S*, of a particular media type at a particular place—either NR or R for NotReady and Ready respectively.
- The number of interactions, *N*₁, currently in progress at a specific target for the particular media.
- The maximum number of interactions, *N*₂, of the particular media that can be routed to a specific target according to the current capacity rule, given the condition that the number of interactions on each of the other media remains unchanged. This calculation does not take into account the physical capacity of the multimedia DN; instead, this value corresponds to the value defined in the capacity rule for the person, place, or tenant resource.
- The number of additional interactions, *N*₃, of a particular media type that can be routed without violating the capacity rule, given the condition that the number of interactions on each of the other media remains unchanged.

Media State

The Ready/NotReady media state recorded in the capacity vector differs from the Ready/NotReady status of Place objects, which is documented in the *Stat Server User's Guide*. The Ready media state, as specified within a capacity vector, signifies that the Genesys router can route an interaction of a particular media type to a DN at a Genesys place, whereas the NotReady media state signifies that the Genesys router cannot route the interaction.

Stat Server derives the media state for the place from the independent media states of all of the DNs associated with that place. This DN media state can take on different interpretations, depending on the DN type and switch type:

- The media state on a voice treatment port (VTP) DN is considered to be Ready if and only if the status of the VTP DN is `WaitForNextCall`.
- A paired Position-Extension Meridian DN is Ready if any of the following apply:
 - The status of the Extension DN is `WaitForNextCall`.
 - An agent is logged in to the Position DN.
 - The Position DN holds any status other than `AfterCallWork` or `NotReadyForNextCall`.

Important

The media state of a DN configured on a Meridian 1 or Meridian Link Symposium switch takes into account the pairing of Position and Extension DNs on the Meridian switch. For purposes of determining capacity, Stat Server considers each pairing of Position and Extension DNs as one DN.

- The media state for most other DN types is Ready if and only if both of the following conditions are true:

- An agent is logged in to the DN.
- The status of the DN is `WaitForNextCall`.

The media state for a place, then, is defined to be `Ready` if the media state of at least one DN (or one pairing of Position-Extension Meridian DNs) at that Place is `Ready`. The media state for a place for media other than voice is equivalent to the status for the place.

Capacity Vector Examples

Example 1

The `[NR 0 1 0]` capacity vector for target PlaceX and Voice media type signifies that PlaceX is in `NotReady` state, no voice interactions are currently registered at PlaceX, and Stat Server can assign no interactions to PlaceX. From this information, you can infer that Stat Server has not yet connected to T-Server and because of this, it is not possible to know whether a voice interaction is currently under way.

Example 2

Capacity vector `[R 1 2 1]` at PlaceY for email media type signifies that PlaceY is in `Ready` state, one e-mail interaction is currently under way at PlaceY, and one additional e-mail interaction can be routed to PlaceY.

Important

N_1 may exceed N_2 in situations where the agents themselves initiate interactions.

Further Examples

Review your own Stat Server log for additional capacity vector examples to better understand the mechanics of how Stat Server applies capacity rules to your resources.