

# Inbound & STCM

Call Queue Settings & Behaviour





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# Document purpose

This document is intended to be used as a guide for Inbound & STCM customers to get familiar with the functionality of the Call Queuing feature. It also contains details of using the LCA feature with Inbound & STCM.

## Principles of Inbound & STCM Call Queuing

The Inbound & SIP Trunk Call Manager Call Queuing feature works on a simple basis of;

- Calls are queued in the network, when the destination number returns a busy signal. The platform then polls the destination number every **\*5 seconds**.
- When the destination number returns an answer, the first caller in the queue is presented to the destination.

**\*5 seconds following a busy response and (approx.) 3 seconds following an answer response. This is the expected behaviour but could vary with different end to end solutions and other networking elements.**

## Q.931 Signalling

The Call Queue feature is used to establish a network-based call queue within a call plan. Please note: that the establishment and operation the call queue has some dependencies on the Inbound platform receiving the appropriate releases codes or network signalling from the customers telephony equipment, using the standard Q.931 signalling protocol.

## Queue on Busy

### Busy Release Codes/Network Signalling to trigger call queuing:

#### Primary codes

Secondary (behaviour may be different if a Divert on Failover is configured at the Destination)

SIP Event	PSTN Cause Code	Description
408 Request timeouts	102	Recover on Expires timeout
480 Temporarily unavailable	18	No user response
<b>486 Busy here</b>	<b>17</b>	<b>User busy</b>
503 Service unavailable	63	Service or option unavailable
504 Gateway time out	102	Recover on Expires timeout
<b>600 Busy everywhere</b>	<b>17</b>	<b>User busy</b>

## Queuing on “Ringing”

Inbound & SIP Trunk Call Manager will also queue calls if ringing is received when the destination number is polled

SIP Event	PSTN Cause Code	Description
180 Ringing	19	No answer from user/Call Proceeding, Alerting

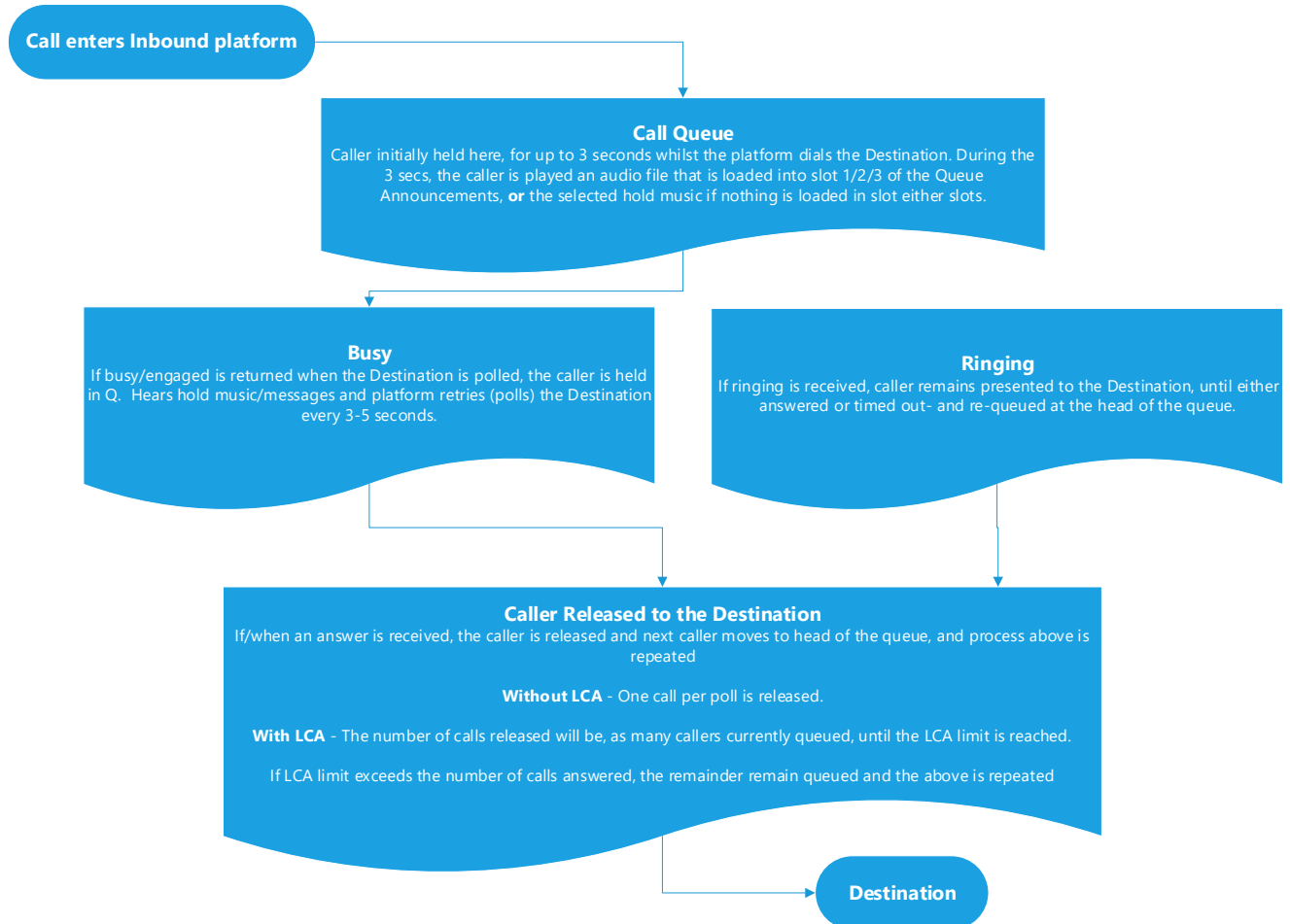
It should be noted that many networks including Gamma will only try to connect a call in a Ringing state for up to 180 secs.

If the call is not answered within this time the call attempt is terminated by the network and the caller is **\*re-queued at the head of the queue.**

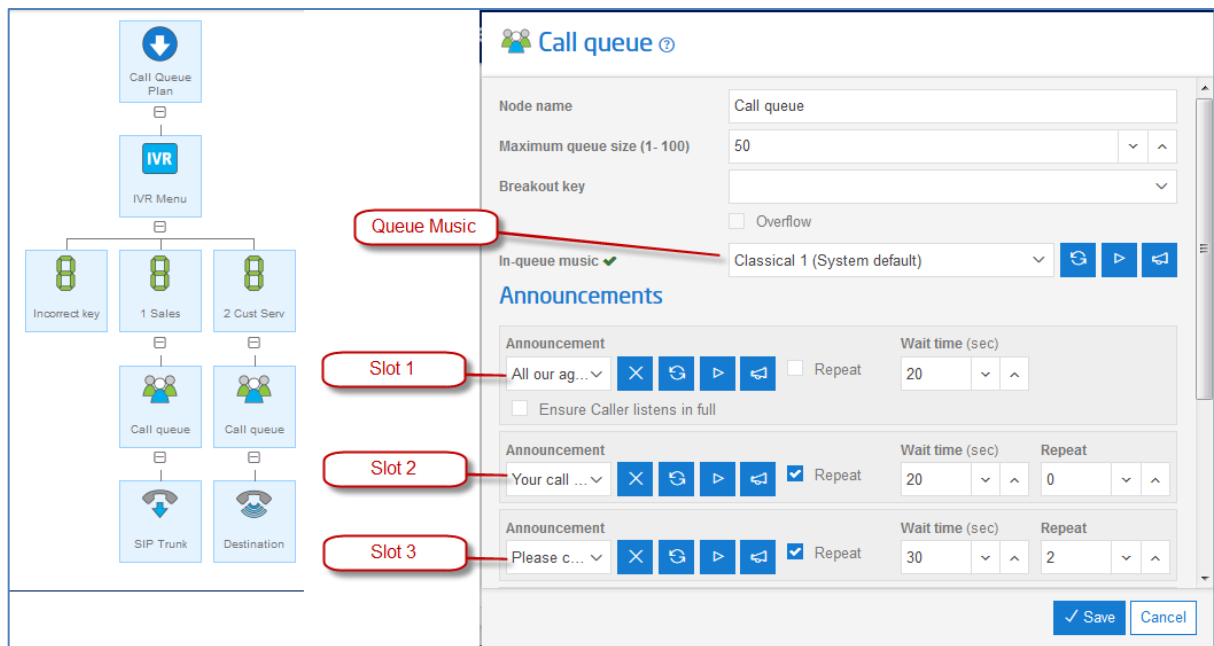
**\* It should also be noted that if your plan also includes a Divert on Failover on the queue destination. Typically calls will failover instead of being re-queued.**

# Queuing Behaviour

The below graphic illustrates how the queue will respond to various conditions.

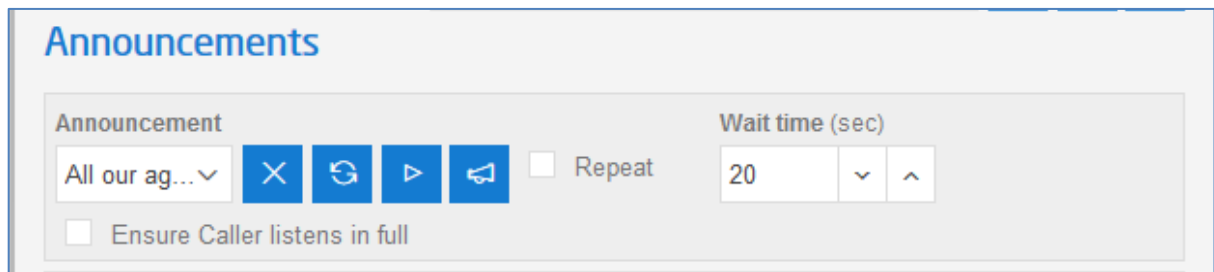


# Example Queue Configuration



See below for details on how the above settings would behave and be experienced by a caller

## Announcement slot 1



In the screenshot above, if a busy is received from the Destination, and this slot is loaded with a recording, this will be the first thing a caller will hear when they enter into the queue.

You should consider this slot to be used for a 'welcome message' (if you have not used a previous Announcement or IVR node to do this) or to inform the caller they are now be entered into a queue. It has not been set to repeat.

The "Wait time" is then set for when the next announcement, in slot 2 (if applicable) should be played, once slot 1 has completed.

**Note - The wait time is when the music on hold will play.**

## In Queue Music

Overflow

In-queue music  Classical 1 (System default) ▼ ↺ ▶ 🔊

**Announcements**

This is a mandatory field and must be loaded with a file. This slot will play in between the announcement slots.

## Announcement slot 2

Announcement	Wait time (sec)	Repeat
Your call ... ▼ <span style="margin-left: 10px;">✕</span> <span style="margin-left: 10px;">↺</span> <span style="margin-left: 10px;">▶</span> <span style="margin-left: 10px;">🔊</span> <input checked="" type="checkbox"/> Repeat	20 <span style="margin-left: 10px;">▼</span> <span style="margin-left: 10px;">▲</span>	0 <span style="margin-left: 10px;">▼</span> <span style="margin-left: 10px;">▲</span>

As per above “Announcement slot 2” is set to play 20 seconds after announcement slot 1 has completed. You can then set it to repeat between 1 and infinite (infinite is set as 0).

You should consider this slot to be used to play a comfort message to the caller. This recording has been set to repeat infinitely.

The “Wait time” is then set for when the next announcement in slot 3 should be played (if applicable), after slot 2 has completed.

## Announcement slot 3

Announcement	Wait time (sec)	Repeat
Please c... ▼ <span style="margin-left: 10px;">✕</span> <span style="margin-left: 10px;">↺</span> <span style="margin-left: 10px;">▶</span> <span style="margin-left: 10px;">🔊</span> <input checked="" type="checkbox"/> Repeat	30 <span style="margin-left: 10px;">▼</span> <span style="margin-left: 10px;">▲</span>	2 <span style="margin-left: 10px;">▼</span> <span style="margin-left: 10px;">▲</span>

As per above “Announcement slot 3” is set to play 30 seconds after announcement slot 2 has completed. This recording has been set to repeat twice only.

The “Wait time” is then set for when the announcement in slot 2 should repeat, after number 3 has played.

The recordings will then repeat as per the settings, until the call is answered or abandoned.

## Position in Queue settings

<b>You are number</b> You are n... ▼ <span style="margin-left: 10px;">✕</span> <span style="margin-left: 10px;">↺</span> <span style="margin-left: 10px;">▶</span> <span style="margin-left: 10px;">🔊</span> <input checked="" type="checkbox"/> Repeat	<b>Wait time (sec)</b> 10 <span style="margin-left: 10px;">▼</span> <span style="margin-left: 10px;">▲</span>
<b>In the call queue</b> ...in the c... ▼ <span style="margin-left: 10px;">✕</span> <span style="margin-left: 10px;">↺</span> <span style="margin-left: 10px;">▶</span> <span style="margin-left: 10px;">🔊</span>	



If you will be using the Position in Queue feature, this will affect the sequence of the announcements (as described above). You should note the following:

If implemented and there is also a file in slot 1 with a wait time, the first announcement of the caller's position in the queue, will play after slot 1's wait time.

The remaining sequence will then be slot2, and 3. Then the whole sequence is repeated

The Position in Queue announcement will also play when the caller progresses up the call queue.

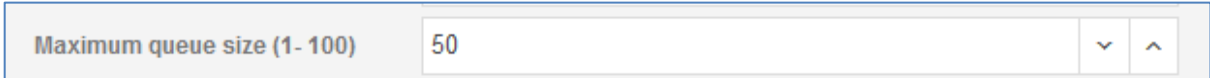
There are pre-loaded, system announcements provided specifically for this feature. Although you can use your own, it is recommended you use the system default or ensure your personalised announcement follows the same logic.

There are 3 files to make up the complete Position in Queue announcement:

1. The first is "You are number" (to be selected or provided by the user)
2. The second is the caller's position (provided by the platform after polling for the caller's position)
3. The third is "in the call queue" (to be selected or provided by the user)


## Other Settings & Options

### Max queue size



This sets the maximum callers that will be held in the queue. Once the queue is full the next caller will either experience what it being returned from the customers CPE (typically busy) or be routed as per the "Overflow" settings (see below).

### Overflow

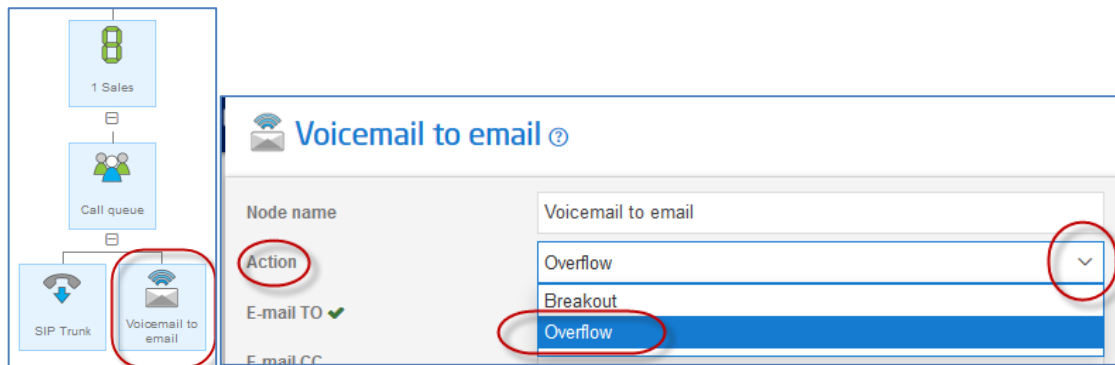


This allows you to select another treatment or route when your call queue is full.

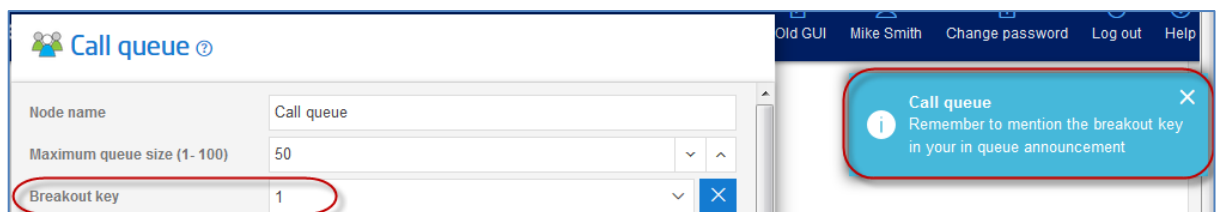
The options are:

- Route calls to another destination,
- Route calls to the Inbound & STCM Voicemail to email feature (if Voicemail is part of the package),
- Or route calls to an Inbound or STCM Announcement.

This option will initially 'greyed out' but will now automatically be selected if you add an additional node to the queue node and select 'Overflow' as the option as per below.



## Breakout



The Breakout Key allows you to offer the option for callers to breakout of the queue by pressing the appropriate key on their telephone keypad.

The breakout treatment or routing options are as per the Overflow options above.

If you opt for this feature you must also remember to announce it in one of the recordings played in slots 1-3, so the caller is aware of the option.

If you select this option, you will be reminded to add the relevant node to the queue node.

# Maximum Queue Sizes

Gamma made a change to Call Queuing Validation rules in the platform release undertaken on the 23rd July 2014. The changes and the new validation rules will be applied as per below:

- Each individual call queue is limited to a maximum queue length of 100 callers
- The total number of callers in multiple call queues pointing to the same destination number is limited to a maximum of 100 callers, (there is a 'Shortcut' node to assist with call queues to the same destination that occur in different parts of a plan)
- The total number of callers in multiple call queues (pointing to 2 or more destinations) in a single call plan will be limited to a maximum of 200 callers
- Any call plans exceeding these limits will not validate. An error message will be returned, as per below.

Validation rule 1:

*Please note the sum of the call queue size pointing to the same destination is too large. Please modify the plan so that the total number callers in the call queue sizes does not exceed 100.*

Validation rule 2:

*Please note that the sum of all call queue sizes for this call plan is too large. Please modify the plan so that the sum of all the call queue sizes (the total number of callers) for this call plan does not exceed 200*

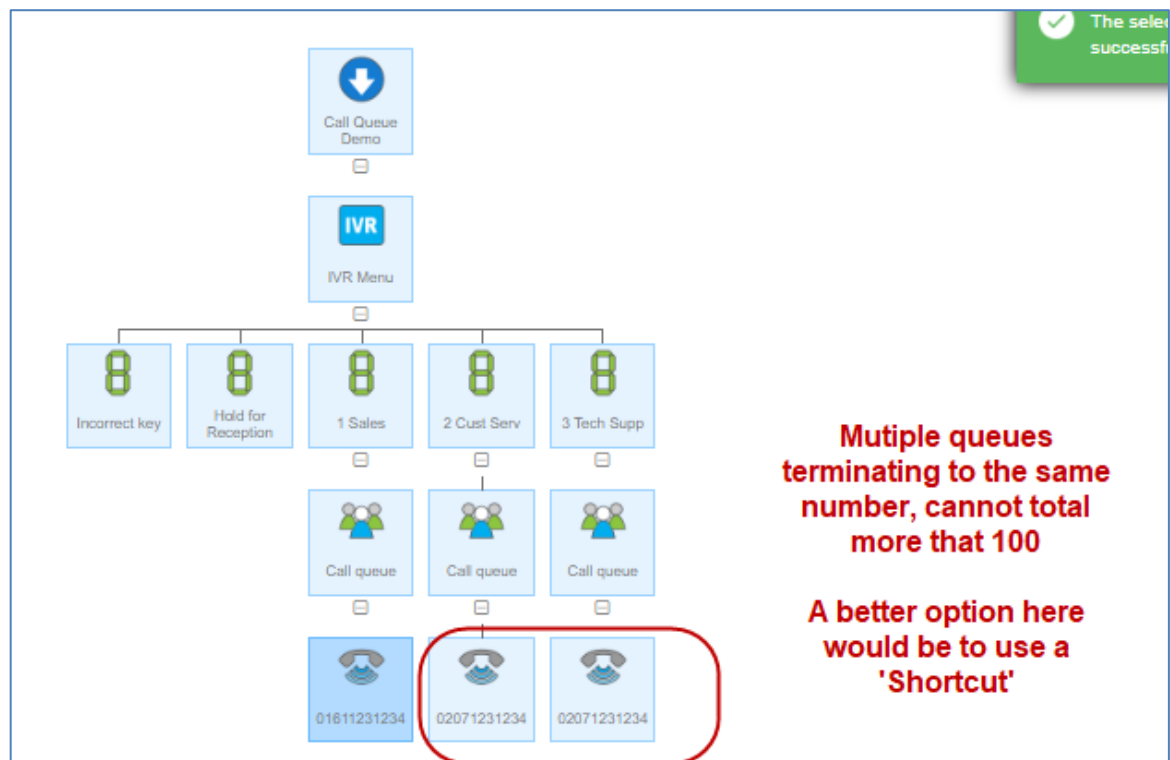
The screenshots below walk through the configuration of the Call Queues and associated changes as a guide to administrators configuring Call Queuing, with the new validation rules applied.

# Single Queue to a Single Destination



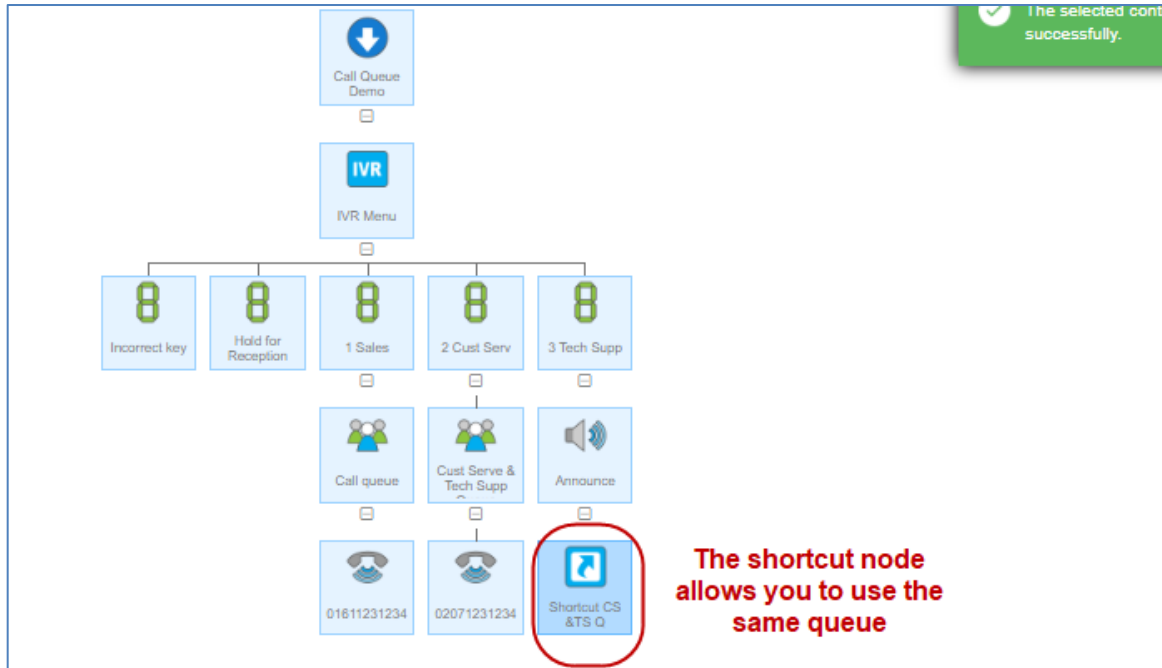
# Multiple Call Queues to the Same Number Destination

It should be noted that where multiple queues terminate to the same destination number. The Inbound & SIP Trunk Call Manager platform will also aggregate these queues when presenting calls to the destination number to maintain respective queuing positions of callers in different queues.



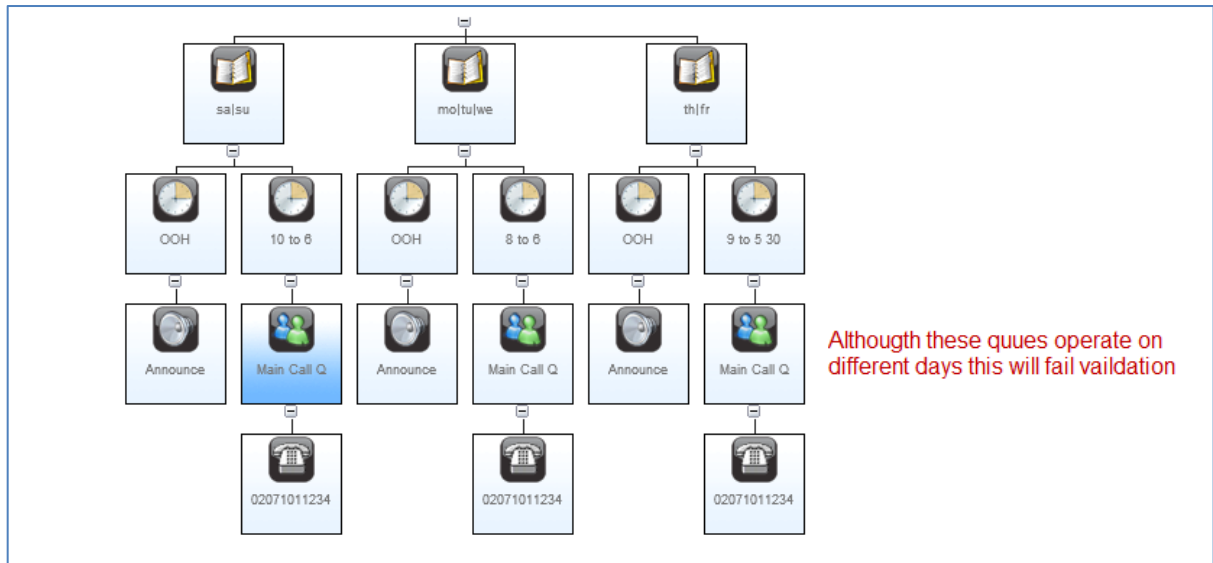
## Multiple queues to the same destination using the *Shortcut* option

1. Delete the 2nd queue and replace it with the *Shortcut* node.
2. Then give the first queue a meaningful name.
3. Then open and edit the *Shortcut* node to select the relevant queue



## The same approach with Date, Day or Time routing

The below plan may look okay...



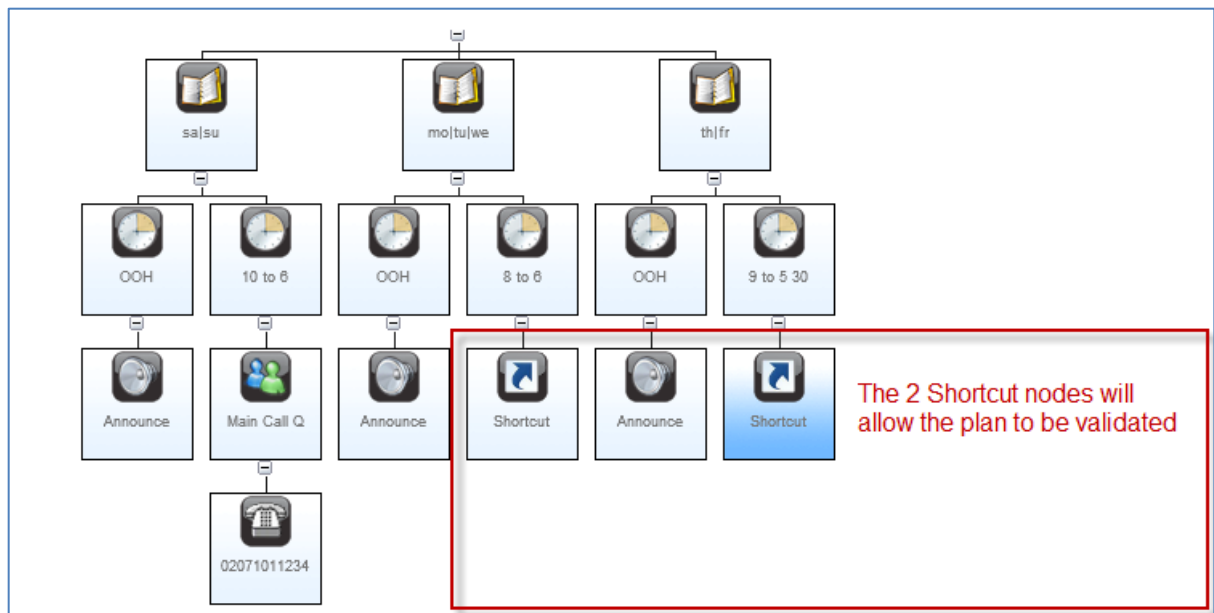
But it will not Validate, as per below (error message)...

**Validation Errors** Save Activate Schedule Activate

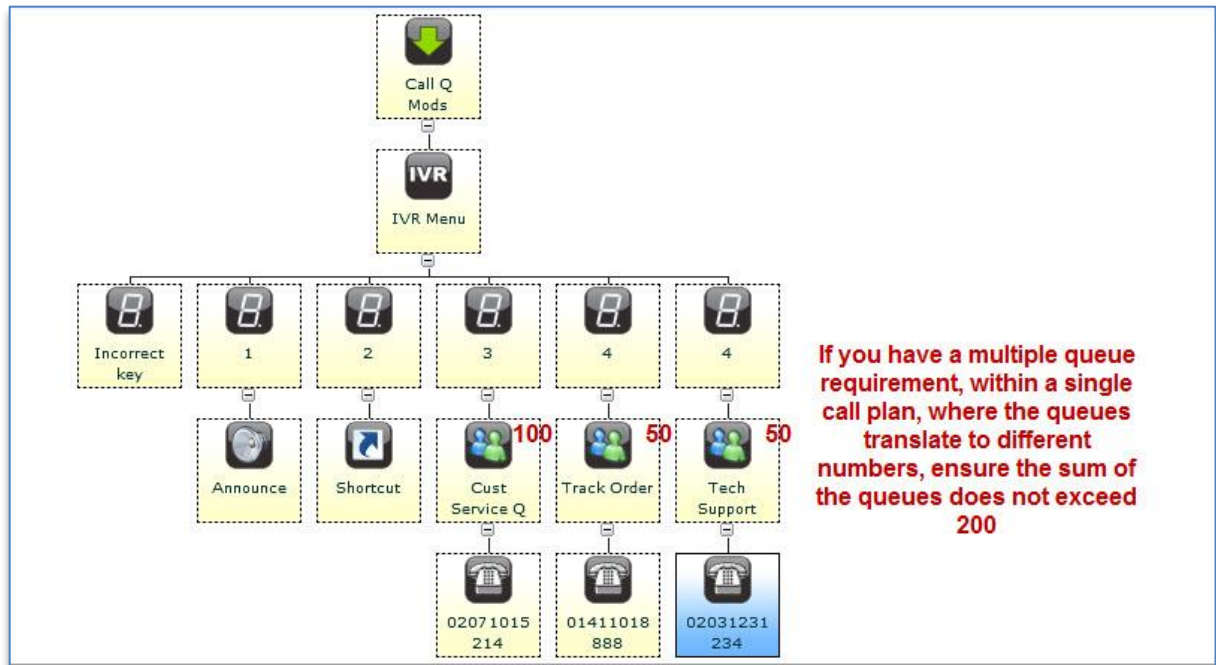
Validation failed for the current Service Plan due to the following reason(s).

Select	Error message
<input type="radio"/>	Please note that the sum of all call queue sizes for this call plan is too large. Please modify the plan so that the sum of all the call queue sizes ( the total number of callers ) for this call plan does not exceed: "200"
<input type="radio"/>	Please note the sum of the call queue size pointing to the same destination is too large. Please modify the plan so that the total number callers in the call queue sizes does not exceed: "100"

Instead, the following configuration will allow the plan to re-use the properties of the 'Main Q' on other days, and for the plan to be *Validated*



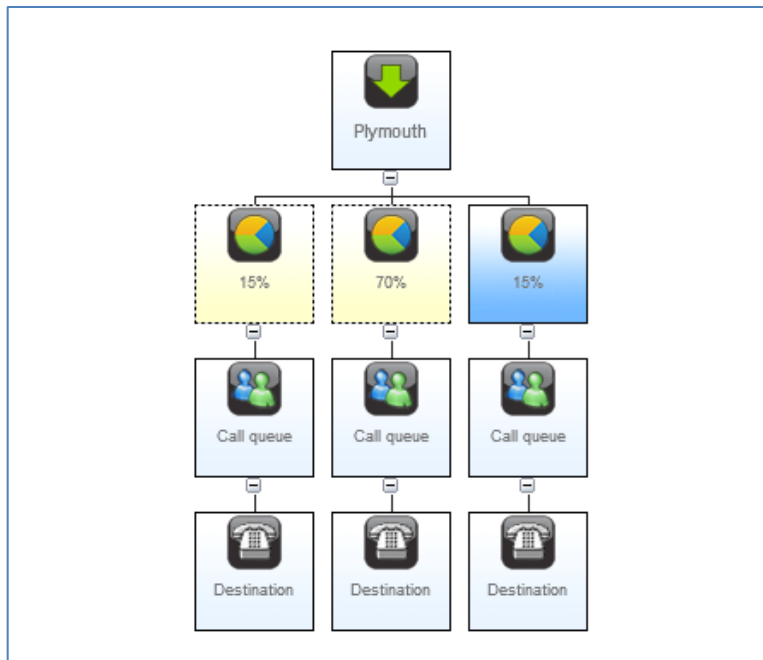
# Multiple Queues to Multiple Number Destinations



**If you have a multiple queue requirement, within a single call plan, where the queues translate to different numbers, ensure the sum of the queues does not exceed 200**



## The same approach should be applied when using Distribution



## Using LCA with a Call Queue

The LCA feature can also be used to enhance the delivery of calls from Inbound or STCM call queue. Essentially when LCA is used with the queuing feature, it increases the throughput of calls presented to the customer's PBX / telephony system, i.e. **multiple calls are presented on each poll of the destination number, as opposed to single calls per poll when not used.**

As an example, if you have 10 agents associated to a particular number, then setting an LCA of 10 against that destination will ensure call delivery is maximised to all available agents during busy periods (i.e. 10 concurrent calls will be presented simultaneously as opposed to one on each poll of your destination number). Any unanswered calls are remaining queued until the next poll.

To summarise, to maximise the efficiency of call throughput from the queue, set an LCA value against the call queue destination number that matches the maximum number of agents associated with taking calls from the queue. This setting should include agents taking transferred calls from queue agents.

## Call Queue Behaviour with LCA

Below is the expected call queueing behaviour when LCA is also being used.

Gamma strongly recommends the end to end call flow is tested with the customers CPE and agent groups for crucial situations, as there CPE interoperation dependencies. Also see the section in this document: [Managing LCA for call centre type set ups including University Clearing.](#)

### Example Queue and LCA Set Up:

- Inbound Call Queue setup - Maximum queue size of 30
- Destination Number CPE set up - Hunt Group with 25, 1st line agents taking calls. 5, 2nd line agents only receiving transferred calls from the 1st line agents. So, a total of 30 agents.
- CPE set to return busy when all 1st line agents are on calls, and an answer when a 1st line agent is available.
- Inbound LCA Setup - LCA setting of 30 (to account for 1st & end line agents)

### Call Flow Scenario:

1. 25 calls received and in progress with the 1st line agents. Callers 25+ arrive and are queued. There are now 30 callers in the queue.
2. Approximately 5 secs later the queue makes the 1st poll following the LCA threshold being reached, and 25 calls are still in session with the 1st line agents, so the destination CPE returns a busy to the network and the 30 callers continue queueing.
3. Another 5 seconds pass and the queue makes a 2nd poll. This time 5 of 1st line agents are available, as they transferred 5 calls to the 2nd line agents. So, the destination CPE returns an

answer to the network and as the total calls in progress are still lower than 30, the LCA tries to present the queued callers to the destination CPE.

4. So, the 30 queued callers are presented to the destination CPE. 5 are answered, which then triggers the LCA threshold (set at 30), and the remaining queued 25 callers are held in the queue.
5. The process repeats when there all lines/agents are busy or there are callers in the queue.

## Managing LCA for Contact Centre's and University Clearing.

As mentioned above, the LCA value should be set to match the total number of agents that can receive calls from any of the numbers with queues and LCA. This should include any (on/off-net) 2nd line call handlers or agents answering transferred calls that originated at the queue.

If the above is observed and agents do not leave logged in phones unattended it should be set and forget. There should be very little need to change the LCA setting throughout the day, the reason for this is; the combination of the LCA and the Inbound/STCM queuing functionality will automate the queuing and call presentation in response to both the current number of calls in progress, responses from the customer CPE when agents are available or busy and the number of callers in the queue.

Despite this, the following should be observed:

### Flexing the LCA up

If the customer is unsure of the total number of agents that could be receiving calls that originate at the queue (due to 3rd party or offnet call transfers), there may be a need to monitor and flex the LCA upwards if agents become available and calls are not filtering through from the call queue/s.

This is a non-intrusive change and will simply release the next batch of callers from the queue. This can be monitored by looking at the Inbound call queue wall board and being aware of how many agents are available at any given time.

### Unattended Handsets

If the destination telephony CPE could return 'Ringing (180 SIP Response)' when calls are presented and there is a chance that calls could ring unattended, Inbound/STCM will continue to present the ringing call until answered or re-queued (at 3 mins). **No other calls will presented during this time, even if other agents have now become available.**

Inbound or STCM do not have control over the call until it times out at 3 minutes, the call either needs to be answered, transferred, rejected or terminated by the customer or their CPE. **See the next point for how to prevent this reoccurring.**

### Reduce the potential of calls ringing unattended

To reduce the potential of the above scenario, or if the customer is unsure of whether this event could occur, it is recommended that the customer aims to deploy one of these options:

1. A divert on no answer on the PBX, to try and divert unanswered calls (after x rings/seconds) to an attended handset and available agent.
2. An automated 'log out agent/handset' on the PBX if, a presented call goes unanswered.
3. Floor walkers to manage agent behaviour and log out unattended handsets where necessary.

## The Call Queue Wall Board

### Key basic information

The wall board will show callers in the queue. It displays as a bar chart, with each bar representing a single caller.

To display a queue, you must deselect 'select all' (unless all numbers on the account currently have a queue configured) and select the number (with a queue) you want to view.

Only one Inbound number can be displayed at a time. So, if you have multiple numbers you wish to view, you will need to change the number being viewed or login multiple times.

However, if a number has a call plan with multiple queue's you, will be presented with a list to select from. You can display each individually or all at once.

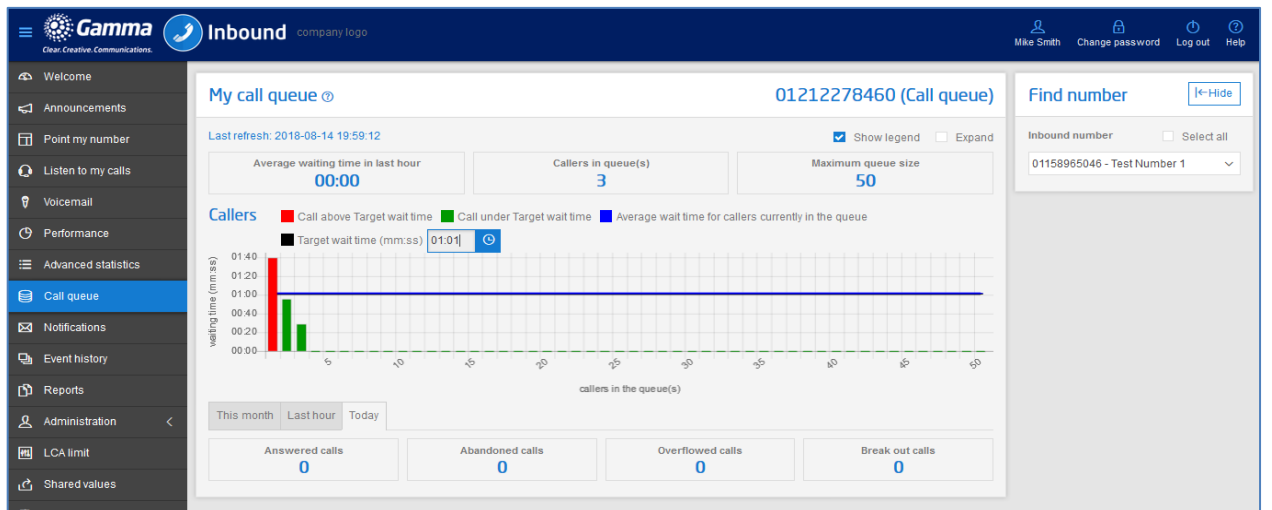
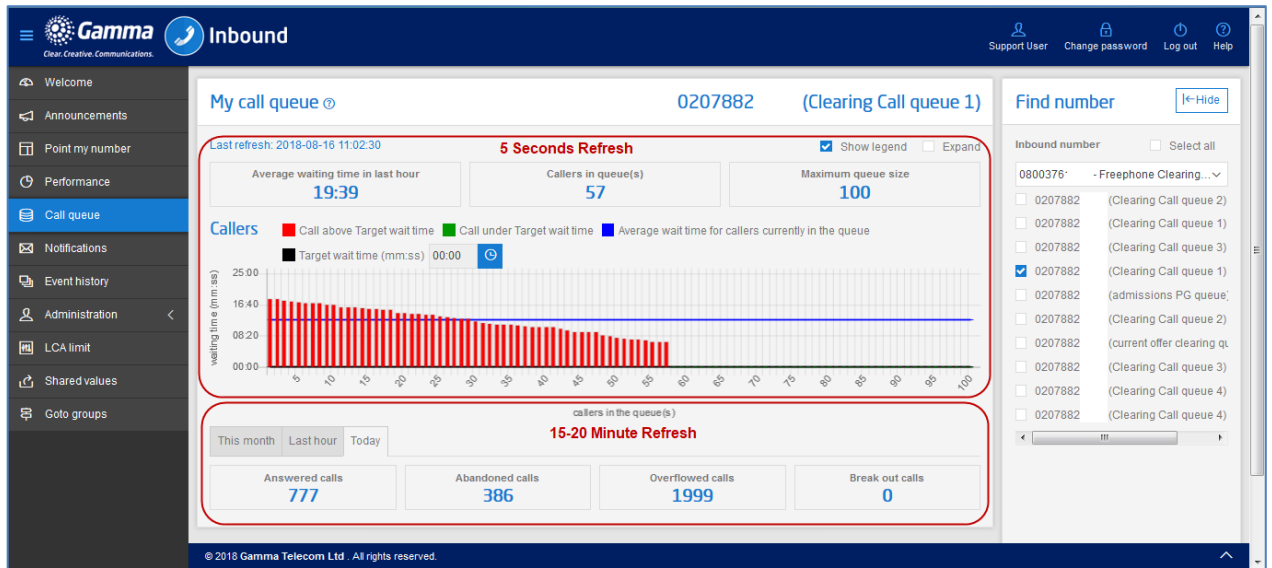
The page can be expanded to full screen with the 'Expand' option.

The 'Show legend' option, allows you to see; the average wait time, set a target wait time, and then view calls above or below your target wait time.

The data showing the number of callers in the queue and the current wait time of each caller, is working on a 3-5 second refresh.

The (summary) data set for; Answered, Abandoned, Overflowed & Breakout calls (at the bottom of the page), runs on a 10-15 minutes refresh

When logged into the Inbound portal, with the Call Queue tab selected, the user account will stay logged in until they log out. Making it suitable to be logged in and projected. Other sections of the portal will time out after 20 minutes of inactivity.





# Contacts

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