

## Analyzing and Improving an Inbound Call Center

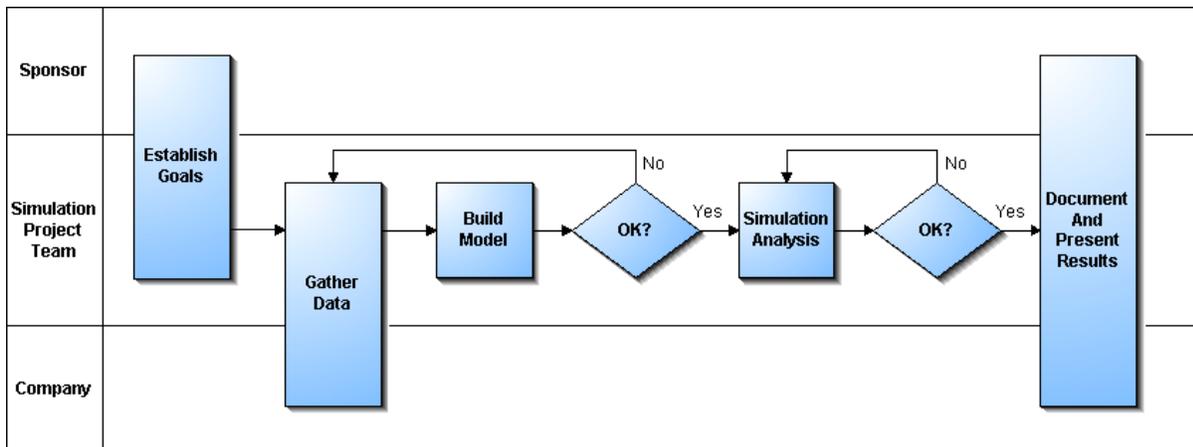
### Objective

The purpose of this exercise is to increase customer satisfaction of an inbound call center. iGrafx® Process™ or iGrafx Process™ for Six Sigma modeling and simulation is used to identify the best alternatives for achieving the objective.

### Background

IGX Bank is an imaginary company specializing in residential home loans. Recent interest rate drops have increased business dramatically. The added helpline call volume is decreasing customer satisfaction due to long wait times to reach company representatives.

Follow this step-by-step process to perform an analysis and simulation project:



### Step 1: Establish goals and constraints

The bank's goal is to reduce abandoned calls below industry norms (5%) at the lowest possible cost. The bank wants to use their in-house employees and the existing automated call answering system (although this can be modified). Hiring additional workers is an option but outsourcing is not.

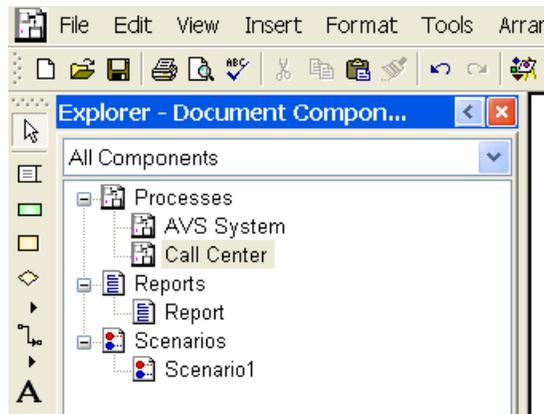
### Step 2: Gather and summarize data

For this tutorial, data from the process is already gathered and entered into the process model. To learn how to create iGrafx diagrams, choose iGrafx Tutorial on the Help menu.

### Step 3: Build an accurate model

This step is also already completed. An iGrafx file is provided which models the IGX Bank inbound call center.

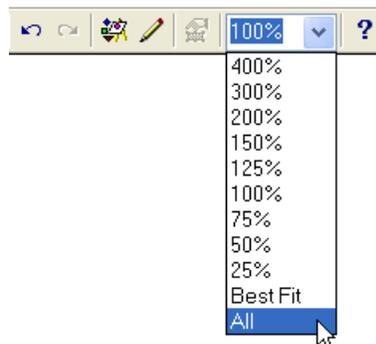
- 1) iGrafx files intended for simulation consist of process maps, scenarios (data describing the simulation environment), and reports (the results of simulation). The following steps give you an overview of the file content.
  - a) Before continuing this improvement project, save "Inbound Call Center.igx" as a different file name or in a different directory so you can refer to the original later.
  - b) Open the file "Inbound Call Center.igx".
  - c) From the File menu, choose Components to display components in the document. From the drop-down list, select All Components as shown below.



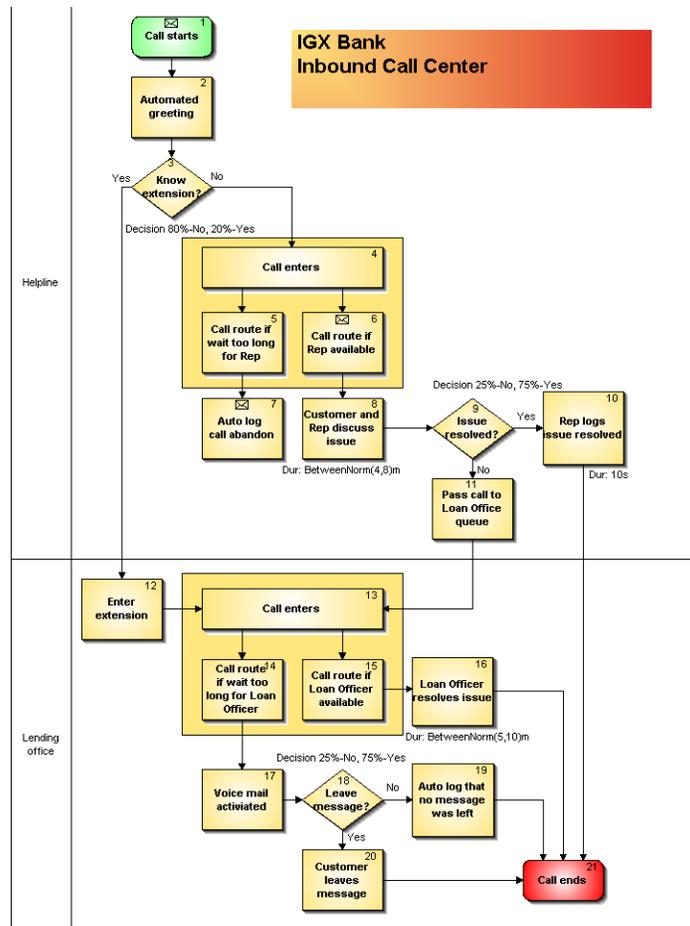
*The Explorer bar showing components*

The .igx file contains two processes (AVS System and Call Center) and one scenario (Scenario1). In this model, the Call Center process is reviewed first, and the AVS System process is used later in a simulation experiment.

- d) Double-click Call Center in the Explorer Bar. The inbound call center process appears in the main window.
- e) Change the Zoom Control drop-down (Standard Toolbar) to All. This brings the complete process into view.

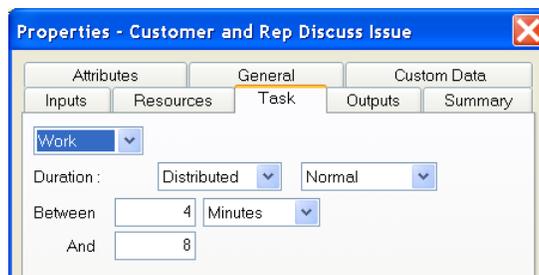


*The Zoom Control*



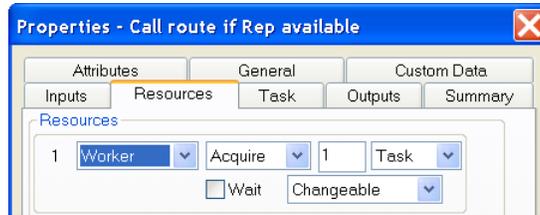
The complete process map

- 2) For the two activities where call center employees talk to customers, review the duration times gathered and summarized to build the model.
  - a) Move your cursor over the note icon (📌 icon) on "6 **Call route if Rep available**" to view the note. You can insert or edit a note by clicking to select a shape and pressing F6 (or, from the View menu, choose Note).
  - b) In the Helpline department, double-click the activity represented by the shape "8 **Customer and Rep Discuss Issue**". In the Properties dialog box, click the Task tab to view the Duration values which specify a task time with a normal distribution curve between four and eight minutes.



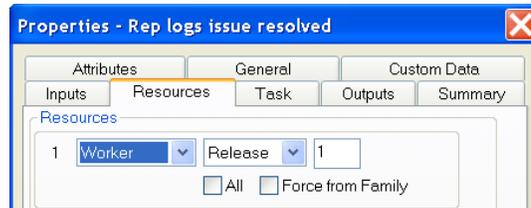
The duration time to discuss an issue between and customer and representative

- c) Without closing the Properties dialog, click the activity "16 **Loan Officer resolves issue**" and note its Duration time. Also inspect the Duration time for "10 **Rep logs issue resolved**".
- 3) Review how resources are acquired and released by activities that process calls.
- a) Double-click the activity "6 **Call route if Rep available**" and click the Resources tab in the Properties dialog box. Note that one worker is acquired and will work on a call through multiple activities until released (at activity #10 or #11). Later, this document describes how callers hang up when no representatives are available.



*This Resources tab shows workers acquired*

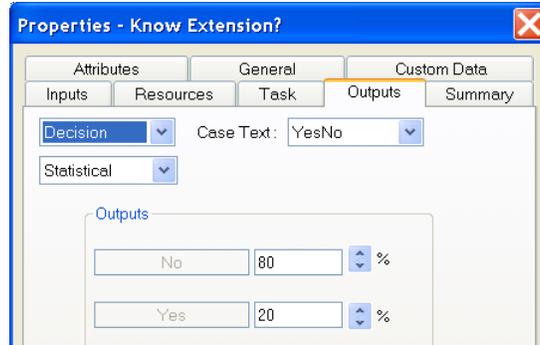
- b) Click the activity "10 **Rep logs issue resolved**". This is where the earlier acquired worker completes the call. Depending on the routing, the worker might also be released by activity "11 **Pass call to Loan Office queue**".



*This Resources tab shows workers released*

A worker is also acquired by activity "15 **Call route if Loan Officer available**" and released by "16 **Loan Officer resolves issue**".

- 4) Review how calls are routed at decision points.
  - a) Double-click each diamond shape (representing decision activities) and choose the Outputs tab to view how calls are routed. All decisions are currently routed by percentage based on data collected from the process.

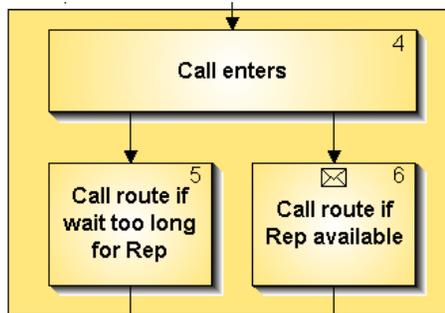


*Routing calls by statistical percentage*

- b) Click Cancel to close the Properties dialog box

- 5) Review how calls "renege" or hang-up after waiting too long.

There are two places where callers may renege. Both involve three shapes highlighted by a tan background rectangle.

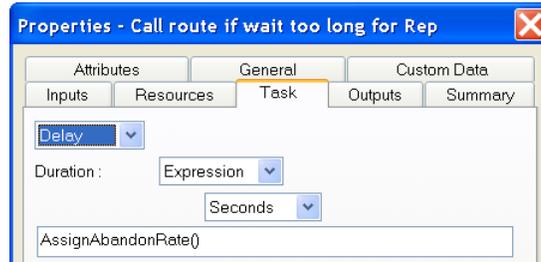


*One of two sections where renegeing is modeled*

Two connection lines leave activity "4 **Call Enters**". For each transaction representing a call that enters this shape, one transaction exits per output connection line. Both transactions are related to the same call. These related transactions are referred to as "family members."

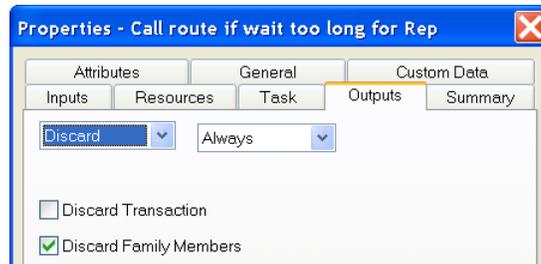
- a) Double-click the activity "5 **Call route if wait too long for Rep.**" On the Properties dialog box, click the Task tab. The Delay Duration defines the amount of time a caller is willing to wait for a representative. Instead of defining the time as a constant number (e.g. 5 minutes), the time varies for each call.

A function allows you to fluctuate the duration of a time. In this example, AssignAbandonRate() varies the duration of time a caller is willing to wait. Functions are discussed in more detail later in this tutorial.



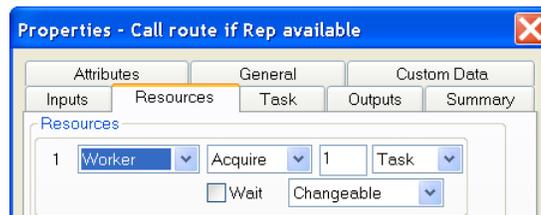
*Using a function to define how long a caller will wait*

- b) Inspect the Outputs tab of this activity. If the caller waits too long (specified by the Duration on the Properties dialog box Task tab), the caller hangs up and the transaction family member waiting for a worker at the activity "6 **Call route if Rep available**" is discarded.



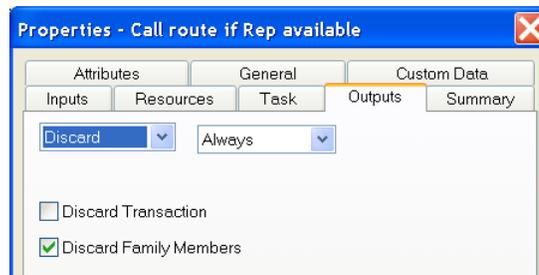
*Reneging from the wait queue by discarding the related transaction*

- c) Click the activity "6 **Call route if Rep available**" and choose the Resources tab. Recall that this activity attempts to acquire a worker (e.g. a Helpline Representative).



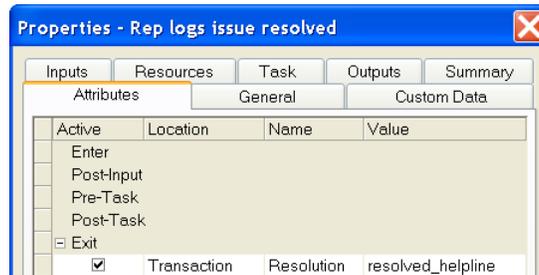
*This Resources tab shows workers acquired*

- d) Look at the Outputs tab. If a worker takes the call, the transaction family member at activity "5 **Call route if wait too long for Rep**" is discarded (e.g. the caller will no longer consider renegeing).



*Stop the ability to renege by discarding the related transaction*

- 6) Review attributes used to collect statistics.
- a) Double-click the activity "10 **Rep logs issue resolved**" and click the Attributes tab. The attribute named Resolution with a value set to resolved\_helpline is used to count calls that have been resolved by Helpline Representatives. Attributes are discussed later in this tutorial.



*Setting the Resolution attribute*

- b) Double-click the following activities and review the value given the Resolution attribute at these steps.
- "20 **Customer leaves message**"
  - "16 **Loan Officer resolves issue**"
  - "19 **Auto log that no message was left**"
- c) Click the Cancel button on the Properties dialog box.

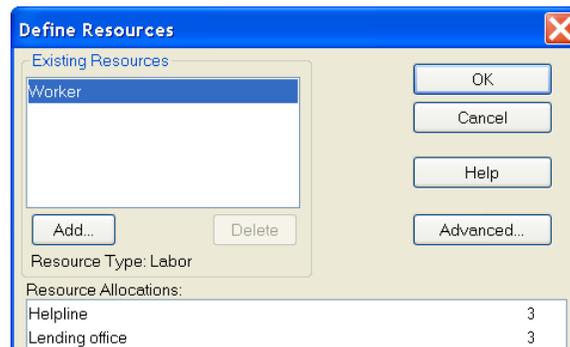
#### Step 4: Define the "as is" scenario

Resource allocations, schedules, and transaction generators are some examples of scenario characteristics.

- 1) Review the allocation of resources.

Earlier, we inspected activities that acquire workers to process calls. Here we describe the workers available to perform the activities. If more calls enter activities than can be handled by the available workers, more callers will hang-up without talking to a representative.

- a) On the Model toolbar, click the Resources  tool. Three workers are available for each of the two departments in the process.



*The allocation of resources*

- b) Double-click the Helpline resource. The Pool Name describes this set of workers in simulation reports. The worker calendar and pay rate are also defined here.



*The Helpline Representatives description*

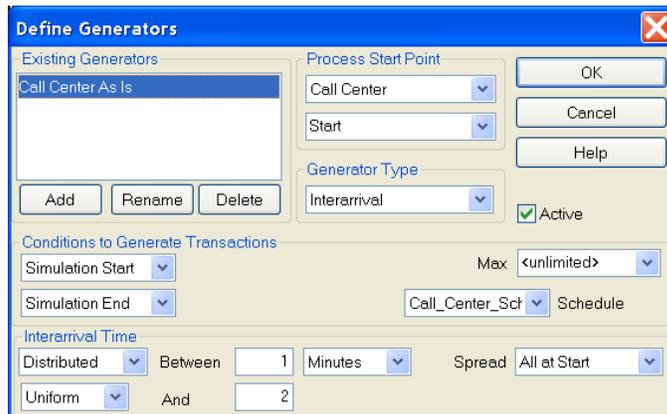
- c) Click the Close button on the Edit Cost/Count dialog box.

- d) Double-click the Lending office resource. They have a higher hourly rate than Helpline workers.



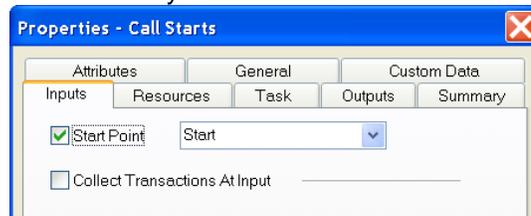
*The Lending Officers description*

- e) Click the Close button on the Edit Cost/Count dialog box.
  - f) Click the Cancel button on the Define Resources dialog box.
- 2) Review the rate of incoming calls.
- a) On the Model toolbar, click the Generators  tool. The Call Center As Is generator creates one call every one to two minutes. Calls enter the process at the shape with the Start Point named Start.



*Generating a call every one to two minutes*

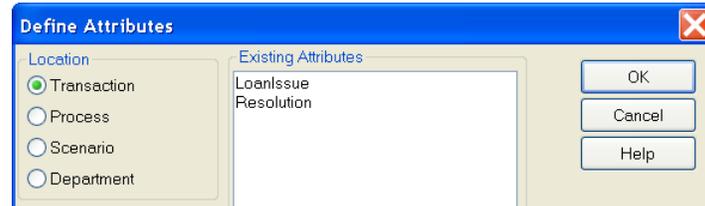
- b) Click the Cancel button on the Define Generators dialog box.
- c) Double-click the activity "1 Call starts." In the Properties dialog box, click the Inputs tab. Because the Start Point named Start is defined here and matches the generator, calls from the generator will enter this activity.



*Defining a start point*

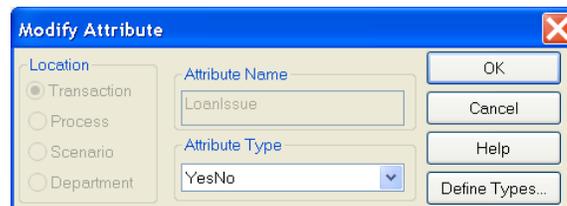
- d) Click the Cancel button on the Properties dialog box.

- 3) Review attributes used in the process.
- a) On the Model toolbar, click the Attributes  tool. Two attributes are defined for the model. The LoanIssue attribute is used during our second "what if" scenario analysis. The Resolution attribute is used to report why callers hang up or complete calls.



*Two attributes are defined*

- b) Double-click the attribute LoanIssue. Its value can be either Yes or No.

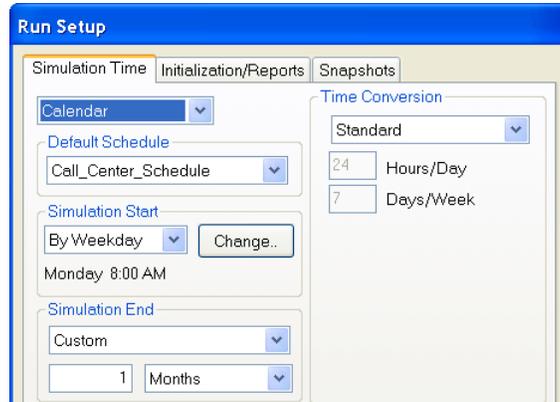


*The LoanIssue attribute type*

- c) Click the Cancel button on the Modify Attribute dialog box.
- d) View the reasons callers hang up.
- i) In the Define Attributes dialog, double-click Resolution.
  - ii) Click the Define Types button.
  - iii) Click reason\_hang\_up under the Existing section of the Define Types dialog.
  - iv) Click the Close button on the Define Types dialog box.
  - v) Click the Cancel button on the Modify Attribute dialog box.
  - vi) Click the Cancel button on the Define Attribute dialog box.

4) Review the simulation run parameters.

- a) On the Model toolbar, click the Run Setup  tool. Click the Simulation Time tab. The simulation will run a one-month experiment using the Call\_Center\_Schedule.

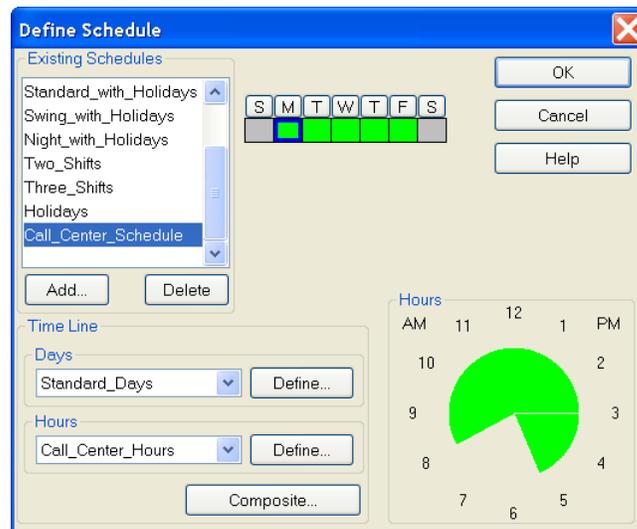


*Defining the simulating length*

- b) Click the Cancel button on the Run Setup dialog box.

5) Review the schedule.

- a) On the Model toolbar, click the Schedules  tool. Scroll the existing schedules list to the bottom and click Call\_Center\_Schedule. Then click any of the green boxes under the day of the week indicators. The time span for the shift is displayed. Workers and the call generator are assigned this custom schedule.

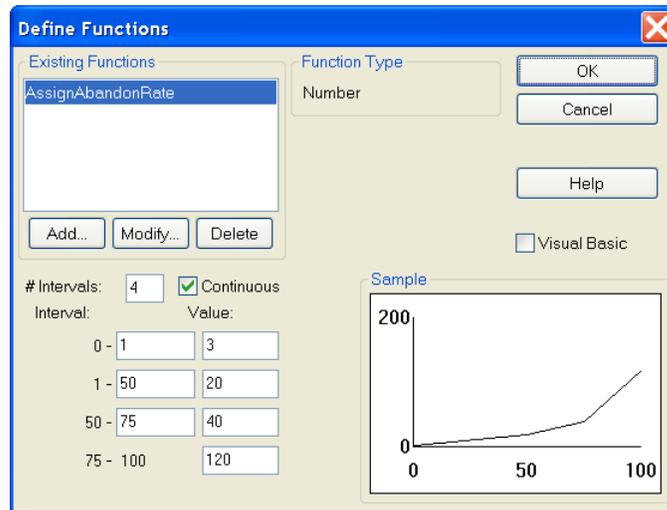


*The Call-Center-Schedule*

- b) Click the Cancel button on the Define Schedule dialog box.

6) Review the function that models the duration callers are willing to wait.

a) On the Model toolbar, click the Functions  tool.



*The AssignAbandonRate function*

The AssignAbandonRate function appears in the Properties dialog box Task tab. It sets the duration of time in seconds for activity "5 **Call route if wait too long for Rep**". The function varies how long a caller will wait before hanging up. Interpret the dialog this way:

For every 100 calls simulated:

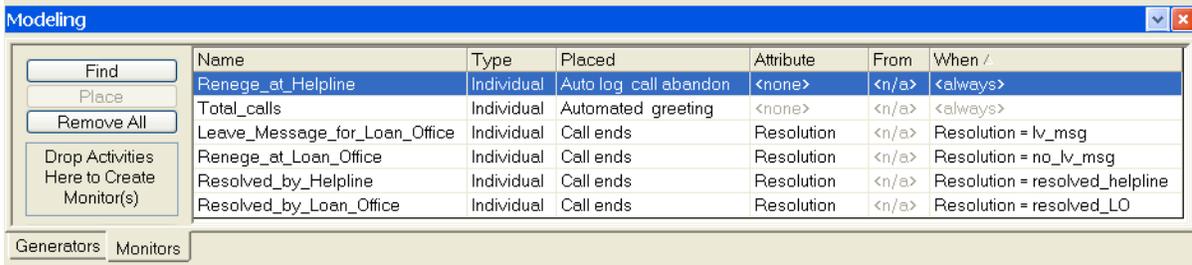
- 1 (0 - 1 interval) caller will wait between 0 and 3 seconds before abandoning the call (reneging).
- 49 (1 - 50 interval) callers will wait between 3 and 20 seconds before abandoning.
- 25 (50 - 75 interval) callers will wait between 20 and 40 seconds before abandoning.
- 25 (85 - 100 interval) callers will wait between 40 and 120 seconds before abandoning.

b) Click the Cancel button on the Define Functions dialog box.

7) Review the Monitors.

Monitors are data collectors that assist process analysis. They are placed on activities in the process diagram where data should be collected. The types of data collected by monitors include basic transaction (call) statistics or the value of attributes at certain points. For example, a monitor can tabulate the number of calls that reach an activity. After a simulation completes, data collected by monitors are available in the Report window.

- a) On the Model toolbar, click the Monitors  tool. Monitors are displayed in the Modeling Bar.



Name	Type	Placed	Attribute	From	When /
Renege_at_Helpline	Individual	Auto log call abandon	<none>	<n/a>	<always>
Total_calls	Individual	Automated greeting	<none>	<n/a>	<always>
Leave_Message_for_Loan_Office	Individual	Call ends	Resolution	<n/a>	Resolution = lv_msg
Renege_at_Loan_Office	Individual	Call ends	Resolution	<n/a>	Resolution = no_lv_msg
Resolved_by_Helpline	Individual	Call ends	Resolution	<n/a>	Resolution = resolved_helpline
Resolved_by_Loan_Office	Individual	Call ends	Resolution	<n/a>	Resolution = resolved_LO

*Monitors tab of the Modeling Bar*

- b) For example, the monitor "Renege\_at\_Helpline" (highlighted above) gathers statistics every time a transaction reaches the activity "7 **Auto log call abandon**." A table in the report window uses this monitor to display the number of calls that entered the "7 **Auto log call abandon**" activity.
- c) Four monitors are placed on the activity "21 **Call ends**". These monitors also gather statistics when transactions reach the activities they are placed on.

These monitors, however, only report transactions that meet a specified condition. For example, the Leave\_Message\_for\_Loan\_Office monitor only gathers statistics on transactions with the Resolution attribute equal to lv\_msg. The condition appears in the When column in the above figure.

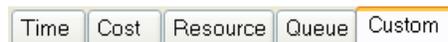
- d) Close the Modeling bar by clicking the Close button  on the upper-right corner of the Modeling bar.

### Step 5: Conduct simulation experiments

Mapping processes is a valuable way to identify areas for process improvement. The greatest value of iGrafx, however, is realized by using process models to run "what if" scenarios to validate improvement ideas before implementing them.

Before doing "what if" analysis, it's important to simulate the "as is" model to verify that the model represents the real-life process. Validate the model by comparing simulation report statistics to real-life statistics for cycle-time, abandoned calls, and so on.

- 1) On the Model toolbar, click the Start/Resume  Tool. One month of real time is simulated in a few seconds. When the simulation completes, a report appears.



*Available Report tabs*

The report is divided into Time, Cost, Resource, Queue, and Custom tabs. Each table or graph within the report is considered a "Report Element". Report elements appear in a default format when a simulation completes.

- a) Click the Custom tab to view user-defined elements. From the Report menu, choose Add Element to create additional elements on any report page. Click Cancel on the Statistic Dialog box.

The "Counts" element of the Custom tab summarizes the number of calls taken and how they were resolved (or abandoned).

#### Counts

Resolved_by_Helpline	3800
Resolved_by_Loan_Office	2869
Renege_at_Loan_Office	9
Total_calls	8190
Leave_Message_for_Loan_Office	27
Renege_at_Helpline	1485

*Note: For all report elements, your results may vary slightly from those shown in this document.*

- b) All report elements can be customized. Double-click the "Counts" element to review its definition.
  - The Statistics tab defines the element to report on Monitors.
  - The Structure tab defines that all monitors are reported.
  - The Filters tab is not active for this particular element.
  - The Format tab sets the display to Tabular or Graph.
- c) Click Cancel on the Edit Report Element dialog box.

If this were a real simulation, you would verify the simulation results against "real-life" data at this point. If the simulation results are unreasonable (for example, the model cycle time is several times greater than known cycle time), you would review the activity and scenario settings in the model for accuracy. An additional method for examining models is the Trace command.

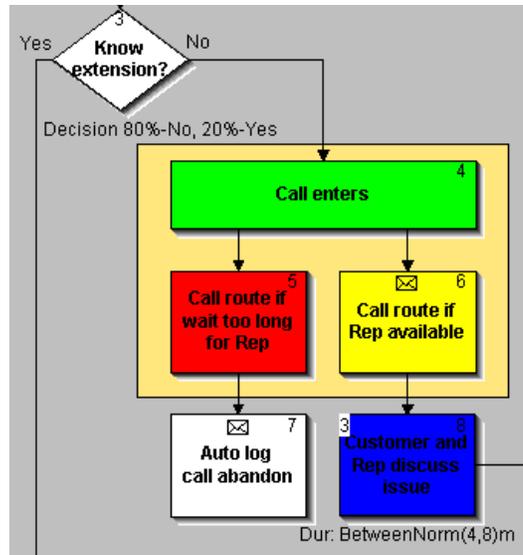
## 2) Run a simulation Trace.

So far we've simulated the Call Center process without any interaction. To help verify and analyze the process map during simulation, we can use the Trace view. This provides a visual way to check the simulation, and to inspect the process while it is running. As a transaction (which is a call in this tutorial example) follows the process flow, shapes change color to signify what is happening with each individual call.

- a) Before running a Trace, use the Component Explorer to display the Call Center process map (if not already visible). Next, on the Model toolbar, click the Trace  Tool. The process map background is grayed to indicate being in Trace mode.
- b) Click the Start/Resume  icon on the Trace toolbar to start the simulation.



*The Trace toolbar*



The number "3" on shape 8 indicates three calls being worked on

A generator sends transactions through the process until the end of the simulation. Activities are colored to indicate the status of calls at those activities.

Color	Status	Meaning for this model
Green	Moving	An activity has been completed on a call which now moves to the next activity.
Blue	Working	An activity of some duration is being performed on a call.
Red	Blocked	In this model, activity #5 and #14 are red when a caller is waiting (because the wait time is defined as a "Delay" on the Task tab of the Properties dialog).
Yellow	Waiting for resource	A call is waiting for a worker because all workers are busy with other calls.
Gray	Waiting schedule	This should not occur in this model. It is common in other models when resources are unavailable (for example, for lunch or day end) and overtime is not allowed.

- c) During the trace simulation, it's possible to step through the simulation one activity at a time with these commands:

To pause the simulation, click the Pause  icon.

To step through the simulation, click the Step  icon.

The numbers that appear on activity statements during a Trace indicate the number of transactions being worked on or waiting at the activity (depending on the color displayed).

- d) To stop the simulation, click the Stop  icon.

- e) View additional transaction information in the Trace view.
  - I. Start a trace for at least a few seconds and then pause it. If the Transactions window is not visible (see below), choose the View > Transactions command.

Current transactions being simulated are listed in the lower section of the iGrafx window. To view more information about a call, click the call (transaction) in the list. Any acquired workers (obtained at activities #6 and #15), are displayed to the right of the transaction list.

Transactions									
ID	State	Process	Activity	Duration	Resource T...	State	Department	Name	
2	Working	Call Center	Customer and Rep discuss is...	5.942638m	Worker	Acquired	Lending office	Res #3	
4	Working	Call Center	Loan Officer resolves issue	7.823177m					
6	Working	Call Center	Customer and Rep discuss is...	5.010686m					
8	Working	Call Center	Customer and Rep discuss is...	5.393784m					
9	Blocked	Call Center	Call route if wait too long for ...	101.235151s					
10	Waiting Resource	Call Center	Call route if Rep available	0s					

*A highlighted call that has acquired a worker*

Selected transactions are also highlighted (with a fill pattern) in the process map.

- II. To close the Transactions window, choose the View > Transactions command.

3) Stopping the simulation trace.

If desired, a simulation can be run to completion in the Trace view. Non-animated simulations, however, run much faster.

We will run subsequent simulations without the Trace view.

- a) If the simulation is not already stopped, click the Stop  icon.
- b) To exit the Trace view, on the Model toolbar, click the Trace  tool.

**Step 6: Run the first "what if" scenario**

- 1) Because we stopped the trace simulation before completing, we need to run a full simulation again (to rebuild the simulation report).
  - a) On the Model toolbar, click the Start/Resume  Tool.

Our goal is to increase customer satisfaction by reducing the number of abandoned calls. Under the existing "as is" process, almost 1500 calls per month are abandoned. This level is unacceptable.

- b) Scroll down the Custom tab of the report to the element shown below.

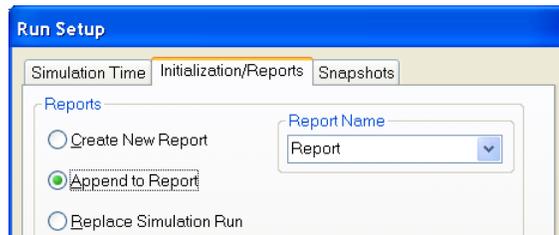
The Helpline Representatives are highly utilized (over 80% utilization). When considering the many times during the day when call volume is low enough to idle some workers, this level of resource utilization is quite high and probably the source of our high level of abandoned calls.

**Time-Weighted Average Resource Utilization**

**Worker - Call Center**

Helpline Representatives	81.98
Lending Officers	57.88

- 2) Run an experiment to analyze the impact of increasing the number of Helpline Representatives. We believe this will reduce the number of renege calls. Instead of testing this idea by hiring an additional Helpline Representative, we will first analyze the impact this new worker should have on the process.
  - a) On the Model toolbar, click the Resources  tool.
  - b) Double-click the "Helpline" resource. Change the Resource Count from 3 to 4.
  - c) Click the OK button on the Edit Cost/Count dialog box.
  - d) Click the OK button on the Define Resources dialog box.
  - e) On the Model toolbar, click the Run Setup  tool. In the Run Setup dialog box, click the Initialization/Reports tab, and select the Append to Report option.



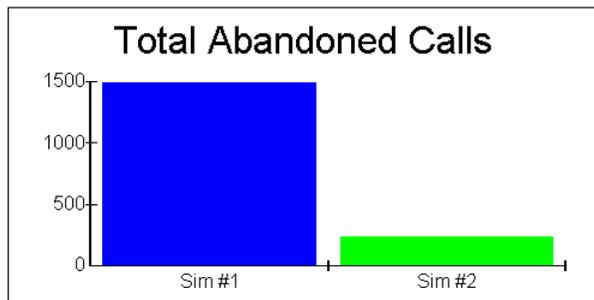
*Choosing to append simulation results*

By using the Append setting, statistics from the next simulation are affixed to the previous simulation results in the report. This provides an excellent way to compare multiple experiments quickly and easily.

- f) Click the OK button on the Run Setup dialog box.
- g) On the Model toolbar, click the Start/Resume  Tool.
- h) Click the Custom tab of the report that appears. Notice that total abandoned calls are dramatically reduced:

**Custom Statistics**

	Sim #1	Sim #2
Tot Calls	8190	8190
Tot Abandoned_Calls	1494.00	233.00
Tot Abandoned_Rate	0.18	0.03



*Report elements showing abandoned calls*

This reduction, however, comes at a price. The report element below also shows that total worker costs have increased by over \$5,000 - the monthly cost of hiring an additional worker.

### Total Cost for All Departments

#### Worker

	Tot Cost	Count
Sim #1	\$46063.23	6
Sim #2	\$51174.08	7

*Report element showing Worker costs*

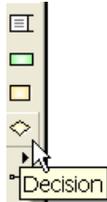
Perhaps there's a more effective way to reduce abandoned calls without raising resource costs.

### Step 7 continued: Run the second "what if" scenario

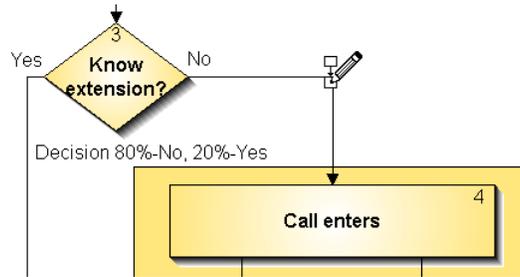
One IGX Bank team member suggests improving the process by using the "AVS System" option available with the automatic call routing software. This option qualifies calls before they are forwarded to Helpline Representatives.

We test this idea with our model before considering any change to our existing process.

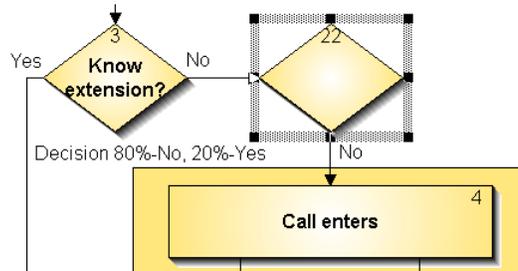
- 1) First, return the number of Helpline Representatives from 4 back to 3.
  - a) On the Model toolbar, click the Resources  tool.
  - b) Double-click the "Helpline" resource. Change the Resource Count from 4 to 3.
  - c) Click the OK button on the Edit Cost/Count dialog box.
  - d) Click the OK button on the Define Resources dialog box.
- 2) Use the Component Explorer to display the Call Center process map.
- 3) Add a diamond (decision) shape to the process map.
  - a) In the Explorer bar, double-click "Call Center" to view the Call Center process.
  - b) Click the diamond shape in the Toolbox toolbar (the frame on the left).



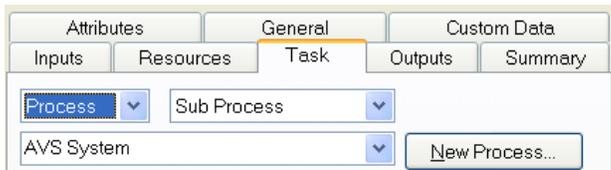
- c) As shown below, position the cursor at the corner of the connection line between shapes #3 and #4.



- d) Click the connection line. A new shape is added to the connectivity as shown:



- e) With the new shape highlighted, type "Loan Issue?" Click empty space (to reset the cursor).  
 f) Double-click the new shape and choose the Task tab. Change the Work drop-down to Process. If not set already, set the adjacent drop-down to "AVS System" as shown below.



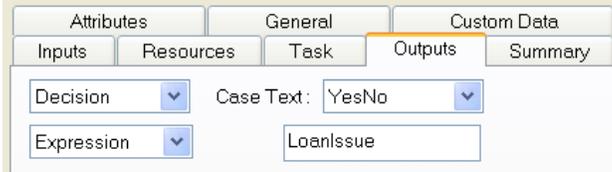
The AVS System process map was defined earlier and included in this file. Until referenced by an activity or generator, however, the AVS System process is not part of any simulation.

- g) Choose the Outputs tab. Change the Statistical drop-down to Expression. Then either:
- Type "LoanIssue" into the adjacent field or
  - Click the  $x=$  icon in the Expression toolbar at the **bottom** of the window.

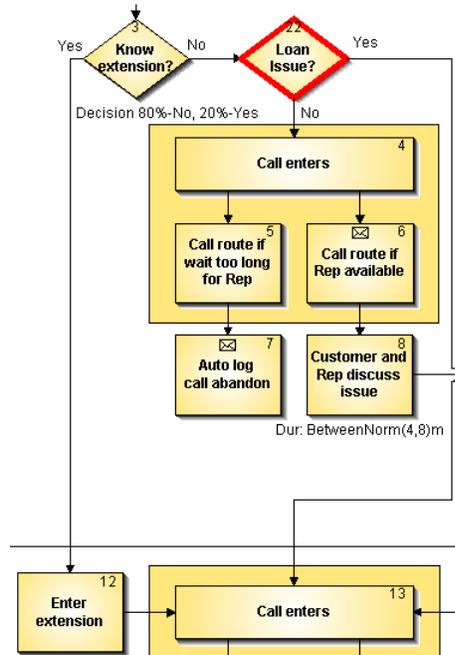


Then choose LoanIssue.

- Click the OK button on the Paste Attribute dialog box.
- h) The Outputs tab now looks like this:



- i) Click the OK button on the Properties dialog box.
- j) The border of "22 **Loan Issue?**" is highlighted to indicate a link to a sub-process. To change the link indicator style, choose Diagram on the Format menu.
- k) Draw a connection line to create the Yes path from "22 **Loan Issue?**" to "13 **Call enters**" as shown below. To draw the line:
  - I. Place your cursor inside the right elbow of the "22 **Loan Issue?**" shape.
  - II. Click and hold the left mouse button.
  - III. Drag your cursor from the source shape to the top face of the "13 **Call enters**" shape.
  - IV. Release the mouse button.

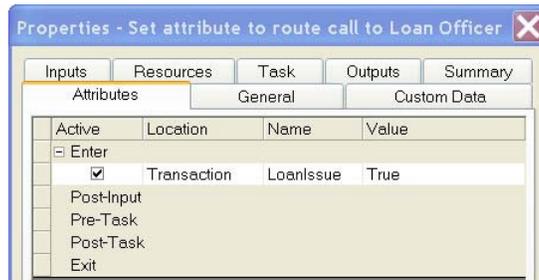


- 4) By routing loan issues directly to Loan Officers, Helpline Representatives should require less time with customers because they are not trying to solve problems they are unqualified to handle. Therefore it's reasonable to reduce the task time for that activity.
  - a) Double-click the activity "8 **Customer and Rep discuss issue**". Change the Duration in the Task tab from 4 - 8 minutes to 3 - 6 minutes with a normal distribution. Click OK.
- 5) It's also reasonable to assume that with better qualified calls, Helpline Representatives will resolve a higher percentage of calls.
  - a) Double-click the activity "9 **Issue resolved?**". Change the "Yes" percentage in the Outputs tab to 90% (wait two seconds and the "No" percentage is changed to 10%). Click OK.
- 6) Review activities in the AVS System sub process.

- a) Right-click the activity "22 **Loan Issue?**" and choose AVS System from the context menu. Alternatively, while holding the shift key down, double-click the activity "22 **Loan Issue?**"

The AVS System sub process is now visible.

- b) Double-click the activity "**Set attribute to route call to Loan Officer**" and click the Attributes tab. The LoanIssue attribute is set True to enable routing calls properly by the activity "22 **Loan Issue?**"



*Setting the LoanIssue attribute*

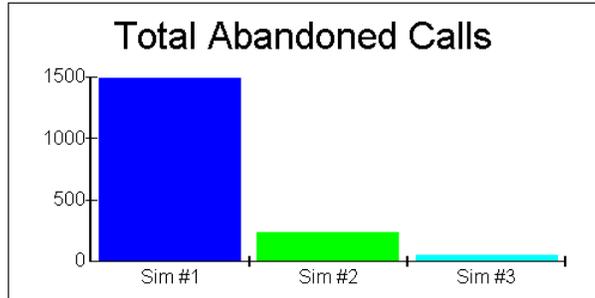
- c) Click the Cancel button on the Properties dialog box.
- d) Double-click the activity "**Have account #**" and choose the Outputs tab. The data gathered indicates that 50% of callers have an account number.
- e) Double-click the activity "**If Loan issue press 1**" and choose the Outputs tab. Twenty five percent of callers with account numbers have loan issues.
- f) Click the Cancel button on the Properties dialog box.
- g) In the Explorer bar, double-click "Call Center" to view the Call Center process.
- 7) Simulate and review the report
- a) On the Model toolbar, click the Start/Resume  Tool.

Note the significant reduction to abandoned calls while total worker cost is returned to nearly its original level (it's slightly different due to resources working different amounts of overtime).

**Of the two scenarios examined, using the AVS System appears to be the best alternative to reach our goal of less than 5% abandoned calls at the least additional cost.**

**Custom Statistics**

	Sim #1	Sim #2	Sim #3
Tot Calls	8190	8190	8190
Tot Abandoned_Calls	1494.00	233.00	49.00
Tot Abandoned_Rate	0.18	0.03	0.01



**Total Cost for All Departments**

**Worker**

	Tot Cost	Count
Sim #1	\$46063.23	6
Sim #2	\$51174.08	7
Sim #3	\$46047.53	6

**Step 8: Additional "what if" experiments**

- 1) What if the rate of incoming calls increases?

From the Model menu, choose Generators. In the Define Generators dialog box, change the rate of incoming calls from between 1 and 2 minutes to between 1 and 1.5 minutes. Simulate and analyze the results.

- 2) What if the Helpline Representatives don't resolve calls any more quickly in the improved process?

In the activity "8 **Customer and Rep discuss issue**", change the Duration in the Task tab back to "4 to 8" minutes with a normal distribution. Simulate and analyze the results.

- 3) What if a Helpline Representative takes a leave-of-absence for one month and there is no back-up for this person?

From the Model menu, choose Resources. Double-click the Helpline Representative resource and change the number of resources from three to two. Simulate and analyze the results.

- 4) Design your own experiments. Have fun with the model!

### Step 10: Document and present results

Generally, the last step in a simulation project is to make recommendations on how the actual system may be changed to improve performance. The results of simulation may be used to justify the cost and benefits of the improvements.

If IGX Bank decides to move forward with changing the process, the process model and simulation results represent a high level functional specification for the new process.

iGrafx publishing methods:

- From the File menu, choose Print.
- From the File menu, choose Publish as.
- From the Tools menu, choose Publish Web Project.
- From the Tools menu, choose Export Table.
- From the Tools menu, choose Export Diagram.
- With one or more objects selected, from the Edit menu, choose Copy. Paste into another program.
- A separate product, iGrafx Process Central, provides automatic publishing capabilities with its Web Central technology.

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