## Database update

Business Components. Rules, events, and checks. Review part 2

GeneXus



## **Business Component**

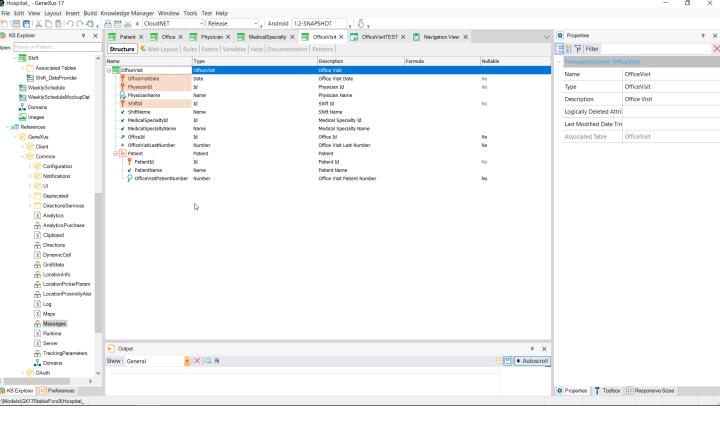
Insert, Update, Delete

Hospital KB

Focused on a KB for a health care service, in the previous video we saw all the rules, events, and checks that were performed when trying to insert data...

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...in a two-level transaction and through the Business Component. Here we will look at update and delete.



We will want to change an office visit. Since the date, physician, and shift are part of the primary key, none of these attributes can be modified for an existing record. We can only modify the office because the last number is used for the serial rule, so it cannot be changed.

The patient entered in a line cannot be changed either because it is part of the primary key. Only the secondary attribute corresponding to the number given to the patient to receive care could be changed, except for the fact that we placed a noaccept rule for that attribute.

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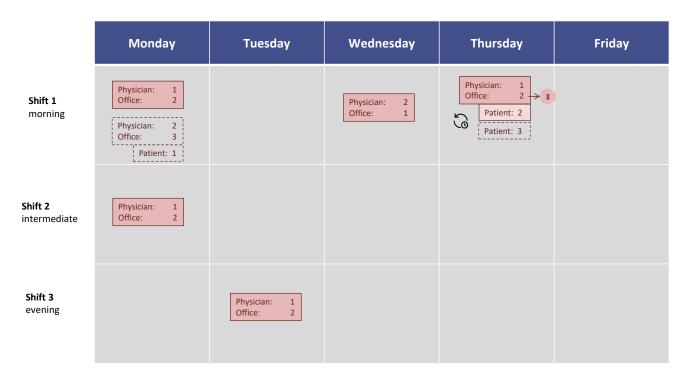


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> We can comment it to have an updatable attribute for each line. Let's comment both the serial rule and the noaccept rule so we can also modify the header attribute, the one for the last given line number.

Of course, we can also add and delete lines to the office visit.

OK, so we want to be able to change the office of a given office visit, change the number assigned to a scheduled patient, add another patient with their corresponding number, and delete one.



Let's start with this: update Thursday's office visit, changing the office to 3 and adding patient 3... if we do it through the transaction, first we have to locate the record to be updated...

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Family Medicine

1

1 UPDATE

DELETE

Shift morning

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11/21/22

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... by clicking here, the transaction is called by passing the primary key and the Update mode as parameters...

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In this way, the record of that primary key is searched for in the header table and its information is retrieved. The same is done for all the related records in the second level table, and their values are retrieved.

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We see that the OfficeId field is the first editable field. None of the previous ones can be modified.

We change it to 3. Of course, if there were another office visit for that day on that shift in that office, here we would get an error stating that this (candidate) key already exists. This is not the case.

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Let's change the number given to the first patient to 2, add patient 3, with number 3, and also change the last number to 3. After confirming, the operation performed will be an update of everything, even if at the lines level this means changing one line and adding another.

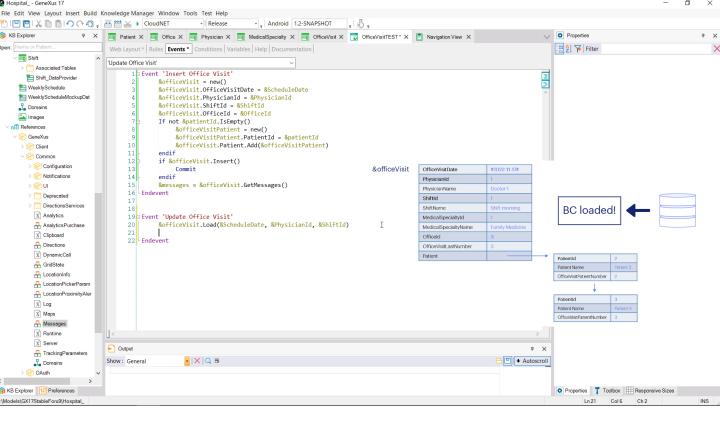


Now we will want to work in this way, but through the Business Component.

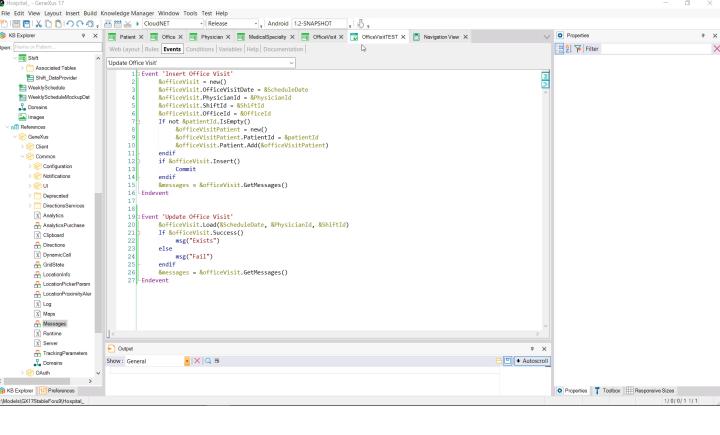
Let's suppose that, in addition to changing the office, we want to change patient 3 for patient 4. Since we cannot do it directly in the record because it is part of the primary key and it cannot be updated, we will have to delete the record and insert a new one with the correct patient and the same number that patient 3 had.

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We have added 2 more variables for the patient we want to replace with the other one for the office visit with that date, physician, and shift. We will add an event to update the office visit of this primary key....



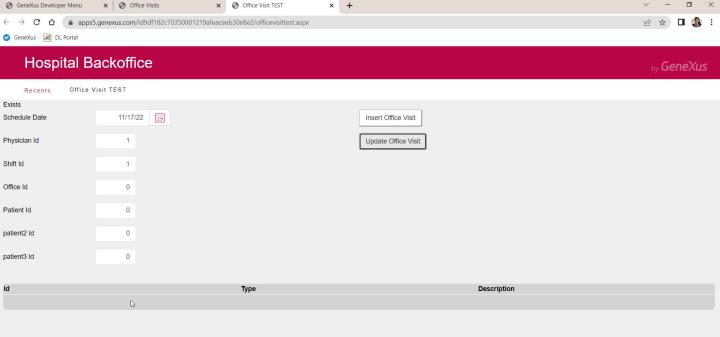
First, we have to load the data corresponding to the primary key in the BC variable. The operation will only be successful if there is a record in OfficeVisit with that key.



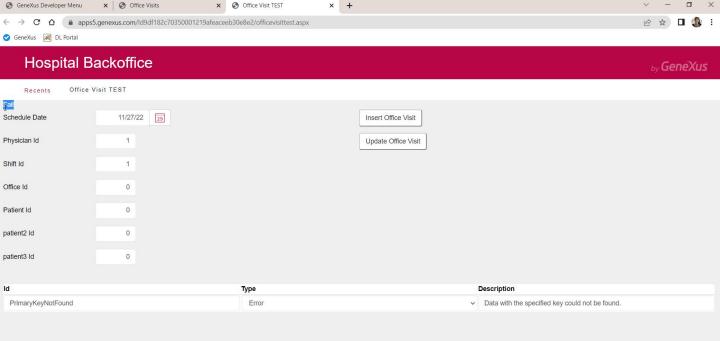
We can check it with the Success method (or its opposite, Fail). We will display messages on the screen indicating whether the record we tried to load exists. We will also retrieve the messages in the message collection. Let's try it quickly.

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SHIFT NAME		11/14/22	1	Doctor 1	Shift intermediate	Family Medicine	2	0 UPDATE	DELETE
		11/14/22	2	Doctor 2	Shift morning	Family Medicine	3	1 UPDATE	DELETE
		11/15/22	1	Doctor 1	Shift evening	Family Medicine	2	0 UPDATE	DELETE
		11/16/22	2	Doctor 2	Shift morning	Family Medicine	1	0 UPDATE	DELETE
		<mark>⊳11/17/22</mark>	1	Doctor 1	Shift morning	Family Medicine	3	3 UPDATE	DELETE
		11/21/22	1	Doctor 1	Shift morning	Family Medicine	1	1 UPDATE	DELETE

We know that this record (the one from Thursday) exists...

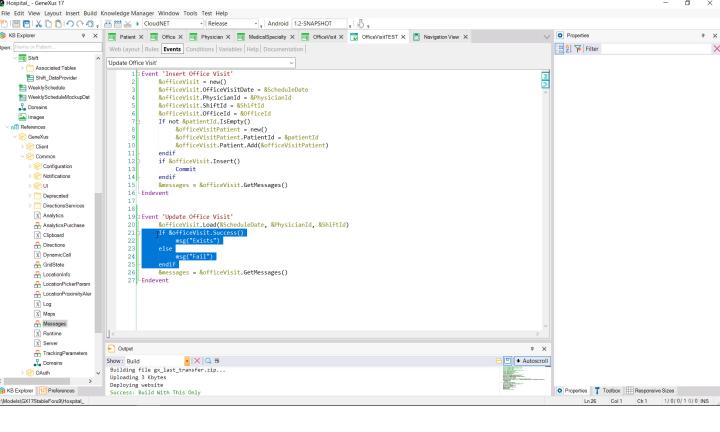


... so we try its key... it was found!

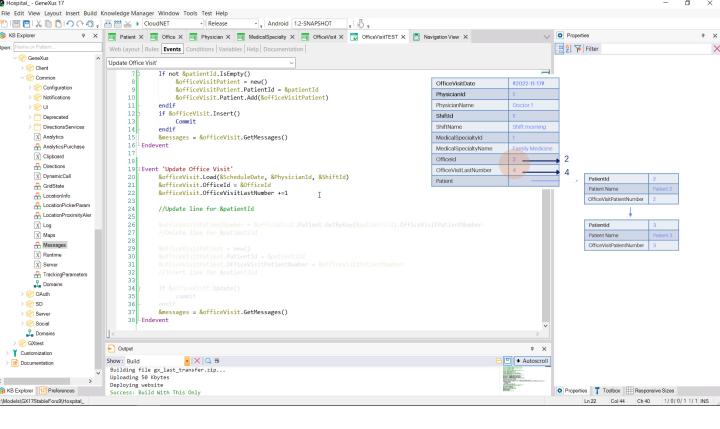


And now we enter a date for which there are no office visits... We see this other one.

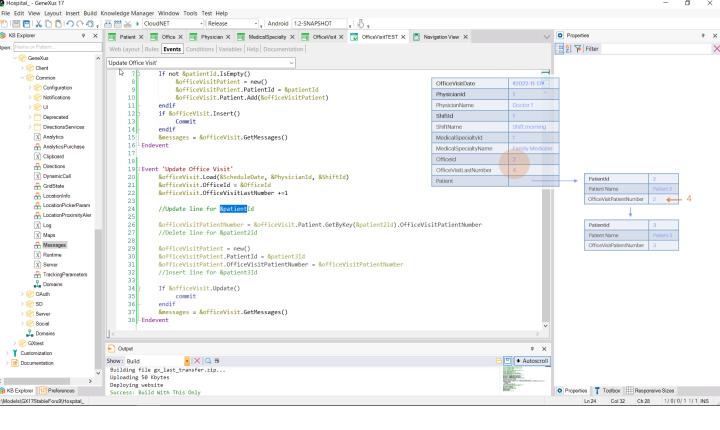
The Success method was False and the message collection shows an error indicating that the primary key was not found.



Let's remove this check because it will be done anyway when we do the update.



Next, we modify the office visit according to the screen variable; we add 1 to the last number given...



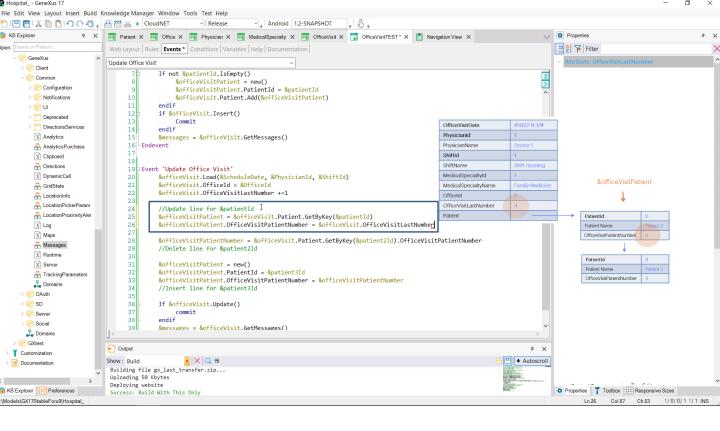
... because it is the one we will use to change the number of the first patient, the one in this variable.

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To do so, remember that we have to use a variable of the BC data type of each line; and use the GetByKey method of the patient collection of the BC that we loaded here.

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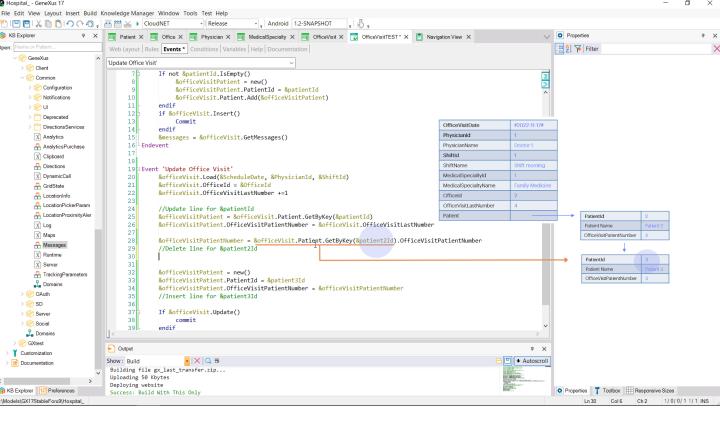
We have to send the line ID to the method so that it can return a reference to that item in the collection. It will be a reference to the item itself, to its memory location; it will not be a copy.



Therefore, it will be enough to modify the value of this element for this variable, because it will be modifying the item of the collection directly. There is no need to do any update. This is enough.

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Now we want to delete the line corresponding to this patient, to insert another one and change the patient.



But before deleting it, we need to retrieve the number that was assigned to it. To do so, we assign what's shown on the right to a variable where we will store that value. Here we are retrieving a reference to the BC of the lines that have this value in the identifier. And from that BC, we are asking for the Patient Number.

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Now we can delete the line. To do so, on the list of patients for an office visit, we run the RemoveByKey method, to which we send the identifier of the line that we want to delete, which is the ID of this patient, that of the second variable of the web panel screen.

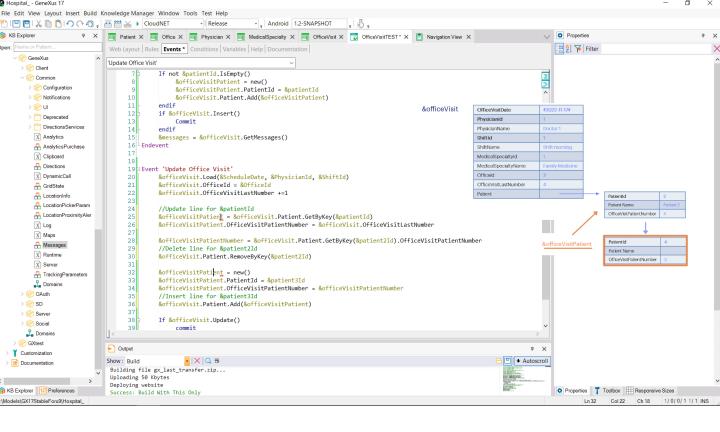
For now, this method only deleted the item from the collection in memory. We have not done anything in the database yet.

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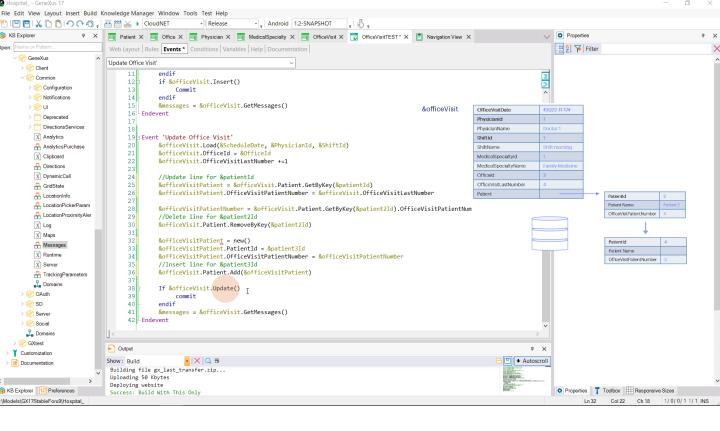
Lastly, we must add a new item to the collection, for the substitute patient, with the number given to the patient being replaced.

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We still need to insert this item to the collection. We do it with the Add method.



In this case, it was essential to ask for new memory for this BC variable of the line, because we had already used it here. If we didn't ask for new memory, then we would be inserting to the collection the same location in memory that was already there, so instead of 2 lines—one for patientId and another for patient3ld—we would have only one, with these values that will have overwritten the first ones.



At this point, we have already made all the changes we wanted on the BC variable that we loaded from the database. Now we need to ask for what we would ask in the transaction by pressing the Confirm button. That is to say, to update the information in the database, running all the Business Component checks. If the result of the Update is successful, we commit. And in any case we retrieve the messages that are generated. Let's try this.

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For this office visit, we want to change the office to 2, give patient 2 the number following the last one and update the last one; delete patient 3 and add patient 4 with their number.

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So here we choose these values, those of that primary key... office 2, patient 2; 3 that we want to change to 4. Success, as we expected.

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Shift Id	1						
Office Id	3	Monday	Tuesday	Wednesday	Thursday	Friday	
Patient Id	2	Physician: 1 Office: 2		Physician: 2	Physician: 1 Office: 2		
patient2 Id	4	Physician: 2 Office: 3		Office: 1	Patient: 2		
patient3 Id	1	Patient					
		Dhusisian					
ld		Physician: 1 Office: 2					
			Physician: 1				
			Office: 2				

Now let's cause the update to fail to confirm that it's checking everything that we would expect it to check.

For example, let's try to change the office to 3 (no problem), give patient 2 the number following the last one (no problem), and delete patient 4 (no problem), to insert a new line for patient 1, who we know is already scheduled for an office visit involving this specialty.

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$\leftrightarrow$ $\rightarrow$ C $\triangle$ $$ apps5.	.genexus.com/ld9df182c70350001219a	feaceeb30e8e2/officevisittest.aspx			₫ ☆	🖬 🥸 E
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Hospital Ba	ackoffice				ьу 🕞	enēXus
Recents Office V	isits — Office Visit — Office Visit	TEST				
Schedule Date	11/17/22		Insert Office Visit			
Physician Id	1		Update Office Visit			
Shift Id	1	Checks		Error Id	Error Description	
Office Id	3	FK: PhysicianId		ForeingKeyNotFound	No matching 'Physician"	
Patient Id	2	error("Physician " + PhysicianId.ToString() +" alread + OfficeVisitDate.ToString(), PhysicianNotAvaila		PhysicianNotAvailable	Physician already has 2 shifts	
patient2 ld	4	FK: ShiftId		ForeingKeyNotFound	No matching 'Shift'	
patient3 Id	1	PK: {OfficeVisitDate, PhysicianId, Shitfld}		DuplicatePrimaryKey	Record already exists	
		FK: OfficeId		ForeingKeyNotFound	No matching 'Office'	
ld		CK: {OfficeVisitDate, ShiftId, OfficeId}			Office Visit Date, Shift Id, Office Id already exists	
		FK: PatientId		ForeingKeyNotFound	No matching 'Patient'	
		PK: {OfficeVisitDate, PhysicianId, ShiftId, PatientId}		DuplicatePrimaryKey	Record already exists	
		error("There is a pending office visit scheduled for t PatientAlreadyScheduledForMedicalSpecialty) if not &IsOk and Insert Level PatientId;	this patient for the same specialty",	PatientAlreadySchedule dForMedicalSpecialty	There is a pending office visit scheduled	

Since the line will be inserted, the transaction error rule that prevents the database from being updated should be executed. Let's try it...

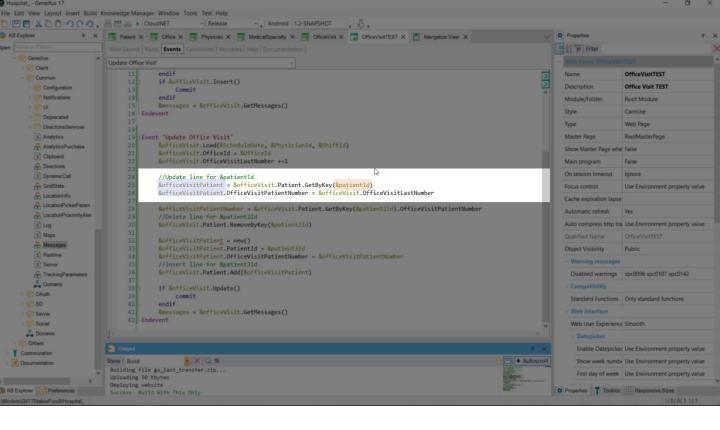
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Hospital B	ackoffice				by <b>GeneXus</b>
Recents Office V	/isits — Office Visit — Office Visit	TEST			
Schedule Date	11/17/22 29		Insert Office Visit		
Physician Id	1		Update Office Visit		
Shift Id	1				
Office Id	3				
Patient Id	2				
patient2 ld	4				
patient3 ld	1				
ld		Туре		Description	
PatientAlreadyScheduledFor	MedicalSpecialty	Error		✓ There is a pending office visit scheduled for this p	atient for the same specialt

It was indeed fired. And the office visit remained unchanged. No update was made to the database.

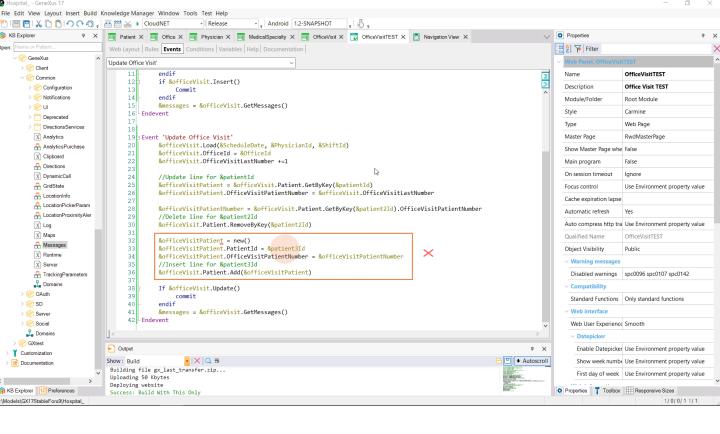
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Hospital B	ackoffice					by <b>GeneXus</b>
Recents Office	Visits — Office Visit — Office Vis	it TEST				
Schedule Date	11/17/22 29			Insert Office Visit		
Physician Id	1			Update Office Visit		
Shift Id	1					
Office Id	3		<b>⊳</b>			
Patient Id	1					
patient2 Id	4					
patient3 Id	3					
ld		Туре			Description	
SuccessfullyUpdated		Warning			✓ Data has been successfully updated.	

If we now choose to give the last number to a patient who is not included in the office visit (for example 1, who is not there... and we change 4 to 3, which should not cause any problems)... that is, we change the office to 3, choose patient 1 to change their number, and change 4 to 3.

Why would it let us update successfully if patient 1 does not exist in the office visit?



Let's look at the code. The problem is that GetByKey did not find an item for patient 1 in the line collection, so this variable will not be able to update the line because it will not be pointing anywhere. The other operations did not find any problems.



If now, to update the first patient we give that of an existing line, for which we also want to delete, but we make a mistake with the new one, and choose one that does not exist...

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🕑 GeneXus 🛛 🔣 DL Portal						
	Shift Name	Shift morning				
	Medical Specialty Id	1				
	Medical Specialty Name	Family Medicine				
				#2022-11-17#		
	Office Id	3		1		
	Office Id	9 V		Doctor 1		
				Shift morning		
	Last Number	5		1		
			MedicalSpecialtyName	Family Medicine		
			OfficeId	3		
	Patient			6		
	Patient Id Patient Name Pa	tient Number	Patient		Patient Name Patient 2	
	× 2 🏫 Patient 2	4			PatientOfficeVisitNumber 4	
	× 3 🍄 Patient 3	3			Patientid 3	
	0	0			Patient Name Patient 3 PatientOfficeVisitNumber 6	
	0	0			Patientid 25	
	0	0			Patient Name PatientOfficeVisitNumber 4	
	0	0				
	0	0				
	[New row]					

In this way, for example, we ask to give the last number to patient 3, delete patient 2 and replace it with 25...

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				OfficeVisitDate #2022-11-17#	
Hospital Ba	ackoffice			PhysicianId 1	
				PhysicianName Doctor1	
0.00 Mine M	/isits — Office Visit — Office	Weik TEOT		ShiftId 1	
Recents Office V	isits - Office visit - Office	VISIT LEST		ShiftName Shift morning	
Schedule Date	11/17/22 29		Insert Office Visit	MedicalSpecialtyId 1	
Schedule Date	29			MedicalSpecialtyName Family Medicine	
				OfficeId 2	
Physician Id	1		Update Office Visit	OfficeVisitLastNumber 6	
				Patient	Patientid 2
Shift Id	1		D₂		Patient Name Patient 2
					Battent Office Visit Number
Office Id	2				<b>↓</b>
Olice Id	2				Patientid 3
					Patient Name Patient 3
Patient Id	3				PatientOfficeVisitNumber 6
					<u> </u>
patient2 Id	2				Patientid 25
					Patient Name PatientOfficeVisitNumber 4
patient3 Id	25				PatientOmcevisitivumber 4
ld		Туре		Description	
				Υ. ·	
ForeignKeyNotFound		Error		<ul> <li>No matching 'Patient'.</li> </ul>	

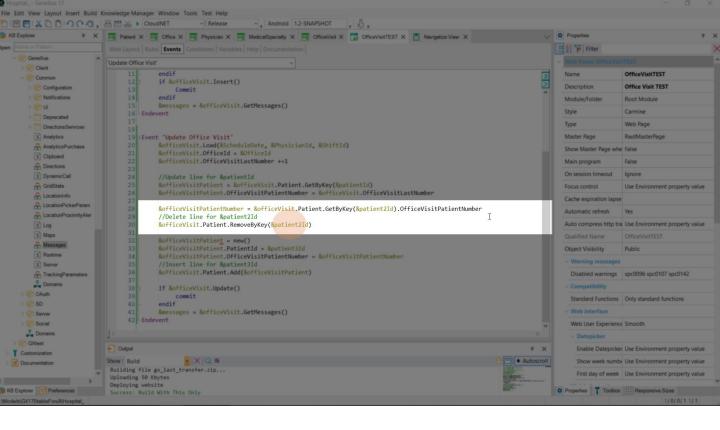
...changing the office to 2, for example... well, we get the referential integrity error of the patient.

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Hospital B	ackoffi	ce				OfficeVisitDate	#2022-11-17#					
neepitai B	aonom	00				PhysicianId	1					
						PhysicianName	Doctor 1					
Recents Office '	Visits — Offic	e Visit — Office Visit TES	т			ShiftId	1					
						ShiftName	Shift morning					
Schedule Date	11/17/	22 29			Insert Office Visit	MedicalSpecialtyId	1					
						MedicalSpecialtyName	Family Medicine					
Physician Id	1				Update Office Visit	OfficeId	2					
Thysician id	· · · ·				Opdate Office Visit	OfficeVisitLastNumber	6					
						Patient		_	Patientid	2		
Shift Id	1								Patient Name	Patient	2	
									PatientOfficeVisitNumber	4		
Office Id	2							_	+			
0.000 14					G.		updat		PatientId	3	_	
					43		upuu	_	Patient Name PatientOfficeVisitNumber	Patient	3	
Patient Id	3	update							PatientOfficeVisitNumber	6		
									+			
patient2 Id	25	delete					inser	. [	Patientid	4		
							mser		Patient Name		_	
		in a set							PatientOfficeVisitNumber	0		
patient3 Id	4	insert										
			_									
ld			Туре			Description						
SuccessfullyUpdated			Warning			<ul> <li>Data has been succ</li> </ul>	essfully updated					

What if we made a mistake the other way around, with the one we want to delete? It allowed us to update! Why? Let's see what it did.

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← → C ☆ 🍙 apps5.genexus	.com/ld9df182c70350001219afeaceeb3	0e8e2/officevisit.aspx?Mode=UPD&OfficeVisitDate=20221117&PhysicianId=1&Shi	ftld=1 I	🖻 🏚 🗖 🥵 i
🕑 GeneXus 🔣 DL Portal				
	Shift Name	Shift morning	OfficeVisitDate #2022-11-17#	
			PhysicianId 1	
			PhysicianName Doctor1	
	Medical Specialty Id	1	Shiftid 1	
			ShiftName Shift morning	
			MedicalSpecialtyId 1	
	Medical Specialty Name	Family Medicine	MedicalSpecialtyName Family Medicine	
			Office/d 2 Office/listLastNumber 6	
			OfficeVisitLastNumber 6 Patient	
	Office Id	2 😚	Patient	Patientid 2
				Patient Name Patient 2 PatientOfficeVisitNumber 4
	Last Number	6		+
				PatientId 3 Patient Name Patient 3
				PatientOfficeVisitNumber 6
	Patient			+
				Patientid 4
	Patient Id Patient Name P	atient number		Patient Name
	× 2 😚 Patient 2	4		PatientOfficeVisitNumber 0
	× 3 😚 Patient 3	6		
	× 4 🔐 Patient 4	0		
	0	0		
	0	0		
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	[New row]			

It increased the Last Number by 1. OK. Assigned it to patient 3, fine. But left patient 2 as it was, and added 4, with 0 for the number. Let's see it in GeneXus...



This will give us 0, because it won't find the item with key 25 in the collection. And this Remove operation will not remove the line for this key, because it does not exist. So the new will be performed successfully but with value 0.

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open: Name or Pattern	Web Layout Rules Events * Conditions Variables Help Documentation		📜 🛃 🌾 Filter	×
✓ SeneXus ∧ > Strength Client	Update Office Visit'			
~ 🕎 Common	11- endif 12 if &officeVisit.Insert()			
> 🕎 Configuration	13 Commit	2		
> 😚 Notifications	14 endif			
> 🕎 UI	15 &messages = &officeVisit.GetMessages()			
> C Deprecated	16 Endevent			
> DirectionsServices				
X Analytics	19∃Event 'Update Office Visit'			
🕂 AnalyticsPurchase	20 &officeVisit.Load(&ScheduleDate, &PhysicianId, &ShiftId)			
X Clipboard	21 &officeVisit.OfficeId = &OfficeId 22 &&officeVisit.OfficeVisitLastNumber +=1			
🕂 Directions	22 adotticevisic.otticevisicLastnumber +=1 23			
X DynamicCall	24 //Update line for &patientId			
🕂 GridState	<pre>25 &amp; officeVisitPatient = &amp; officeVisit.Patient.GetByKey(&amp;patientId)</pre>			
🕂 LocationInfo	<pre>26 &amp;officeVisitPatient.OfficeVisitPatientNumber = &amp;officeVisit.OfficeVisitLastNumber</pre>			
A LocationPickerParam	<pre>27 28 &amp;officeVisitPatientNumber = &amp;officeVisit.Patient.GetByKey(&amp;patient2Id).OfficeVisitPatientNumber</pre>			
A LocationProximityAler	29 //Delete line for &patient21d			
X Log	30 if &officeVisit.Patient.RemoveByKey(&patient2Id)			
X Maps	31 I			
A Messages	32 &officeVisitPatient = new()			
X Runtime	<pre>33 &amp;officeVisitPatient.PatientId = &amp;patient3Id 34 &amp;officeVisitPatient.OfficeVisitPatientNumber = &amp;officeVisitPatientNumber</pre>			
X Server	35 //Insert line for &patient3Id			
TrackingParameters	36 &officeVisit.Patient.Add(&officeVisitPatient)			
L Domains	37 - endif			
> 😭 OAuth	38 If &officeVisit.Update() 39 commit			
> 😭 SD	40 - endif			
> Server	41 &messages = &officeVisit.GetMessages()			
> Social	42 Endevent			
1 Domains		~		
> 🔐 GXtest				
> Customization	E Output	7 ×		
> Documentation	Show: Build •   X   Q =	合 🛄 🗲 Autoscroll		
	Building file gx_last_transfer.zip			
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We could improve things a bit, asking for the result of the remove operation. And add the line only if it was successful.

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Hospital Back	office							<sub>by</sub> GeneXus
Recents Office Visit —	Office Visits							
X HIDE FILTERS	Office Visits	Q Nam	ne					+ INSERT
MEDICAL SPECIALTY NAME								
_	Visit Da	te 🛆 Physician Id	Physician Name	Shift Name	Medical Specialt	Office Id	Last Number	
OFFICE VISIT DATE	11/1	4/22 1	Doctor 1	Shift morning	Family Medicine	2	0 UPDATE	DELETE
SHIFT NAME	11/1	4/22 1	Doctor 1	Shift intermediate	Family Medicine	2	0 UPDATE	DELETE
	11/1	4/22 2	Doctor 2	Shift morning	Family Medicine	3	1 UPDATE	DELETE
	11/1	5/22 1	Doctor 1	Shift evening	Family Medicine	2	0 UPDATE	DELETE
	11/1	6/22 2	Doctor 2	Shift morning	Family Medicine	1	0 UPDATE	DELETE
	11/1	7/22 1	Doctor 1	Shift morning	Family Medicine	2	6 UPDATE	DELETE
	11/1	7/22 2	2 Doctor 2	Shift morning	Family Medicine	3	0 UPDATE	DELETE
	11/2	1/22 1	Doctor 1	Shift morning	Family Medicine	1	1 UPDATE	DELETE

Last notes: here we have the office visit on Thursday 17, for physician 1 on shift 1 in office 2. Let's add an office visit with another physician for the same date and shift but in office 3. If now we want to change the first office visit, that of physician 1, to office 3, which is now busy....

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Hospital B	ackoffice			by <b>GeneXus</b>
Recents Office \	Visits — Office Visit — Office Visit	TEST		
Schedule Date	11/17/22 29		Insert Office Visit	
Physician Id	1		Update Office Visit	
Shift Id	1			
Office Id	31			
Patient Id	3			
patient2 Id	25			
patient3 Id	4			
ld		Туре	Descrip	otion
		Error	T	Visit Date,Shift Id,Office Id already exists

...the update will fail due to a duplicate candidate key.

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Hospital E	Backoffice				by <b>GeneXus</b>
Recents Office	Visits — Office Visit — Office V	'isit TEST			
Schedule Date	11/17/22 29			Insert Office Visit	
Physician Id	1			Update Office Visit	
Shift Id	1		N		
Office Id	45		6		
Patient Id	3				
patient2 Id	25				
patient3 Id	4				
ld		Туре		Description	
ForeignKeyNotFound		Error		✓ No matching 'Office'.	

And if we want to change the office to a nonexistent one, the referential integrity check will fail.

Image: Signer Subscription (1)       Type       Description       Image: Signer Subscription (Signer Subscrip)))       Image: Image: Image: Image: Imag	CeneXus Recents Office Visit TESTC Schedule Date 11/27/23 3 Physician Id 1 Lupdate Office Visit Shift Id 1	-
Hospital Backoffice       Second	Mospital Backoffice         Recents       Office Visit TESTC         Schedule Date       11/27/23       Insert Office Visit         Physician Id       1       Update Office Visit         Shift Id       1       Insert Office Visit	🚯 E
Recents       Office Visit         Schedule Date       11/27/23         Physician Id       1         Update Office Visit       Update Office Visit         Shift Id       1         Office Id       3         Patient Id       2         patient2 Id       3         patient3 Id       4	Recents     Office Visit TESTC       Schedule Date     11/27/23       Physician Id     1       Update Office Visit	
Schedule Date 11/27/2   Physician Id 1   Update Office Visit   Office Id   0<	Schedule Date 11/27/23     Physician Id 1     Update Office Visit     Update Office Visit	ในรั
Physician Id     Image: Constraint of the system of the syst	Physician Id     1       Shift Id     1	
Shift d 1   Office ld 3   Patient ld 2   patient2 ld 3   patient3 ld 4	Shift Id 1	
Office Id     3       Patient Id     2       patient2 Id     3       patient3 Id     4		
Patient Id     2       patient2 Id     3       patient3 Id     4	Office Id 3	
patient2 Id 3 patient3 Id 4		
patient3 Id 4	Patient Id 2	
	patient2 Id 3	
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	ld Description	
PrimaryKeyNotFound         Error         Data with the specified key could not be found.	The second se	

And of course, if there is no record with this primary key, no matter what values we enter in these variables, when we try to update, we will get this error because the Load was not successful.

Office Visit	×	+				GeneX	ันร
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	Office Visit			&officeVisit .Load(#20	022-11-17#, 1, 1)		
				OfficeVisitDate	#2022-11-17#		
				PhysicianId	1		
	Visit Date	11/17/22		PhysicianName	Doctor 1		
				ShiftId	1		
	Physician Id	1		ShiftName	Shift morning		
				MedicalSpecialtyId	1		
	Physician	Doctor 1		MedicalSpecialtyName	Family Medicine		
	Name			OfficeId	2		
		↓ S		OfficeVisitLastNumber	6		
	Shift Id	1		Patient		PatientId	2
						Patient Name	Patient 2
	Shift Name	Shift morning				PatientOfficeVisitNumber	4
						Ļ	
	Medical Specialty Id	1				PatientId	3
	opoolary la					Patient Name	Patient 3
	Medical	Family Medicine		&officeVisit.Offic	eld	PatientOfficeVisitNumber	6
	Specialty						
	Name					PatientId	4
	Office Id					Patient Name	Patient 4
	Office Id					PatientOfficeVisitNumber	0
	Last Number	6					
			-				

In summary: to update through the transaction, the value of the primary key is sent to it and there the values of the header and line attributes are brought from the database to the screen.

To do it through the BC, the Load method is applied to load the elements of the BC structure. So the attributes on the screen and the lines are like the elements of the BC and the items of the collection.

The user can change those attributes of the header that can be modified, and the developer does the same with the BC through the variable, by accessing the element: BC variable, period, element name (for example, OfficeId).

In the transaction, the user can change some data of a line directly by clicking on that line and editing the desired field.

To do this with the BC, you must first access the line by code; that is, the item in the collection. To do so, there is the GetByKey method that can only be applied to the BC element that is a collection of lines. Here it is &officeVisit, period, Patient. Unlike the transaction, where we can see the line and its values, here we have to retrieve it, starting from its identifier. If there is an item with that ID in the collection, then we will perfectly retrieve the memory location of the item (and it will be convenient, surely, to assign it to a variable of the BC data type of the line, to work more comfortably). There we modify the elements of the item/line that we are interested in. It could be the PatientOfficeVisitNumber. But what if the ID that we specify for the GetByKey does not exist? The &officeVisitPatient variable will not be pointing to the position of the line. If it had not been used before or had been assigned a new, then it will be empty, and the change made to the PatientOfficeVisitNumber will have no effect on the original BC. If we want to remove a line from the transaction, we identify it and mark it like this. In the BC we have the RemoveByKey method of the items collection. Again, if we pass an item ID that is not in the collection, it will not be able to do anything on that line that we wanted to delete. Everything will remain unchanged. This method has the advantage of returning True or False based on whether it finds the item.

And if we want to add a new line to the transaction, we do it directly using one of the empty lines provided by the grid.

In the BC, we will have to create the memory space for the item, with a variable of the data type of the lines. Also, by assigning it the new, complete its elements, and use the Add method of the collection of items. That's how we add this memory space to the collection.

So far, either by handling the transaction or the BC variable, we have worked in memory. For all this to impact on the database, the order must be given. In the transaction, it is done with the Confirm button (since it is in Update mode, it will try to update). In the BC, we do it with the Update method (we could also use the Save method, but we are not going to see it here). As a result, the corresponding rules, events and transaction checks will be executed. That is, in the BC all those that do not depend on the interface (and are not qualified to run only on the web, through the environment attributes that we had seen in the previous video).

In short, when working with the BC we have to be more careful because we don't see the existing lines and we can make mistakes in this programming. Then we will discuss a simpler way to insert or modify lines (but not to delete them), which is to handle them through a Data Provider.

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		y				^	8	officeVisit		
	Medical Specialty Id	1						OfficeVisitDate	#2022-11-17#	
								PhysicianId	1	
	Medical	Family Medicine						PhysicianName	Doctor 1	
	Specialty Name							ShiftId	1	
								ShiftName	Shift morning	
	Office Id	2						MedicalSpecialtyId	1	
								MedicalSpecialtyName	Family Medicine	
	Last Number	6						OfficeId	2	
	Last Hamber							OfficeVisitLastNumber	6	
	Patient							Patient		PatientId
	Fallent									Patient Name
	Patient Id	Patient Name Patient N	umber							PatientOfficeVisitNumber
	× 2	Patient 2	4					&officeVisitPatient =		
	Х 3	Patient 3	6							PatientId
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	0	Ŷ	0							Patient Name
	0	•	0							PatientOfficeVisitNumber
	0		0							
		[New row]				Ŧ				

In the transaction, the user can modify some data of a line directly by clicking on that line and editing the desired field.

To do this with the BC, you must first access the line by code, that is, the item in the collection. To do so, there is the GetByKey method that can only be applied to the BC element that is a collection of lines. Here it is & officeVisit, period, Patient. Unlike the transaction, where we can see the line and its values, here we have to retrieve it, starting from its identifier. If there is an item with that ID in the collection, then we will perfectly retrieve the memory location of the item (and it will be convenient, surely, to assign it to a variable of the BC data type of the line, to work more comfortably). There we modify the elements of the item/line that we are interested in. It could be the PatientOfficeVisitNumber.

But what if the ID that we specify for the GetByKey does not exist? The &officeVisitPatient variable will not be pointing to the position of the line. If it had not been used before or had been assigned a new, then it will be empty, and the change made to the PatientOfficeVisitNumber will have no effect on the original BC.

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Office Visit	×	+		~	_	Ш	×
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오 GeneXus 🛛 📈 DL Po	ortal						
							1
	Medical Specialty Id	1					
	Medical Specialty Name	Family Medicir	ne				
	Office Id	2	<b>û</b>				
	Last Number	6					l
	Patient						
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OfficeVisitDate	#2022-11-17#			
PhysicianId	1			
PhysicianName	Doctor 1			
ShiftId	1			
ShiftName	Shift morning			
MedicalSpecialtyId	1			
MedicalSpecialtyName	Family Medicine			
Officeld	2			
OfficeVisitLastNumber	6			
Patient			PatientId	2
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&officeVisit.Patient.R	emoveByKey(4)		Patientid	4
			Patient Name	Patier
			PatientOfficeVisitNumber	

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If we want to remove a line from the transaction, we identify it and mark it like this. In the BC we have the RemoveByKey method of the items collection. Again, if we pass an item ID that is not in the collection, it will not be able to do anything on that line that we wanted to delete. Everything will remain unchanged. This method has the advantage of returning True or False based on whether it finds the item.

Office Visit	×	+							GeneX	US"
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	Medical Specialty Name	Family Medicine	9	•	&0	fficeVisit				
						OfficeVisitDate	#2022-11-17#			
	Office Id	2	Ŷ			PhysicianId	1			
						PhysicianName	Doctor 1			
	Last Number	6				Shiftld	1			
	Last Number	0				ShiftName	Shift morning			
						MedicalSpecialtyId	1			
	Patient					MedicalSpecialtyName	Family Medicine			
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						Patient		→ [	PatientId	2
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	+	4 Patient 4	θ		&	officeVisit.Patient.Add(&d	officeVisitPatient)		PatientOfficeVisitNumber	4
		Û	0						Ļ	
۵	4	) }	0					[	PatientId	3
									Patient Name	Patient 3
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	C	0	0			PatientId			PatientId	4
		[New row]				Patient Name			Patient Name	Patient 4
		[New TOW]				PatientOfficeVisitNumber			PatientOfficeVisitNumber	0
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			-	¥						

And if we want to add a new line to the transaction, we do it directly by using one of the empty lines provided by the grid. In the BC, we will have to create the memory space for the item, with a variable of the data type of the lines. Also, by assigning it the new, complete its elements, and use the Add method of the collection of items. That's how we add this memory space to the collection.

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	Medical Specialty Name	Family Medicine	3	*	&0	fficeVisit			
						OfficeVisitDate	#2022-11-17#		
	Office Id	2	Ŷ			PhysicianId	1		
						PhysicianName	Doctor 1		
	Last Number	6				ShiftId ShiftName	1 Shift morning		
						MedicalSpecialtyId	1		
	Patient					MedicalSpecialtyName	Family Medicine		
						OfficeId	2		
	Patient	Id Patient Name	Patient Number			OfficeVisitLastNumber	6		
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	+	4 Patient 4	θ					PatientOfficeVisitNumber	4
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	0	Û	0			PatientId		PatientId	4
		[New row]				Patient Name		Patient Name	Patient 4
		[New IOW]				PatientOfficeVisitNumber		PatientOfficeVisitNumber	0
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So far, either by handling the transaction or the BC variable, we have worked in memory. For all this to impact the database, the order must be given. In the transaction, it is done with the Confirm button (since it is in Update mode, it will try to update). In the BC, we do it with the Update method (we could also use the Save method, but we are not going to see it here). As a result, the corresponding rules, events and transaction checks will be executed. That is, in the BC all those that do not depend on the interface (and are not qualified to run only on the web, through the environment attributes that we had seen in the previous video).

In short, when working with the BC we have to be more careful because we don't see the existing lines and we can make mistakes in this programming. Then we will discuss a simpler way to insert or modify lines (but not to delete them), which is to handle them through a Data Provider.

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😚 KB Explorer 🛛 🖓 🗙	🔄 Patient X 🔄 Office X 📑 Physician X 📑 MedicalSpecialty X 📑 OfficeVisit X 😨 OfficeVisitTEST X 👩 Navigation View X	V Properties 7 X
pen: Name or Pattern	Web Layout Rules Events Conditions Variables Help Documentation	E A Filter
✓ SeneXus > Son Client	Delete Office Visit'	
Common	20 &officeVisit.Load(&ScheduleDate, &PhysicianId, &ShiftId) 21 &officeVisit.OfficeId = &OfficeId	
> 🛜 Configuration	21 &officeVisit.OfficeId = &OfficeId 22 &officeVisit.OfficeVisitLastNumber +=1	2
> Rotifications		^
> 🔗 UI	24 //Update line for &patientId	
> C Deprecated	<pre>25 &amp;officeVisitPatient = &amp;officeVisit.Patient.GetByKey(&amp;patientId)</pre>	
> DirectionsServices	26 80fficeVisitPatient.OfficeVisitPatientNumber = &officeVisit.OfficeVisitLastNumber 27	
X Analytics	28 8officeVisitPatientNumber = &officeVisit.Patient.GetByKey(&patient2Id).OfficeVisitPatientNumber	
AnalyticsPurchase	29 //Delete line for &patient2Id	
X Clipboard	30 if &officeVisit.Patient.RemoveByKey(&patient2Id)	
A Directions	31 32 &officeVisitPatient = new()	
X DynamicCall	32 aofficeVisitPatient = new() 33 & &officeVisitPatient.PatientId = &patient3Id	
A GridState	<pre>34 &amp;officeVisitPatient.OfficeVisitPatientNumber = &amp;officeVisitPatientNumber</pre>	
	35 //Insert line for &patient3Id	
A LocationPickerParam	36 &officeVisit.Patient.Add(&officeVisitPatient) 37 - endif	
A LocationProximityAler	3/ end1 38 If &officeVisit.Update()	
X Log	39 comit	
X Maps	40 - endif	
A Messages	<pre>41 &amp;messages = &amp;officeVisit.GetMessages()</pre>	
X Runtime	42 - Endevent 43	
X Server	43 44 Event 'Delete Office Visit'	
A TrackingParameters	45 &officeVisit.Load(&ScheduleDate, &PhysicianId, &ShiftId)	
L Domains	46 &officeVisit.Delete()	
> 🔗 OAuth	47 if &officeVisit.Success() 48 Commit	
> 🔗 SD	49 endif	
> Server	50 & messages = &officeVisit.GetMessages()	
> Social	51 - Endevent	

Social Domains

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E Output

Show : General

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Finally, we want to delete, so we add the button and in the associated event: first we load the BC variable by primary key—the three variables are displayed here—, and then we apply the Delete method to the BC. For now, this method does not return True or False as the Insert and Update do. So to know the result of the operation we will have to execute the Success method (or its opposite, Fail).

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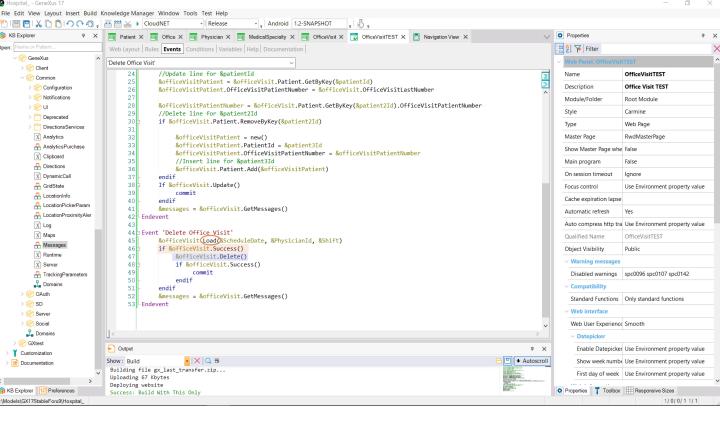
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🕑 GeneXus 🛛 😹 DL Portal				
Hospital Ba	ackoffice			by <b>GeneXus</b>
Recents Office V	'isit TEST			
Schedule Date	11/17/22 29		Insert Office Visit	
Physician Id	2		Update Office Visit	
Shift Id	1		Delete Office Visit	
Office Id	0			
Patient Id	0			
patient2 Id	0			
patient3 Id	0			
ld		Туре	Description	
SuccessfullyDeleted		Warning	<ul> <li>Data has been successfully deleted.</li> </ul>	
			n. <b>A</b>	

Let's first test the deletion of an office visit that we know exists. This one. We enter the key values. It deleted it without any problems.

If from another table there were a record referencing the one we wanted to delete, then the deletion would have failed due to referential integrity. But this is not the case. In our application at the moment there is no subordinate table to this one, that is to say, that references it.

🚱 GeneXus Developer Menu	× Solution Office Visits	× S Office Visit TEST	× +		~ - 🗆 ×
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Physician Id	2		Update Office Visit		
Shift Id	1		Delete Office Visit		
Office Id	0				
Patient Id	0				
patient2 Id	0				
patient3 Id	0				
ld		Time		Description	
CandidateKeyNotFound		Type Error	~	<ul> <li>Please 'Get' data before trying to update it. I</li> </ul>	

And if now we enter a nonexistent office date... it throws this error that is not very clear because it mentions an update, but actually the Get indicates that it failed because it could not perform the Load.



We could try the Delete only if the Load was successful.

Of course, it could happen that the Load is successful (because the record exists) but the Delete fails, for example, because of referential integrity, as we've just said. Or because there is an error rule conditioned to be fired on Delete and with another condition that is met.



Insert, Update, Delete

Transaction

## **Business Component**

We have now finished reviewing the relationship between updating through the transaction and updating by code through the Business Component, with examples of the three modes.



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Checks	Error Id	Error Description
FK: PhysicianId	ForeignKeyNotFound	No matching 'Physician"
<pre>error("Physician " + PhysicianId.ToString() +" already has 2 shifts assigned for the date: "     + OfficeVisitDate.ToString(), PhysicianNotAvailable) if &amp;shifts &gt;= 2 and Insert;</pre>	PhysicianNotAvailable	Physician already has 2 shifts
FK: Shiftld	ForeignKeyNotFound	No matching 'Shift'
PK: {OfficeVisitDate, PhysicianId, ShitfId}	DuplicatePrimaryKey	Record already exists
FK: OfficeId	ForeignKeyNotFound	No matching 'Office'
CK: {OfficeVisitDate, ShiftId, OfficeId}		Office Visit Date, Shift Id, Office Id already exists
FK: PatientId	ForeignKeyNotFound	No matching 'Patient'
PK: {OfficeVisitDate, PhysicianId, ShiftId, PatientId}	DuplicatePrimaryKey	Record already exists
error("There is a pending office visit scheduled for this patient for the same specialty", PatientAlreadyScheduledForMedicalSpecialty) if not &IsOk and Insert Level PatientId;	PatientAlreadyScheduledFo rMedicalSpecialty	There is a pending office visit scheduled