How to implement purchase and restoration of multiple items with In-App Purchase and Java ME

This article describes how to perform purchase and restoration of 2 or more items with In-App Purchase for Series 40 by piping the purchase and restoration tasks in a thread. The In-App Purchase API does not support simultaneous multi-purchases or multi-restorations on Series 40. This is because the In-App server blocks with the first incoming request. No further requests can be processed by the server until the current one is completed. The client needs to implement the necessary logic, in order to queue the multiple restorations or purchases locally and forward them to the sever only after the currently active task is completed.

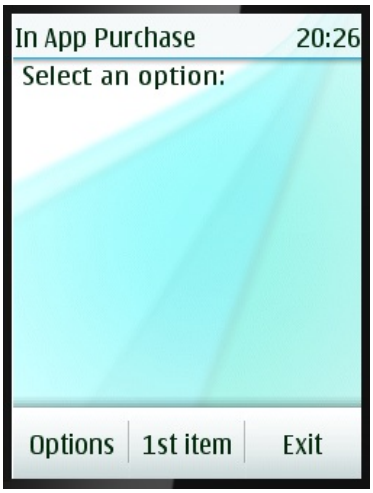
Introduction

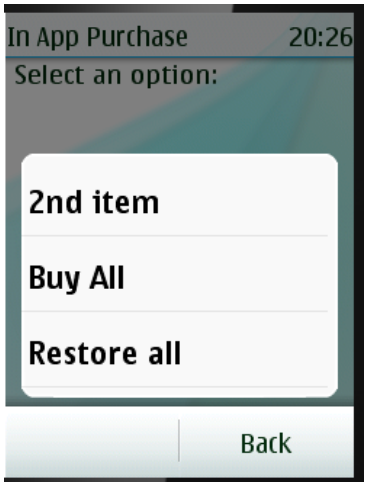
In this example we demonstrate how to purchase and restore simultaneously two DRM-protected items. Please note that restoration can only be performed for Nokia DRM-protected content. Restoration of DRM-protected content currently cannot be tested before the application is published and the content is DRM-protected by Nokia Store. We therefore use the In-App Purchase Simulation of Nokia's SDK 1.1 for Java, for running and testing the MIDlet. The application consists of following commands:

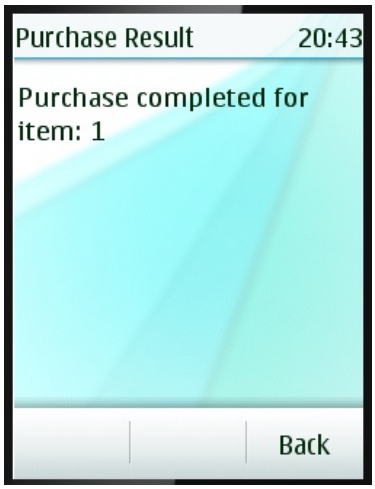
- Display information about the first item
- Display information about the second item
- Perform a purchase for both the first and the second item
- Restore both items

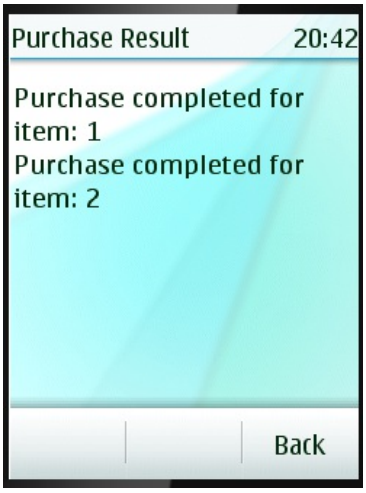
Note: In order for this example to properly work, one needs to create an IAP_VARIANTID.txt file inside the resource directory of the working project, having six zeros 000000 as content

The information about each item's price, description and title is shown on the same screen as the commands. The result from the purchase and restoration is shown on a new screen and there is a back command to return to the main screen. In the screen shots below, a multiple purchase is attempted and the results for each purchase are asynchronously returned one after the other by the server:









In-App Purchase Simulation Settings

Before one can test the code for this MIDlet, the SDK's In-App Purchase Simulation settings need to be properly configured. Two In-App items should be added to the simulation, each with a description, a price, a title and a Product ID. The Product ID is a unique 6 digit identifier for the purchasable item. It

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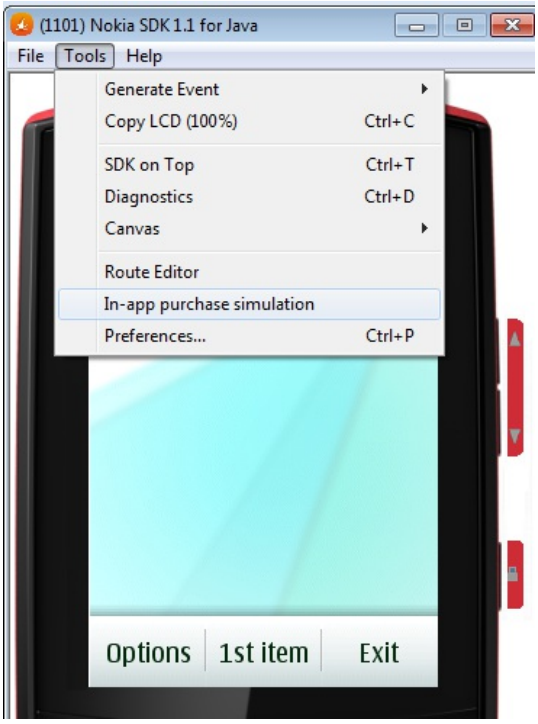
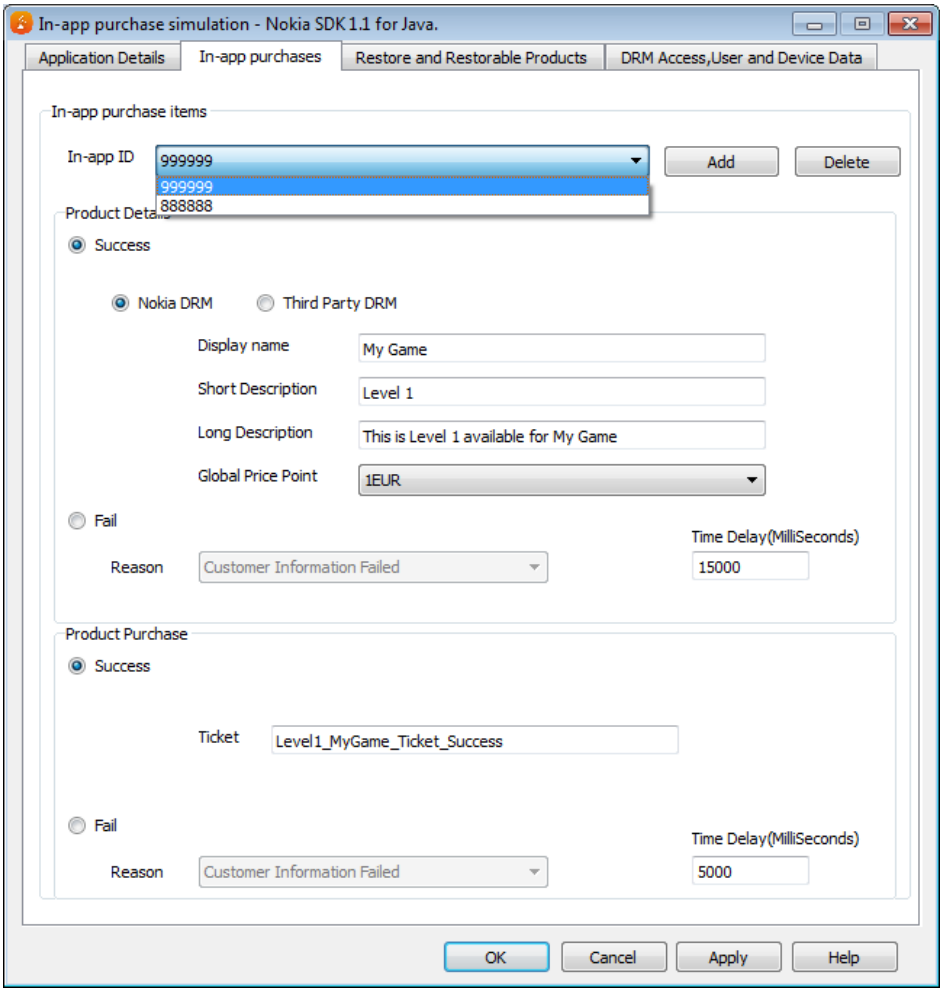
is assigned automatically by Nokia when the item has passed the Store's Quality Assurance process. Here, we use two arbitrary Product IDs, mind that these should be replaced with the actual ones, before publishing the application.

The images below demonstrate

- how to launch the In-App Purchase Simulation from the SDK



- how to add Product IDs along with their metadata for purchase operations



- and how to enable DRM-protected restoration simulation for each Product ID

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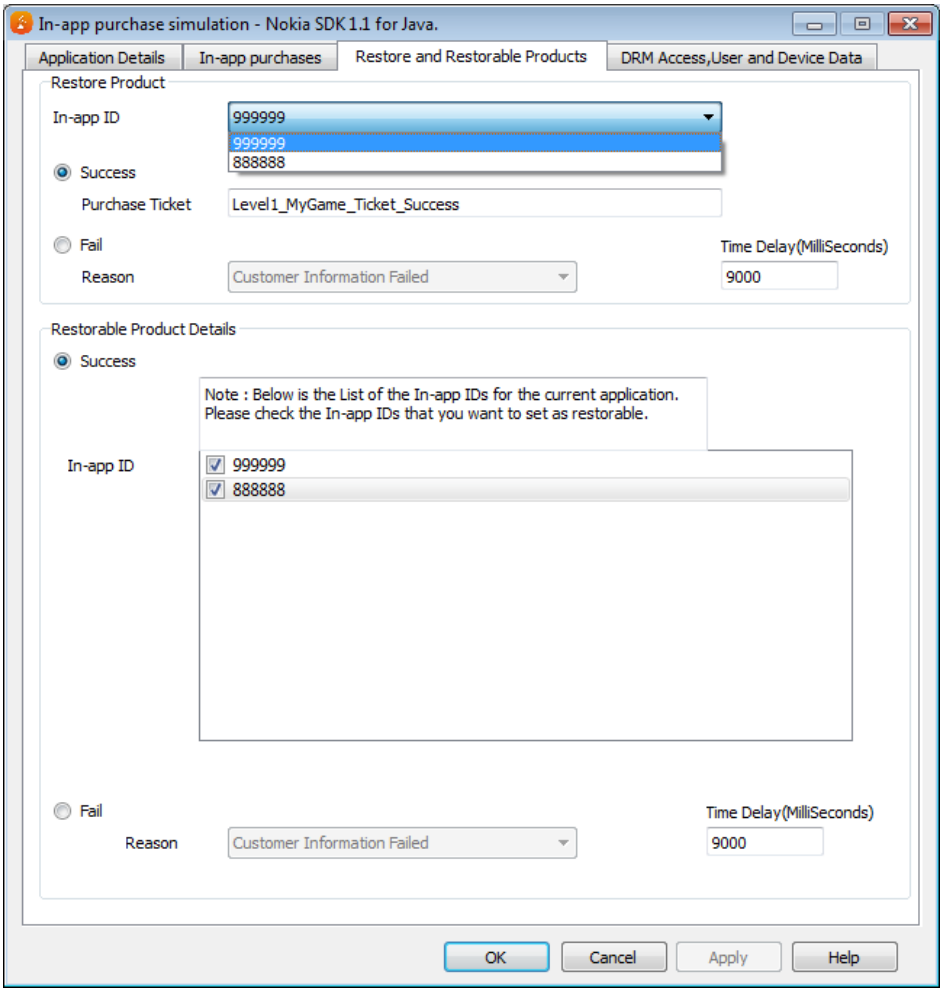

Notice that a custom delay can be manually entered by the user, to simulate the server's delay in returning a response.

The logic behind piping the requests

The Product IDs are stored in an array. This example uses only two items, but the same logic can be applied to three or more items. All the multiple purchases and restorations occur inside a thread. The thread reads the array with the Product IDs, performs either a purchase or restoration for each ID and pauses after every iteration. It regularly wakes up to see if the current purchase or restoration is completed in order to continue with the next.

```
                                        //this loop iterates through the items that need to be restored or purchased
for(int i=0; i<ids.length ; i++)
{
 //this is the item under restoration or purchase currently
 activeId ++;
 int status;

 if(!multipleRestoration) {
  status = manager.purchaseProduct(ids[i], IAPClientPaymentManager.FORCED_AUTOMATIC_RESTORATION);
 }
 else {
  //sends the restoration request
  status = manager.restoreProduct(ids[i], IAPClientPaymentManager.ONLY_IN_SILENT_AUTHENTICATION);
 }
 if (status != IAPClientPaymentManager.SUCCESS) {
  System.out.println("do not expect a call back");
 }
 //doesn't allow the restoration or purchase to proceed to the next item in line, unless the current restoration receives a call b
 proceed = false;

 while( !proceed) {
  try {
   //sleeps for 2 seconds then wakes up and checks if it is time for the next item to be restored
   Thread.sleep(2000);
  } catch (InterruptedException e) {
   // handle Thread interruption
  }
 }
}
```

In the above snippet, the purchaseProduct call will cause the MIDlet to connect to the SDK's In-App Purchase Simulation, process the request and return back the result via the purchaseCompleted call back method:

```
//purchase call back
public void purchaseCompleted(int status, String ticket) {
 if(status == IAPClientPaymentManager.SUCCESS) {
```


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```
    resultForm.append("Purchase completed for item: " + (activeId + 1) + "\n");
   }
   else {
    resultForm.append("Purchase failed for item: " + (activeId + 1) + "\nThe status is: " + status + "\n");
   }
   // this unblocks the sleeping thread and performs purchase on the next item (if any)
   proceed = true;
  }
```

At the end of this call back method a boolean flag is turned to true in order to allow the sleeping thread proceed with the next purchase.

Similarly, the restoreProduct call, will query the server and return a response via the restorationCompleted method:

```
  //restoration call back
  public void restorationCompleted(int status, String ticket) {

   if( status ==IAPClientPaymentListener.OK) {
    resultForm.append("Restoration completed for item: " + (activeId + 1) + "\n");
   }
   else {
    resultForm.append("Restoration failed for item: " + (activeId + 1) + "\nThe status is: " + status + "\n");
   }
   //this unblocks the sleeping thread and performs restoration on the next item (if any)
   proceed = true;
  }
```

The MIDlet's code

```
 import javax.microedition.lcdui.Command;
 import javax.microedition.lcdui.CommandListener;
 import javax.microedition.lcdui.Display;
 import javax.microedition.lcdui.Displayable;
 import javax.microedition.lcdui.Form;
 import javax.microedition.lcdui.StringItem;
 import javax.microedition.midlet.MIDlet;
 import javax.microedition.midlet.MIDletStateChangeException;
 import com.nokia.mid.payment.IAPClientPaymentException;
 import com.nokia.mid.payment.IAPClientPaymentListener;
 import com.nokia.mid.payment.IAPClientPaymentManager;
 import com.nokia.mid.payment.IAPClientProductData;
 import com.nokia.mid.payment.IAPClientUserAndDeviceData;


 public final class InAppMultiItemsMIDlet
  extends MIDlet
  implements IAPClientPaymentListener, CommandListener, Runnable {

  private Form mainForm; //the main form
  private Form resultForm; //this form is used for the result for purchasing and restoring
  private Display display;
  private Command exitCmd = new Command("Exit", Command.EXIT, 0);
  private Command showFirstID = new Command ("1st item", Command.OK, 1); //displays information for the 1st item
  private Command showSecondID = new Command ("2nd item", Command.OK, 2); //displays information for the 2nd item
  private Command buyAll = new Command("Buy All", Command.OK, 5); //performs multipurchase
  private Command restoreAll = new Command ("Restore all", Command.OK, 6); //performs multirestoation
  private Command backCmd = new Command ("Back", Command.BACK, 0); //this command returns back to main form from the result form
  private StringItem info;

  IAPClientPaymentManager manager;
  Thread thread;  //the multiple restoration thread
  boolean proceed = false;  //blocks the multiple restoration thread until the current restoration is completed
  String[] ids;  //The list of Product IDs to be restored
  int activeId = -1; //keeps track of the current item under restoration or purchase
  boolean multipleRestoration = false; //this flag changes a multi purchase to multi restoration

  protected void startApp() throws MIDletStateChangeException {
   display = Display.getDisplay(this);
   mainForm = new Form("In App Purchase");
   display.setCurrent(mainForm);
   //all the commands
   mainForm.addCommand(exitCmd);
   mainForm.addCommand(showFirstID);
   mainForm.addCommand(showSecondID);
   mainForm.addCommand(buyAll);
   mainForm.addCommand(restoreAll);
   info = new StringItem("Select an option",null);
   mainForm.append(info);
   mainForm.setCommandListener(this);

   //some random values. These need to be changed with the appropriate Product IDs.
   ids = new String[2];
   ids[0] = "999999" ; //First Item
   ids[1] = "888888" ; //Second Item

   try {
    manager = IAPClientPaymentManager.getIAPClientPaymentManager();
    IAPClientPaymentManager.setIAPClientPaymentListener(this);
   } catch (IAPClientPaymentException e) {
    info.setLabel("Error");
    info.setText("IAPClientPaymentException:" + e.getMessage() + "\n");
   }
  }

  public void productDataReceived(int status, IAPClientProductData pd) {
   //Title, price and short description is shown
      if (status == IAPClientPaymentListener.OK) {
       String fullDescription = "";

       String title = pd.getTitle();
          String price = pd.getPrice();
          String sdesc = pd.getShortDescription();

          fullDescription = "Title:" + title + "\n" + "Price:" + price + "\n" + "Short Description:" + sdesc + "\n";
          info.setLabel("Description");
          info.setText(fullDescription);
      }
      else {
       info.setLabel("Error");
       info.setText("Product data retrieval failed with code:" +status);
      }
  }
```


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```
 //each operation needs the product ID of the item in question
 public void commandAction(Command c, Displayable d) {
  if(c == exitCmd) {
   notifyDestroyed();
  }

  if(c == showFirstID) {
   showDescription("999999");
  }

  if(c == showSecondID) {
   showDescription("888888");
  }

  if(c == buyAll) {
   multipleRestoration = false;
   doPurchaseRestoreAll(ids);
  }

  if(c == restoreAll) {
   multipleRestoration = true;
   doPurchaseRestoreAll(ids);
  }

  if(c == backCmd) {
   display.setCurrent(mainForm);
  }
 }

 public void showDescription (String id) {
  int status = manager.getProductData(id);
  if (status != IAPClientPaymentManager.SUCCESS) {
       System.out.println("Do not expect a call back\n");
  }
 }

 public void doPurchase(String id) {
  resultForm = new Form("Purchase Result");
  resultForm.addCommand(backCmd);
  resultForm.setCommandListener(this);
  display.setCurrent(resultForm);
  manager.purchaseProduct(id, IAPClientPaymentManager.FORCED_AUTOMATIC_RESTORATION);
 }

 public void doPurchaseRestoreAll(String[] ids) {
  //the thread that handles the multiple restoration and purchase
  thread = new Thread(this);
  thread.start();
 }

 //purchase call back
 public void purchaseCompleted(int status, String ticket) {
  if(status == IAPClientPaymentManager.SUCCESS) {
   resultForm.append("Purchase completed for item: " + (activeId + 1) + "\n");
  }
  else {
   resultForm.append("Purchase failed for item: " + (activeId + 1) + "\nThe status is: " + status + "\n");
  }
  // this unblocks the sleeping thread and performs purchase on the next item (if any)
  proceed = true;
 }

 //restoration call back
 public void restorationCompleted(int status, String ticket) {

  if( status ==IAPClientPaymentListener.OK) {
   resultForm.append("Restoration completed for item: " + (activeId + 1) + "\n");
  }
  else {
   resultForm.append("Restoration failed for item: " + (activeId + 1) + "\nThe status is: " + status + "\n");
  }
  //this unblocks the sleeping thread and performs restoration on the next item (if any)
  proceed = true;
 }

 public void run() {
  //Displays the restoration result page
  if(!multipleRestoration) {
   resultForm = new Form("Purchase Result");
  }
  else {
   resultForm = new Form("Restoration Result");
  }
  resultForm.addCommand(backCmd);
  resultForm.setCommandListener(this);
  display.setCurrent(resultForm);

  //this loop iterates through the items that need to be restored or purchased
  for(int i=0; i<ids.length ; i++)
  {
   //this is the item under restoration or purchase currently
   activeId ++;
   int status;

   if(!multipleRestoration) {
    status = manager.purchaseProduct(ids[i], IAPClientPaymentManager.FORCED_AUTOMATIC_RESTORATION);
   }
   else {
    //sends the restoration request
    status = manager.restoreProduct(ids[i], IAPClientPaymentManager.ONLY_IN_SILENT_AUTHENTICATION);
   }
   if (status != IAPClientPaymentManager.SUCCESS) {
    System.out.println("do not expect a call back");
   }
   //doesn't allow the restoration or purchase to proceed to the next item in line, unless the current restoration receives a call b
   proceed = false;

   while( !proceed) {
    try {
     //sleeps for 2 seconds then wakes up and checks if it is time for the next item to be restored
     Thread.sleep(2000);
    } catch (InterruptedException e) {
     // handle Thread interruption
    }
   }
  }
  activeId = -1;
 }
```


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```
  //unimplemented methods
  protected void destroyApp(boolean arg0) throws MIDletStateChangeException {

  }

  protected void pauseApp() {

  }

  public void userAndDeviceDataReceived(int arg0,IAPClientUserAndDeviceData arg1) {

  }

  public void productDataListReceived(int arg0, IAPClientProductData[] arg1) {

  }

  public void restorableProductsReceived(int status, IAPClientProductData[] list) {

  }
 }
```

Resources

The source code of this MIDlet is available for download from here: File:InAppMultiItemsMIDletSource.zip

The binary files of this MIDlet are available for download from here: File:InAppMultiItemsMIDletBinaries.zip

See also

- The Developer's guide - In App Purchase

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