hp process manager
interactive edition

white paper

from service provider to e-service provider
creating e-services with hp process manager, interactive edition

Version 1.0
2 November 2001

hp invent

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**section 1
about this document**

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about this document

purpose

This document explains how HP Process Manager, Interactive Edition can help service providers implement interactive web-based and mobile-based services – or e-services. It starts by discussing some of the problems and challenges faced by service providers that are attempting to implement these services. It then explains the role Interactive Edition can play in building interactive on-line services.

audience

This document is intended for system architects and business owners within the telecommunications industry. However, although the document draws on examples that are relevant to telecom service providers, this document can also be read by anyone else with an interest in using Interactive Edition to develop interactive applications.

further information

For more information on Interactive Edition visit **www.hp.com/go/processmanager**.

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the e-service challenge

Let's start with a story. Jack lives in London, England, and he is very keen on soccer. He likes nothing better than to spend his weekends – and any other time when he can manage it – watching soccer matches. He therefore spends much of his time (and money) on trips to see his favorite team play. One evening as he is on his way home from work, a friend phones him to tell him that he has a spare ticket to see England play Greece in Athens. Jack is really excited. All he needs to do now is book a trip to Athens. Not wishing to waste any time, Jack immediately uses his mobile phone to access an on-line portal called Go Anywhere that provides travel products, including cheap trips at short notice. He chooses Go Anywhere's travel booking service, types in his details and travel preferences – and the trip is booked.

That's the promise of e-services: for you to provide services to your customers, when they want them and where they want them – on the web, on a mobile phone, or on any other device you choose. But to do this requires the technology that enables you to develop your services and on-line applications quickly and easily. In this document, therefore, we will look at the challenges and problems facing service providers and how HP Process Manager, Interactive Edition can make it possible to deliver e-services that are truly available "anytime, anywhere, any device".

e-services

So what is an e-service? An e-service is a packaged service that is provided electronically over a network (either internal or external). By this we mean the entire experience of using the service and not just specific functions of the service. It could be a travel booking service, a banking service, an information service, a news subscription service or a gaming service. In this context we would not consider the "Open a new bank account" service to be an e-service, but simply one function out of many of the banking e-service.

Some of the opportunities for e-services are listed in table 1, and many of these are already available.

table 1

example e-services listed
by vertical market

vertical market	e-services
Enterprise processes	Enterprises today are looking for messaging, scheduling and internet access
Transport	Vehicle tracking, scheduling, telematics in automobiles
Supply chain	Status, delivery timings, electronic signatures
Financial services	Stock quotes, dealing, account balance
Consumer retail	Order enquiries, delivery (for example, "I'm coming to collect my groceries"), order confirmation, simple ordering (for example, "replicate my base grocery order")

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vertical market	e-services
Sales force automation	Order status, customer information, email, scheduling
Field engineers	Maintenance information (for example, "get me latest problems with this type of printer"), scheduling of work, ordering of parts
Consumers	Chat, ring tones, cartoons, instant messaging, games, taxi booking, video clips, digital photos, music download. This is a "fashion business". Therefore, all that matters is the speed with which cool new products and services can be delivered to the market.
Digital money	Using a mobile phone as a "digital wallet" to which customers download digital money. Companies are already making facilities available that enable businesses to charge their customers by adding the charge to the customer's mobile phone bill. Such services are popular with businesses that traditionally have dealt with large amount of cash and don't accept credit cards, such as taxi drivers.

the bottom line

Before we look at how Interactive Edition can help you create and deploy e-services, let's start by looking at the challenges that are facing the service providers contemplating web-based and mobile-based services.

In an increasingly saturated mobile phone market, telecom service providers are facing some real challenges:

- **New sources of revenue** – There is a finite amount of money to be made from new subscriptions alone, so service providers need to look at value-added services as new sources of revenue. The challenge is to find that "must-have" service to provide the incremental revenue opportunity, be it an information service, video on demand, a location-based service, or whatever. Telecom companies need to convert from simply being service providers to being information providers. However, the service provider must maintain a flexible attitude and continually explore new sources of revenue. For example, at one time charging for advertising seemed a lucrative source of revenue, but failing advertising-based revenue has since forced service providers to look elsewhere.

- **Attracting new customers** – Companies need to seek new and innovative ways of not only keeping existing customers but also attracting new ones. Specifically, in the case of communication services, this means moving away from connection services into information services. For example, now that most people have a mobile phone, selling the idea of a mobile phone is no longer a sufficient selling concept in itself. Instead service providers have to start selling the value-added, mobile-based information services, such as on-line portals.

- **Reducing churn** – In a saturated market keeping existing customers is becoming increasingly important. As a result, service providers need to seek ways of keeping existing customers and preventing churn. One way is to tie customers into services, the idea being that the more difficult it is for a customer to change to another service provider, the less likely they are to try. A more positive, customer-friendly approach is to provide a steady stream of new services so that customers won't even consider changing to another service provider.

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- **Responding quickly** – In a fast changing, leading-edge market a service provider needs to respond quickly to the changing market requirements. Whether it is creating a new service or modifying an existing one, it has to be done quickly. It's no use taking weeks or months to get that trendy new service up and running, it has to be up and running within days. Service providers want to be able to think up a service on Thursday and have it implemented by Monday.

  Responding quickly and introducing new services also helps reduce churn. For example, if a competitor creates a new service, the service provider's own customers are less likely to change to that competitor in order to use a new service if they know that the service provider will be introducing their own equivalent service shortly.

towards e-services

Moving away from simply selling connection services to selling web-based and mobile-based information services presents a service provider with an additional set of challenges:

- **Adding value** – The service that will succeed and make money for the service provider is the service that delivers real value to the customer. Value in this sense is context specific. That is, the customer only perceives the information to be of value at the time they actually need it. For example, right now sitting at your desk you are probably uninterested in the weather and tides on the coast. But if you are about to take your sailing dingy out for a day's sailing, you might be very interested. In fact, you might even be willing to pay to receive this information on your mobile phone just before sailing.

- **Consistent quality** – If a service provider is to create new services almost overnight, then it will be necessary to create new services by bundling other services together wherever possible. If these services are existing services that have been used before, then a consistent quality is assured through the use of proven services. However, where third-party services are used the service provider has little control over their quality and care has to be taken to ensure that these are to the same high quality.

- **Setting the craze** – Consumers, especially the young, have a passion for following the latest craze. A service provider that can cash in on this craze – or better still create a new craze, such as providing an on-line service that shadows a popular television program – can make a lot of money. However, these services need to be created and deployed almost overnight, as a delay of even a few days may mean that the operator has missed the opportunity and the next craze has taken over. In addition, once interest in a craze has waned it should be possible to remove or replace the service quickly.

- **Targeting customers** – The challenge is how to provide information to users in a targeted manner. It is no use simply pushing information to unsuspecting customers in the hope that they will be interested in receiving that information. It may even have the reverse effect and put customers off. The answer lies in allowing the customer to choose what sort of information they wish to receive, perhaps through some sort of on-line process or wizard. As a result customers are happy and the dropout rate reduces.

- **Billing** – Service providers need to look for new and innovative ways of charging for their services. On the face of it, billing for connection services would seem fairly straightforward – you provide a line and charge a fee for its use one a month, once a quarter or once a year. Even so, billing is still a major problem. Do you charge by distance, or for time, or both? Now, with on-line "soft" services, billing is just about to get much worse. For example, if the customer accesses an information service or views a video clip, do you charge them on a per use basis or for the length of time they are connected to the service? How do you authorize that use and pass on the charge to the billing cycle? These are all considerations that must be faced, and a flexible approach to service development is needed to resolve these issues.

implementing e-services

Remember Jack? We last saw him at the beginning of this document ordering a trip to Athens using his mobile phone. In order to fully understand what HP Process Manager, Interactive Edition offers a service provider, we will now look at the service Jack was using more closely. We will also look at the features of Interactive Edition that make the implementation of this service possible.

what is a service?

First of all, let's look at what it is exactly that we are implementing. We can say we're implementing a service, but what do we mean by this? Specifically, within the context of this document a service is a specific business function that has a software interface.

A service consists of two parts:

- **An external interface**

  The interface describes how the service will be used. Specifically the interface specifies how to access the service (such as by its name and location), its input values and the results it sends back.

- **Internal functionality**

  All but the simplest service will be made up of several sub-components (such as calls to other services) and so the functionality of a service determines how these components are linked together. There is a clearly defined sequence to the components within the service that determines the order in which they will be used. The service needs some form of logic that can impose conditions on this sequence in order to orchestrate the service. These conditions may be time-related, data related or respond to events within the service.

  The functionality of the service is encapsulated within the service so that users of the service interact with the interface only and the internal functionality is hidden from them.

the role of process

The functionality of a service is therefore a sequence of steps that is determined by rules – in other words it is *a process*. Thus the sequence between the components that make up the service can be considered a flow between steps in a process. Similarly, the logic that orchestrates the service can be thought of as a set of rules that determines this process flow.

Interactive Edition is designed to implement processes and is therefore an ideal product for the orchestration of services. With Interactive Edition you can draw the functionality of a service as a process and define the rules that determine the flow between the components within your service.

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where does interactive edition fit in?

HP Process Manager, Interactive Edition is a new generation of process technology. It provides lightweight process control logic that enables you to quickly develop composite applications for web-based and mobile-based services. Composite applications are applications that are composed of other applications and services.

figure 1
architecture of an on-line application

Interactive Edition sits between the presentation layer and the logic layer, thus orchestrating the interactions with the user and interfacing with the underlying services.
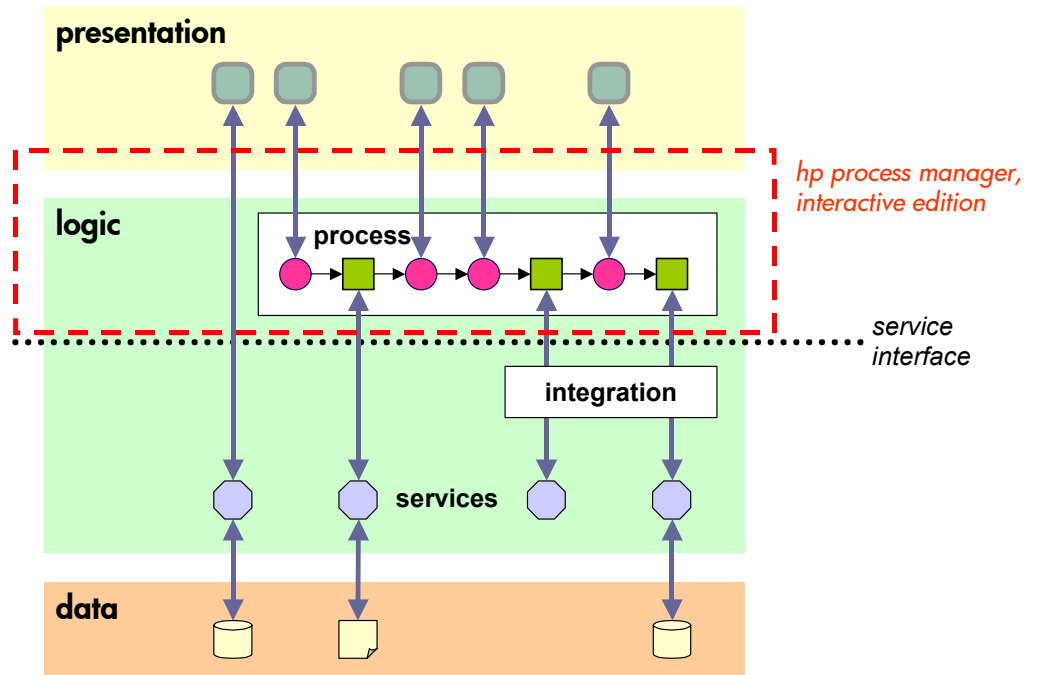
The architecture of an on-line application typically consists of three layers (see figure 1):

- A presentation layer that interacts with user

- A logic layer that controls access to the services used within the application. The logic layer can be subdivided into three further layers: a process layer (business logic), an integration layer (integration message bus) and a services layer (software services and business applications).

- A data layer

Interactive Edition sits between the presentation layer and the logic layer, thus providing the business logic for the interactions between the user and the application. Thus, on one side Interactive Edition controls the interaction with the user, ensuring that correct information is displayed and in the right order, and on the other side it orchestrates access to the underlying applications and services that make up the application presented to the user.

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a base scenario

In order to understand how Interactive Edition can help develop on-line applications, we will start by considering a base scenario. We will then extend this with "what ifs" as we explore the advantages of HP Process Manager, Interactive Edition.

Go Anywhere is a on-line travel portal run by a mobile phone operator that offers travel services, in particular the Travel e-service used by our friend Jack allows customers to book an airline flight and a hotel together. If an up-front payment is required as a result of using the service, this is added to the customer's mobile phone bill.

The Travel e-service is implemented as an Interactive Edition process. A high level overview of this process is shown in figure 2 and the details of each of the high level steps are given in the following sections.

figure 2
high level process for the Travel e-service
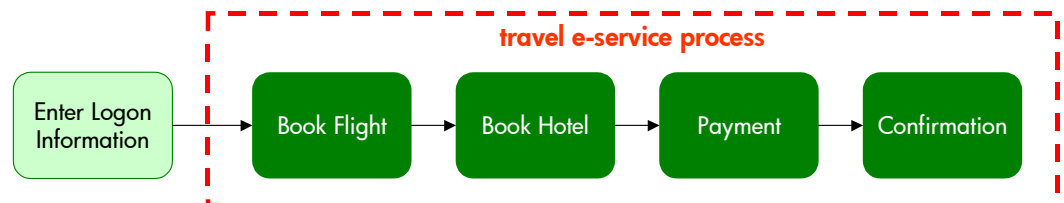
Note: In reality, the process is more complicated than that shown below. In particular, the selection screens are oversimplified and there need to be some loops in the process, such as a loop from the Book Hotel to before Book Flight that allows Jack to change his chosen flight if a hotel room is not available. The process should also allow Jack to abort the process if he can't be allocated his chosen flight and/or hotel.

Enter Logon Information:
So that Jack doesn't need to supply his details every time he uses a service on the Go Anywhere portal, the portal asks Jack to log on with his name and password when he first enters the portal. This information is used to locate Jack's personal details in a user registration database for the Go Anywhere portal. When Jack chooses the Travel e-service, his details are passed to the interactive process that is run for the service.
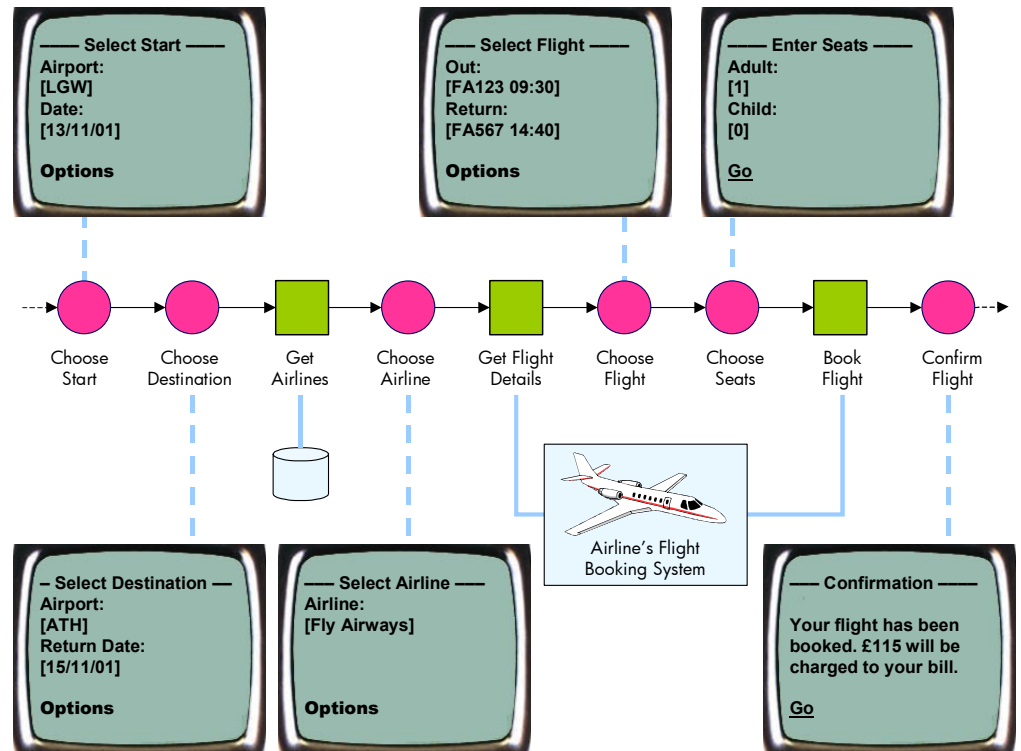
Book Flight:
This is the first phase of the process for the Travel e-service (see figure 3). In this phase of the process Jack is asked to enter his flight preferences. It works as follows:

1. The process asks Jack for his start airport and start date.

2. The process asks Jack for the destination airport and the return date (he can leave this blank if necessary).

3. The system uses this information to determine a list of airlines, which it displays so that Jack can choose one.

4. The process accesses the airline's own system for a list of available flights, which it displays so that Jack can choose one.

5. Jack enters the number of seats he wants.

6. The process books the flight directly with the airline.

7. The process displays a flight booking confirmation.

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figure 3
the Book Flight phase of the Travel e-service

— Select Start —
Airport:
[LGW]
Date:
[13/11/01]
Options

— Select Flight —
Out:
[FA123 09:30]
Return:
[FA567 14:40]
Options

— Enter Seats —
Adult:
[1]
Child:
[0]
Go

Choose Start — Choose Destination — Get Airlines — Choose Airline — Get Flight Details — Choose Flight — Choose Seats — Book Flight — Confirm Flight

– Select Destination —
Airport:
[ATH]
Return Date:
[15/11/01]
Options

— Select Airline —
Airline:
[Fly Airways]
Options

Airline's Flight Booking System

— Confirmation —
Your flight has been booked. £115 will be charged to your bill.
Go

This base scenario shows some of the features of HP Process Manager, Interactive Edition.

With Interactive Edition you define your processes using a graphical process definer tool. This lets you see the process in a graphical form, which is easily understandable by both IT and business people. The process snippet in figure 3 is based on what you would see in the process definer tool.

Note that process diagrams contain several types of nodes of which there are two types that show process steps (as in figure 3):

- The pink circles represent interactive nodes. These show where an interaction with the user occurs (in figure 3 the example screens are shown against these nodes).

- The green squares show the use of services (both internal and external) within the process. These services might be manual tasks performed by people (such as employees), other processes or sub-processes, or third party applications or information sources (such as a CRM system, a business application, or a company database).
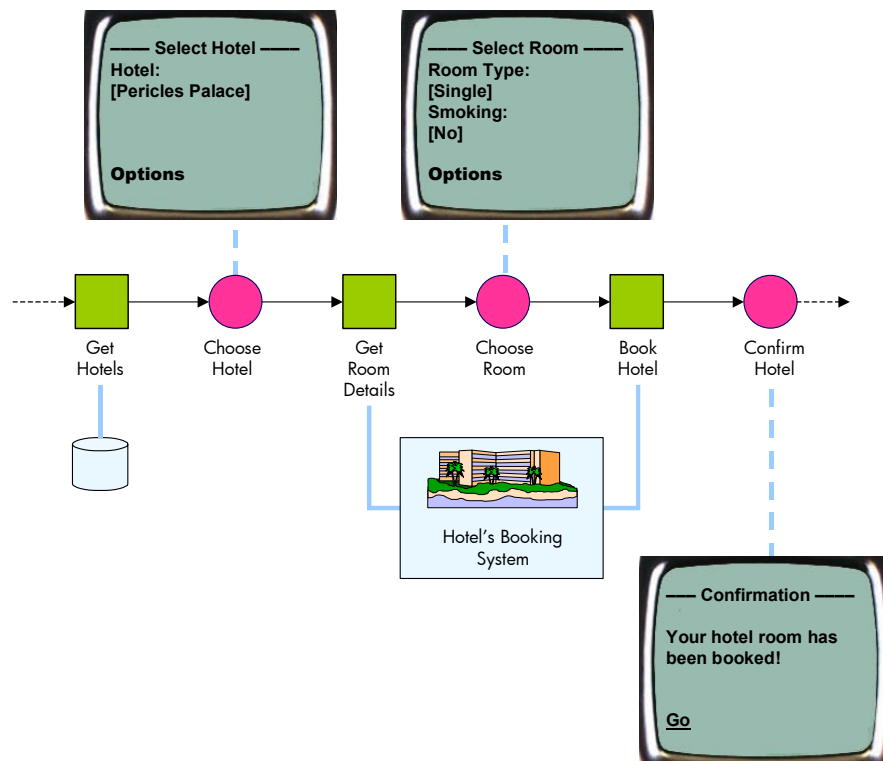
Book Hotel:
This phase of the process is very similar to the Book Flight phase, except that this time Jack is choosing his hotel room. This phase of the process is shown in figure 4.

Again, in the process definition we can see interactive nodes (pink circles) that are used to talk to Jack and service nodes (green squares) that are used to access a hotel database and a hotel's booking system with a business-to-business interaction. The process is as follows:

1. The process fetches a list of hotels in Athens and displays it for Jack to choose one.

2. The process accesses the hotel's booking system for room details so that Jack can choose his room preferences.

3. The process books the hotel room and displays a confirmation.

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figure 4
the Book Hotel phase of the
Travel e-service

Payment:
In this phase the process uses a software service to access the operator's phone billing system in order to add the resulting charges to Jack's next bill. This phase has no interactive steps.

Confirmation:
In this phase the process confirms Jack's order and thanks him for his order. It also tells Jack the charge that will be added to his next phone bill.

integration

Consider what happens to Jack's request for a flight or a hotel (see figure 3 and figure 4). In both cases the process doesn't talk just to Jack; in order to complete the booking it also has to talk to databases within the same company, and perform business-to-business interactions with the systems that belong to the airline and the hotel using web services.

These other systems are accessed through software components known as service providers, which provide access to specific types of software services (the term service provider should not be confused with the use of the term in the telco sense). Thus the JMS service provider supplied with Interactive Edition allows access to any application that is attached to a JMS message bus. Other service providers that are provided as standard are the JDBC, JavaBean and Enterprise JavaBean service providers.

For example, in figure 3 there are two service providers: one to access a database of airlines, and another to enable a business-to-business conversation with an airline's flight booking system (used by two nodes). The same is true of figure 4, in which one service provider access a database of hotels and another service provider interacts with the hotel's booking system.

process abstraction

Interactive Edition allows you to abstract – or separate – the process from both the supporting software services and the user interface. In fact, the process definition itself enforces this by its use of two types of process nodes: interactive nodes that control the user interface, and service nodes that access the supporting software services. This gives an application architecture like the one shown in figure 5, which is based on the architecture given in figure 1. This architecture is divided into application flow layers (presentation and process logic layers) and operations layers (integration and the services layers).

figure 5
a service-based architecture
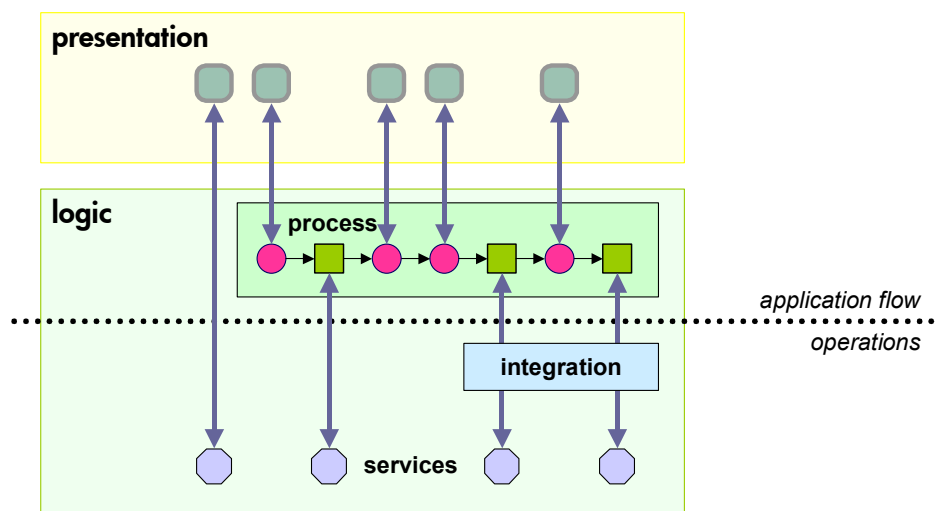
This architecture has several advantages:

- The user interface can be delivered using more than one channel. For example, the service provider can implement the Travel e-service so that it can be accessed both as WAP screens on a mobile phone and as web pages on a PC.

- You can change the process (that is, the business logic) without needing to change the existing user interface and services. All you need to do is add the user interface and software services for any new steps. For example, Jack's service provider could add optional travel insurance to the Travel e-service simply by adding some additional steps to the process, together with additional user forms and software services.

- You can use an integration layer to leverage your investment in existing applications and software services. The integration layer automates the interfaces between the applications and services, and organizes the exchange of data between them. For example, Jack's service provider could design the Travel e-service to make use of an existing CRM system.

- You can change a service without affecting the process or presentation layers. For example, the Travel e-service uses an airlines database to build up a list of airlines. Initially Jack's service provider might choose to implement this as a simple software service that looks up an in-house database. Eventually however, keeping the database up to date might prove impractical and the service provider decides to use a third party web service (that is, a software service available from another company over the Internet) in order to build up a list dynamically each time. The current software service is therefore changed to the new one, but the user interface is unaffected and so customers can continue to use the Travel e-service with the same user interface as before.

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multi-channel applications

The abstraction of the presentation layer from the process allows for multi-channel applications. By this we mean that you are not restricted to a single delivery channel, say a web page or a WAP page, and are therefore not straight jacketed into writing your application for a particular user interface. Instead you can have a variety of output channels (or presentation layers) for the one process, thus allowing the user to choose their preferred channel.

For example, we saw Jack access the Travel e-service from his mobile phone, but he could have accessed the same process from his home PC instead. In this case he would have been presented with a web form interface to fill in. The process he uses in both cases is identical; it's just the user interface that is different.

Interactive Edition processes achieve this by using a presentation controller that receives the data from the process. It is the responsibility of the presentation controller to receive the data that is output by the process and display it to the user. To use a different channel, you simply develop and deploy a different presentation controller. This has several benefits:

- Existing customers are given more choice and flexibility in their choice of access device – true availability "anywhere, anytime, any device".

- By adding a new channel the e-service becomes accessible to a new customer base. For example, adding mobile phone access to an existing web only service makes the service accessible by people who own a mobile phone but don't own a PC for web access.

- Re-branding of services is made easier, as the service provider can simply provide a new presentation layer for each client's brand.

Some channels pose particular problems for on-line applications. In particular, web browsers have navigation features that may raise certain issues for on-line applications. Specifically, a web browser provides the user with the ability to jump to any page they like through the provision of a Back button and a history list. This is not an issue when a page consists entirely of information, but it is an issue when the page is part of an on-line process and the order of the pages is critical.

For example, Jack is sitting at his home PC using the web-based interface to the Travel e-process on Go Anywhere's web site to book his travel. Jack has selected the Pericles Palace Hotel and has now reached the form that is asking him for the details of what sort of room he wants. Unfortunately the Pericles Palace Hotel only has relatively expensive suites available and Jack wants a cheap single room, so Jack decides that he would prefer to stay in a different hotel. He therefore clicks on the Back button in his browser and displays the earlier form that asked him for his preferred hotel, selects a new one, and clicks on the Submit button at the bottom of the page.

Will this confuse the process? No. Interactive Edition saves the state of the process at each step so Jack can redo an earlier step in the process simply by resubmitting an earlier form, and the process automatically reruns the appropriate steps. Of course, some process logic is required to adjust any data stores that might have been updated, but overall far less coding is required than with a traditional approach to application development.

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aggregating services

Interactive Edition makes it very easy to take two or more services and combine them into a new service. You just need to define the process (or add extra steps to an existing one) and call the service interfaces for the underlying services. In our example, Jack's mobile phone operator have done just that by taking a Flight Booking service and a Hotel Booking service and combining them into a single Travel e-service. They now have a new service that offers Jack added value: before Jack would have needed to book his flight and the hotel separately, now he can do them together.

Note that when Jack uses the Travel e-service he does not distinguish between booking a flight and booking a hotel room, as far as he is concerned they are just two parts of the one process. Indeed, he is unaware that the services are actually provided by the airline and the hotel. Because the presentation is separated from the underlying services, the Travel e-service can present information to the customer in a seamless and uniform way. In particular, the information gleaned from one service can be fed to the next service in the process. For example, once Jack has decided on his destination and date of travel, this data can be passed as input to the hotel booking service, thus saving Jack the need to enter it all again.

The ability to aggregate services allows the operator to respond quickly to customer demands for new services and create them almost overnight. For example, they could easily extend the Travel e-service to offer additional services, such as currency, car hire and travel insurance. The operator simply adds some additional steps and calls software services that forward the requests to the bank, car rental company and insurance company as appropriate. In fact, the operator is well on the way to creating a one-stop shop for travel services – to the envy of its competitors.

targeting customers

Aggregating existing services allows a service provider to create new services quickly and add value to their existing services. However, the service provider still needs to make money from the new service and this means making sure that customers actually buy the service. A mass advertising campaign to all customers is probably too expensive and will have a low rate of return. It might even antagonize those customers that have no interest in the new service. It makes much more sense to create services that are tailored to particular groups of customers and then have a targeted advertising campaign for these customers.

For example, Jack is quite happy to arrange his own trip to see a soccer match, but he only did this when his friend phoned to say he had some tickets. If the Go Anywhere portal provided targeted services and offered trips for specific sports events, the story could be different…

One evening as Jack sits on the train going home from work he receives a text message from the Go Anywhere portal. This message offers him a three-day trip to Athens to see a soccer match between England and Greece and includes a personalized offer identifier. Jack immediately uses his WAP phone to run the Travel Offer e-service to book the trip.

The Travel Offer e-service is a modified version of the Travel e-service we saw earlier. For a start, the airline and hotel have already been decided on and Jack simply has to specify his choice of flight time and the type of hotel room. He also has to enter the offer identifier when he starts the process so that the process can retrieve the details of the offer from a database.

Of course, the Go Anywhere portal has to know that Jack is keen on sport, and soccer in particular, so that it can offer him relevant offers. The portal therefore needs to include a registration process so that Jack can register his interests. Specifically he needs to tell the portal that he is interested in soccer related travel offers. Jack's mobile phone operator therefore uses Interactive Edition to create an interactive Registration process that lets customers register their interests.

Interactive Edition also makes it possible for Jack's mobile phone operator to monitor how processes are used and build up a picture of Jack's use of the portal. In particular, Interactive Edition records status information while a process runs for auditing purposes. By using this information to monitor how the process on the Go Anywhere portal are used, Jack's operator can build up a picture of Jack's usage of the portal and the services that it offers. This information can then be used to offer Jack tailored services, such as trips to see a soccer match, as is the case here. By adding more refined heuristic algorithms it would be possible, say, to offer Jack a better price on future trips as an existing customer, or even target him with repeat offers for those teams he has seen play before.

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benefits of interactive edition

As we have seen in this document, HP Process Manager, Interactive Edition enables the creation of web-based and mobile-based e-services. Specifically, using Interactive Edition as the basis for building e-service solutions delivers the following benefits:

- Leverage existing assets (people, applications and technology) – use Interactive Edition to create new service interfaces to existing systems and integrate them together.

- Explore new technologies – Interactive Edition is built on the latest technologies: web services, J2EE and application servers.

- Fast creation of services – Interactive Edition enables you to aggregate existing services into new and exciting services.

- Create reusable objects and services – Interactive Edition promotes the concept of reusability through its abstraction of the process from the underlying services. Furthermore the finished process exhibits a clearly defined interface, thus making it a highly reusable service.

- Exploit new channels – Interactive Edition enables device independent solutions, thus allowing you to exploit new channels and create multi-channel applications.

The realization of these benefits will mean that your company will be able to respond more quickly to market pressures and will allow you to take the first step in the transformation from a service provider into an e-service provider.