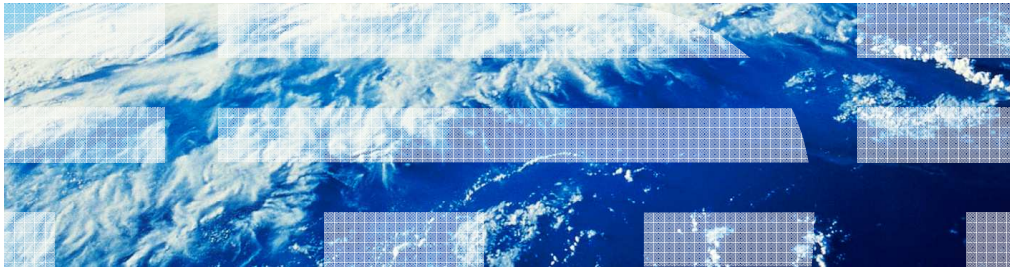


WebSphere Commerce V7 Feature Pack 4

Location-based services



This presentation provides an overview of the location-based services solution in WebSphere Commerce Version 7 Feature pack 4. You should have a general knowledge of the features in WebSphere Commerce Version 7 before viewing this presentation.

Table of contents

- Location-based services overview
- WebSphere Commerce solution overview
- Architecture
- Location-based scenarios

This presentation will first provide a big picture on the location-based services technology before showing you which pieces the WebSphere Commerce V7 Feature Pack 4 solution covers. You will see the architecture and terminology used in the solution. Then you will see the two main scenarios explained in detail.

Location-based Services Overview

- What is it?
 - Allow you to report real time current location to a given platform
 - Information service accessible using mobile devices through mobile network
 - Ability to make use of geographical position of mobile device
- What are the top uses?
 - GPS Navigation
 - Weather alerts
 - Traffic updates
 - Restaurant reviews/info
 - Locating nearby convenience services
- Notable players
 - Foursquare
 - Google Maps
 - Facebook Places
 - Gowalla

So what is location-based services (LBS)? Like the name sounds, it allows you to report your current location in real time to a given platform. It is accessible with mobile devices through the mobile network and can be used in a variety of applications. Although location-based services have been around since 2000, they were mainly used in commerce with a subscription-based business model. Only with the release of Apple's 3G iPhone and Google's location-based service enabled Android OS, were developers able to introduce location-based services to the mainstream consumer.

Some of the top uses are GPS navigation, weather alerts, traffic updates, restaurant reviews/info and locating nearby convenience services. You are probably familiar with some of these notable players in the LBS space.

Foursquare, probably the best-known dedicated location-based service, provides incentives for users by offering daily "mayor" status for checking in frequently at a given location. Google Maps added check-ins to let users rate and review locations in real time. Facebook Places allow consumers to check into a place and have it show up in their News Feed, similar to the process of "Liking" a page. Finally, Gowalla allow users to 'check in' at Spots in their local vicinity, either through a dedicated mobile application or through the mobile website.

Location-based Services technology

- Positioning or methods to locate
 - Global Positioning System (GPS)
 - WiFi, NFC, RFID, Bluetooth
- Geographic Information Systems (GIS)
 - Provide tools to provision and administer base map data
 - Manage point-of-interest data
- Location Management
 - Process positioning and GIS data
 - Acts as gateway between positioning equipment and LBS infrastructure

One of the most obvious technologies behind LBS is positioning or methods to locate. The most widely recognized system is the Global Positioning System (GPS), which is based on the concept of trilateration. There are however, other means of positioning in addition to GPS such as WiFi, NFC, RFID, and Bluetooth technologies used to match devices to nearby services based on their surroundings.

Geographic data is also an important aspect of any location system. Geographic Information Systems (GIS) provide the tools to provision and administer base map data such as man made structures (streets, buildings) and terrain (mountains, rivers). It is also used to manage point-of-interest data such as location of shopping areas, restaurants and so on.

After positioning the mobile user and knowing the map data around that position, there must be a location management function to process positioning and GIS data on behalf of LBS applications. The location management function acts as a gateway and mediator between positioning equipment and LBS infrastructure.

WebSphere Commerce Location-based Services solution overview

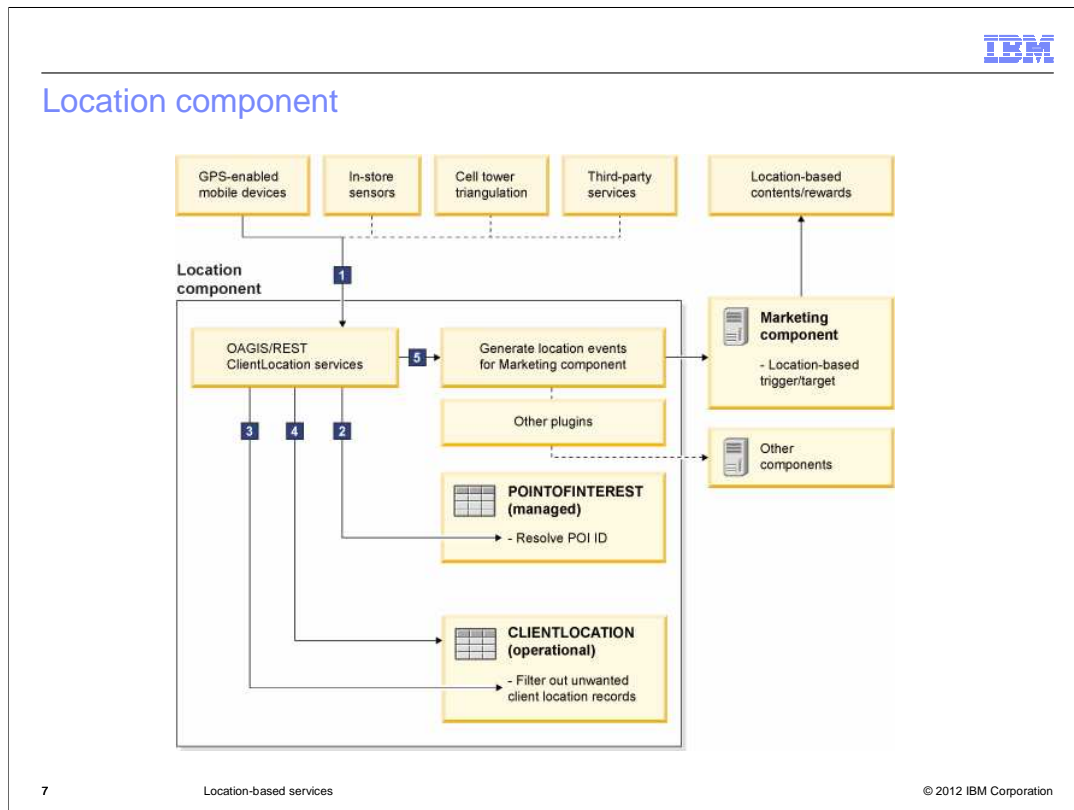
- For shoppers
 - Get location-based content and rewards by checking in to their local store
- For business users
 - Create location-based marketing activities
- Customization potential
 - Integrate with other location sources such as
 - In-store sensors
 - Vendors
 - Support other location-based services

So what are the benefits of the Commerce location-based services solution? Shoppers with GPS-enabled mobile devices are able to get location-based content in their store, such as seeing flyers for their local store, and getting rewards for checking in to their local store. Business users can create location-based marketing activities. The two scenarios focused on in Feature Pack 4 are store check-in and displaying local content. Businesses can also extend the location component to support other location-based services. Since the LBS REST API accepts the client location record, vendor social networking sites (eg. Foursquare) can collect the client location (via their check-in services) and invoke API with the user location information which will then trigger WebSphere Commerce marketing/promotion events.

Architecture and Terminology

Next, the presentation will take you through the architecture and terminology used in this solution.

Location component



WebSphere Commerce uses the Location component to collect and process client location records. This component provides a set of OAGIS and RESTful services for collecting client location records. The component also provides business logic with extension points for resolving and filtering client location records, and for dispatching location events to the Marketing component. This diagram depicts a high-level overview of the Location component.

The component is responsible for collecting client location records, such as a customer's location, generated by location sources such as a customer's GPS-enabled mobile device. It also resolves information missing from the client location records, such as resolving the Points of Interest corresponding to a geographic location. Next, it filters out unwanted client location records, such as those with geographic locations that cannot be resolved to any Point of Interest. The Location component does not act as a location data repository so only the last known location of a client is persisted for resolving or filtering client location records. Finally, location events are dispatched to other components such as the Marketing component.

Location Source

- A device to detect a client's geographic location or proximity to a point of interest
- Feature Pack 4
 - GPS-enabled mobile device
- Other possibilities
 - A camera phone scanning a 2D barcode with embedded geographic or point of interest data
 - In-store sensors, for example: Celadon, Presence Zones, NFC readers
 - Cell tower triangulation
 - IP geolocation
 - Third party services: Foursquare, Facebook Places

A location source is a device that can detect a client's geographic location or proximity to a point of interest. It is responsible for generating client location records and sending them to the Location component.

For example, devices such as a GPS-enabled mobile device, that can detect a client's geographic location or proximity to a point of interest. In WebSphere Commerce V7 Feature Pack 4, GPS is used though there are other possible methods as well.

Geographic location

- World Geodetic System
 - Latitude (degrees)
 - Longitude (degrees)
 - Altitude – height (in meters) if available
 - Examples
 - 43.5, -79.5
- W3C Geolocation
 - Accuracy – (meters)
 - Altitude Accuracy (meters)
 - Heading (degrees)
 - Speed (meters per second)

The Location component uses the WGS 84 when expressing geographic locations. The World Geodetic System is a standard for use in cartography, geodesy, and navigation. So a geographic location is a point somewhere on earth, and its denoted by the components: Latitude in degrees, longitude in degrees, and altitude in meters.

The W3C Geolocation API is used to include the accuracy in meters, altitude accuracy in meters, heading in degrees and speed in meters per second.

Point of Interest (POI)

- Named geographic location predefined by the business
 - Geographic region
 - Physical store
- Granularity
 - Region: Toronto (43.5, -79.5)
 - Zone: ABC Books (43.521, -79.574)
 - Cell: Fiction
 - Point: Mystery
- Used when
 - Creating a location-based marketing activity
 - Marketing managers choose from available geographic regions and physical stores the activity can target

A point of interest (POI) is a location that you are interested in. The point of interest can either be a geographic region or a physical store. There are four levels of granularity. The broadest level is the region where it identifies the geographical region the POI represents or belongs to. Within a region you can have a zone or store. You can see the geolocation is more refined for the zone. A cell identifies a subregion within a zone such as an aisle or department that the POI represents or belongs to. The last level is a point. A point within a cell can be a kiosk or shelf that the POI represents or belongs to.

Point of Interest (POI) - continued

- OAGIS noun: PointOfInterest
- REST resource: pointOfInterest
- DB Tables
 - POINTOFINTEREST

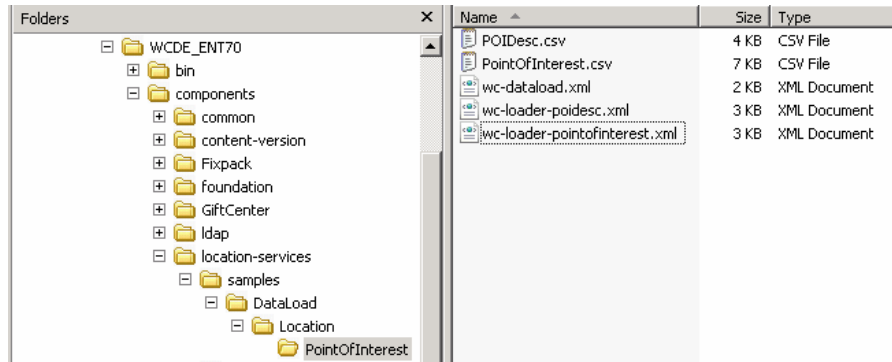
POINTOFINTEREST_ID	IDENTIFIER	POITYPE	STORE_ID	REGION_ID	POINT_ID	LATITUDE	LONGITUDE	RADIUS
10001	'Sherway Gardens'	'Store'	10001	'Ontario'	'10001'	43.67300	-79.55400	30.0000
10005	'Burnaby Center'	'Store'	10001	'British Columbia'	'10005'	49.25500	-122.99500	30.0000

- POIDESC
 - Language sensitive names and descriptions

These are the new services for accessing points of interests and changing the client location. In this solution, there are 3 new database tables, 2 of which are shown here. The POINTOFINTEREST table stores the places you are actually interested in and the POIDESC table allows descriptions of language sensitive information of these places. The last table is described later.

Loading point of interest data

- Data load POI data
- Samples directory location
 - <WC_70>\components\location-services\samples\DataLoad\Location\PointOfInterest
 - Need to update store ID for your store



WebSphere Commerce provides sample points of interest data that can be loaded into the database using the Data Load utility. There is a sample that loads point of interest locations into the POINTOFINTEREST table and point of interest descriptions into the POIDESC table. These samples require location-based services and smart phone and tablet starter stores. Ensure that location-based services are enabled, and that smart phone and tablet starter stores are published before running any of the location samples. The sample data for point of interest locations use a default STORE_ID value of 10101. If store publish has assigned a different Store ID value, you must manually update the values in the STORE_ID column of the CSV file.

Client Locations

- A client's location at a specific point in time
 - Example: 43.547, -79.577
- Generated by location sources
 - Shopper's GPS-enabled mobile device
- Sent to Location component for processing

A client location is the last known location of the registered shopper. Client locations are a shopper's location at a specific point in time. They are generated by location sources and sent to the Location component for processing. The Location component does not act as a location data repository. It only persists the last known location of a shopper.

Client Location - continued

- OAGIS noun: ClientLocation
- REST resource: clientLocation
- DB Table
 - CLIENTLOCATION

CLIENTLOCATION_ID	SOURCE_TYPE	LATITUDE	LONGITUDE	ACCURACY	REGION_ID	ZONE_ID	ACTION
10001	'GPS'	43.67300	-79.55400	0.00000	'Ontario'	'10001'	'Check-in'

The client location table stores the location definition of a client. For example, a client location can be the location of a customer.

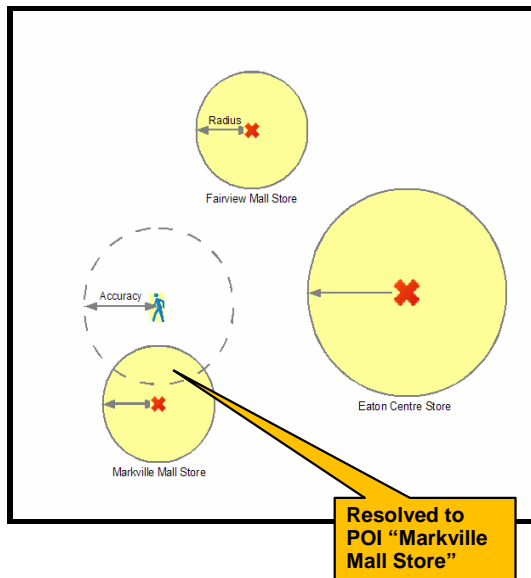
Client location record interactions

- Collecting
 - Via OAGIS service - ChangeClientLocation
 - Via REST service - clientLocation
- Resolving/Filtering
 - ChangeClientLocationBasePartCmdImpl
 - ResolveClientLocationCmd
- Persisting
 - ChangeClientLocation - tracks client location records into database
- Dispatching
 - DispatchClientLocationEventCmd
 - Monitors client location reports and determines which are reported to the marketing service
 - Default implementation calls MarketingFacadeClient.evaluateMarketingTrigger(Map) to dispatch a location event to the Marketing component
- Querying
 - OAGIS GetPointOfInterest service or REST GET pointOfInterest service
 - Supports queries on points of interest, including proximity-based and nearest-neighbor queries

The Location component uses several methods to interact with client location records. This interaction includes methods that help collect, resolve, filter, and persist client records. These methods query Points of Interest, dispatch location events, and invoke and use the Customer Checks In marketing trigger.

When a client location record is reported to the Location component, ChangeClientLocationBasePartCmdImpl calls a sequence of commands which direct the processing of the client location report. This sequence of commands forms a command "pipeline" which refines and resolves the raw information (such as latitude, longitude) in an incoming client location report. The pipeline culminates in a set of output client location reports which are linked to particular points of interest. The pipeline might be customized by providing a subclass of ChangeClientLocationBasePartCmdImpl which overrides the getPipelineCommandInterfaces() method. The getPipelineCommandInterfaces() method emits an ordered list of command interface names to be used in pipeline processing.

Resolving Client Location Records



- ClientLocation noun has fields that define a circle (dotted line)
 - Latitude
 - Longitude
 - Accuracy
- PointOfInterest noun has fields that define a circle (yellow circles)
 - Latitude
 - Longitude
 - Radius
- Threshold = overlapping region
- Note:
 - Accuracy = 0 means return closest POI
 - Only the latitude/longitude values matter for a physical store (not the address)

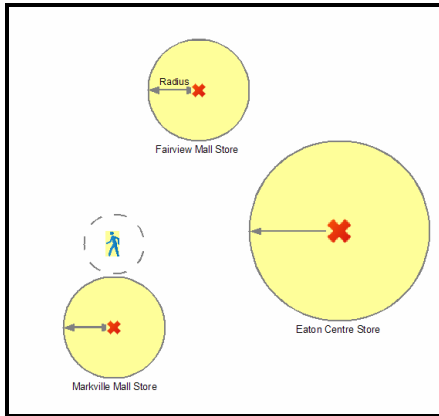
16

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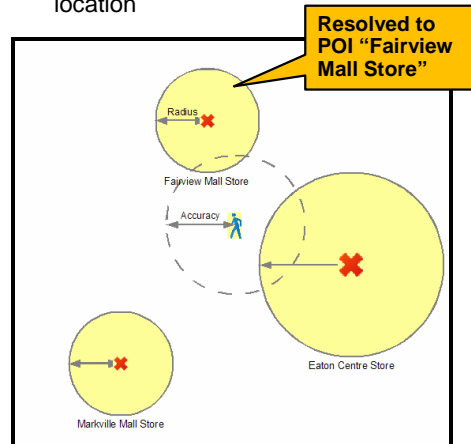
Here is a visual representation of how the client location records are resolved. The client location is represented by the green person, and its latitude, longitude and accuracy creates a circle in space. The point of interest noun, represented by the yellow circles, have fields that also defines a circle in space. The threshold is the overlapping region. In this example, a client location record is resolved to Markville Mall Store. An accuracy of 0 meters means return the closest POI to the client location. Only the latitude/longitude values matter for a physical store, not the address.

Resolving Client Location Records



- Shopper's geographic location is not resolved to any POI

- Shopper's geographic location overlaps with 2 POIs
- OOB behavior resolves nearest location



This slide continues with two more visual examples. In the left example, the record's geographic location is not resolved to any POI, even though it has the same latitude/longitude. This is because the geographic location is now more accurate and no longer overlaps the POI "Markville Mall Store".

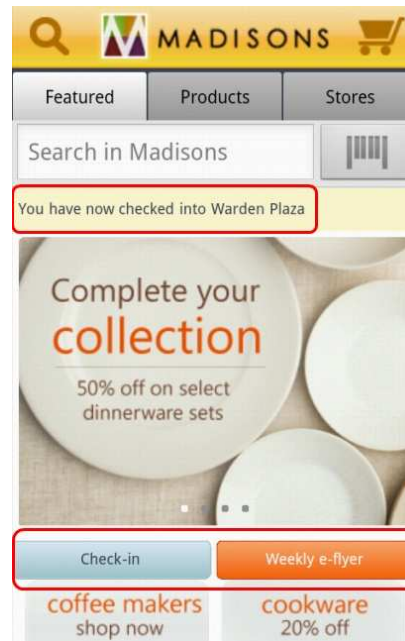
In the right example, the record's geographic location overlaps with two POIs. The default behavior is to resolve to which ever one is geographically closer and that this behavior can be customized depending on the company's business need.

Location-based scenarios

The next slides will show the two main scenarios implemented in this release.

Check-in scenario

- Check-in
 - Shoppers indicate their location and receive location-specific information or rewards
 - Smart phone web store, hybrid and native applications



19

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The location-based flows include the store pages that are used by shoppers with GPS-enabled mobile devices, and can receive location-based content and rewards using location-based services. For example, shoppers can check in to nearby store locations to receive rewards such as coupons, or view store flyers for nearby store locations.

The first scenarios is store check-in. It allows shoppers to indicate when they arrive at a physical store. Shoppers can tap the Check-in button, and after signing in will see which store they checked into. Marketing managers can react to check-in events and target store-specific rewards or advertise to the shopper. The check-in feature is provided in the smart phone web store and device-specific applications only. It is not available in the tablet store.

e-flyer scenario

- e-flyer
 - Display region or location-specific advertising
 - Smart phone web and tablet stores, hybrid application
- Page elements
 - JSP files
 - EflyerDisplay.jsp represents the mobile and tablet page.
 - e-Marketing Spots
 - Mobile20EFlyerESpot
 - TabletEFlyerESpot

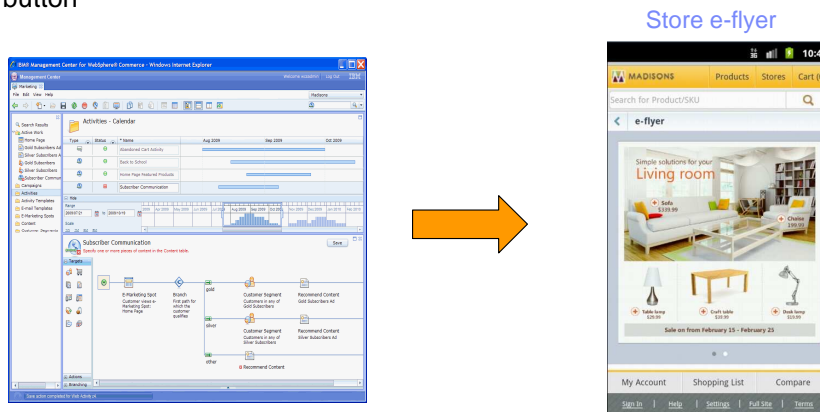


The second scenario is the e-flyer. It provides a way to display location-specific advertising in the store such as a weekly sales flyer for the closest physical store or sales region. The precision marketing tools in the WebSphere Commerce Management Center have been enhanced to support these new marketing capabilities.

The page contains a new EflyerDisplay.jsp file representing the mobile and tablet page. There are also two new e-Marketing spots as shown on the slide. The e-flyer feature is available in both the smart phone and tablet web stores and the Android hybrid application.

Management Center Precision marketing enhancements - 1

- Web activity
 - Control what displays in predefined e-Marketing Spots on mobile store page
 - Example: Display store special / weekly flyer when shopper clicks on button



21

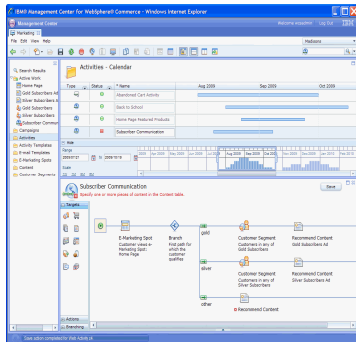
Location-based services

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Business users can now display location-based contents using a new web activity action.

Management Center Precision marketing enhancements - 2

- Dialog activity
 - Automate marketing actions based on the specific behavior of your customers over time
 - Example: Offer a coupon after user checks into a store 3 times



Business users can also automate marketing actions, such as when a customer checks into a store, through the use of a new trigger in a dialog activity.

Location-based Content Recommendation

The image displays two screenshots from the IBM Business Process Manager interface. The left screenshot, titled "New Activity From Template", shows a list of templates. The "Location Based Content Recommendation" template is highlighted with a red box and a yellow callout labeled "New template". The right screenshot, titled "*New Web Activity", shows the configuration of a new web activity. The "Targets" section includes an "E-Marketing Spot" trigger, and the "Actions" section includes a "Display Location-based Content" action, which is highlighted with a yellow callout labeled "New action". The configuration for the "Display Location-based Content" action includes a "Location Type" dropdown set to "Point Of Interest", and "URL prefix" and "URL suffix" input fields.

23

Location-based services

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The new web activity action is called “Display Location-based Content”. This action allows you to define local marketing content to display in the store when the shopper clicks the e-flyer button. As with the “Customer Check In” trigger, you can target a specific store or a larger region such as a city or state. Rather than having to configure recommended content for many different locations, a specific naming convention is used.

How to find the content?

- Display Location-based Content action uses a naming convention to locate content to display
- Point of Interest
 - prefix + pointOfInterest ID + suffix
- Region
 - prefix + region + suffix
- Ex:
 - <http://localhost/wcsstore/Madisons/images/eFlyer/toronto.png>
 - Prefix = <http://localhost/wcsstore/Madisons/images/eFlyer/>
 - Suffix = .png
- Override any setting in optional URL prefix and suffix fields in action definition
- Customize by
 - Extend *DisplayLocationBasedContentActionTaskCmdImpl* class and implement *composeContentURL* method
 - Ex: Handle different content for different languages

The "Display Location-based Content" action will use a naming convention in a URL to locate the content to display in the e-Marketing Spot. There is no need to create Content or Attachments within the Management Center. The content can be served from the web server, edge server (akamai), or any location the shopper requires.

The name of the point of interest or region must appear in the name of the file that contains the marketing content. Within the action, you can define a prefix that comes before the region or point of interest name, if any. You can also specify a suffix, including a file extension, that comes after the name.

This will override any setting in the *DisplayLocationBasedContentActionTaskCmdImpl* class and implement *composeContentURL* method.

What types of content can be used?

- JSP file
 - Mobile Directory: <WC_eardir>/Stores.war/Madisons/mobile20/eFlyer
 - Tablet Directory: <WC_eardir>/Stores.war/Madisons/tablet/eFlyer
 - Format: <PointOfInterest>.jsp
 - The business user can specify prefix and suffix
 - prefix: /Madisons/mobile/eFlyer or /Madisons/tablet/eFlyer
 - suffix: .jsp
 - Passed in e-Marketing spot JSP


```
<c:set var="relativeStoreJspUrl" value="{jspStoreDir}eFlyer/" />
<wcf:param name="DM_locationContentValidation" value="file" />
<wcf:param name="DM_locationContentUrlPrefix" value="{relativeStoreJspUrl}" />
<wcf:param name="DM_locationContentUrlSuffix" value=".jsp" />
```
- Image file
 - Directory: <http://www.web-hosting.com/Madisons/eFlyer>
 - Format: <PointOfInterest>.png
 - The business user can specify prefix and suffix
 - prefix: <http://www.web-hosting.com/Madisons/eFlyer>
 - suffix: .png

So what types of content can you use? You can either have a JSP file, the format used by the Madisons mobile store, or an image file.

In the scenario with a JSP file, the path to identify the location of the content is a relative path to the location of the file on the application server. Typically, the marketing manager creating the Display Location-based Content web activity needs to be guided by the store developer to fill in the URL prefix and URL suffix, and what these values should be. In most cases, it is expected these fields are left empty in the web activity definition, and the values are specified in the e-Marketing Spot JSP. In this example, the e-flyer files for mobile is located in the directory shown and have the format <PointOfInterest>.jsp. Alternatively, the prefix and suffix can be passed in an e-Marketing spot JSP.

In the scenario with an image file, the example shows the path of the content as an URL to the location of the file on the web or edge server. The directory, format, prefix and suffix are shown on the slide.

New trigger – Customer Check In

- Customers are targeted with marketing materials or promotional offers with:
 - Send a message
 - E-mail
 - SMS
 - Issue a coupon
 - Put customer into a segment

The diagram illustrates a trigger flow starting with a green circle, leading to a 'Customer Check In' step (represented by a person icon), which then leads to a 'Send Message' step (represented by an envelope icon) and finally to a red circle with an exclamation mark.

Customer Check In
Customer checks into the following points of interests:
Yorkdale Centre
Checked in at least 1 times

Send Message
Message type: Text message (SMS)
Content: Welcome to Madisons Yorkdale

The configuration interface for the 'Customer Check In' trigger includes the following fields:

- Location Type: Point Of Interest
- *Point Of Interest: A table with columns 'Name' and 'Description'. The table contains one entry: 'Yorkdale Centre' with 'Yorkdale Centre' as the description. Below the table, it indicates '0 of 1 selected'.
- *Times: 1
- Time frame: At any time

26

Location-based services

There is a new dialog trigger for tracking when a shopper checks-in using their mobile device. The check-in location type can be a point of interest, such as a specific store, or a region, such as a city. The screen capture shows a single point of interest selected however multiple stores or cities can be selected in a single activity. When setting up this trigger, you also have the option to set frequency details such as how many times a shopper checked-in over a period of time. The dialog activity in the upper right of the screen shows a simple example. When a shopper checks in to the Yorkdale Centre then they receive a text message welcoming them to the store and informing them of the store specials.

Limitations and considerations

- Not available in Feature Pack 4
 - Business user tools to manage POIs – need to data load POI data
 - Device-to-client mapping
 - Fraud detection
- Other limitations
 - Mobile reference applications only support business-to-customer flow

Feature supported	Android Hybrid	Android Native	Tablet Web	Smartphone Web
Check-in	☑	☑		☑
e-flyer	☑		☑	☑

Here is an overview of the limitations in this release. There currently is no business user tools to manage point of interest data in this release. You will need to data load the point of interests, and there are some samples provided by default. There is no device to client mapping and fraud detection. Also, the mobile reference applications only support the business-to-customer flow. There is also a table of the supported platforms for the check-in and e-flyer features.

Summary

- Location-based services overview
- Commerce solution overview
- Architecture
- Location-based scenarios

You first saw a big picture overview of the location-based services technology. Then you saw which pieces the WebSphere Commerce V7 Feature Pack 4 solution covers. You also saw the solution architecture and some terminology used in the solution. Finally, the presentation covered the main scenarios introduced in the release.

References

- **Mobile starter stores location-based flows**
 - <http://publib.boulder.ibm.com/infocenter/wchelp/v7r0m0/index.jsp?topic=/com.ibm.commerce.starterstores.doc/refs/rsmmolocflow.htm>
- **Location-based services**
 - <http://publib.boulder.ibm.com/infocenter/wchelp/v7r0m0/index.jsp?topic=/com.ibm.commerce.webservices.doc/concepts/cwlocation.htm>
- **Location samples**
 - <http://publib.boulder.ibm.com/infocenter/wchelp/v7r0m0/index.jsp?topic=/com.ibm.commerce.data.doc/refs/rmlsamplelocation.htm>
- **Display location-based content action**
 - <http://publib.boulder.ibm.com/infocenter/wchelp/v7r0m0/index.jsp?topic=/com.ibm.commerce.management-center.doc/concepts/csbactdisconloc.htm>
- **Customer checks in trigger**
 - <http://publib.boulder.ibm.com/infocenter/wchelp/v7r0m0/index.jsp?topic=/com.ibm.commerce.management-center.doc/concepts/csbtrilocbase.htm>
- **Location component interactions**
 - <http://publib.boulder.ibm.com/infocenter/wchelp/v7r0m0/index.jsp?topic=/com.ibm.commerce.webservices.doc/concepts/cwlocationint.htm>

Here are the references of the solution.



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