

# Oracle LBS

## Routing Engine Implementation

ORACLE



DOD QOL Information Technology Center

e|spatial 

The background features a wireframe globe on the left and a faint map on the right. The globe is composed of a grid of lines representing latitude and longitude. The map shows a street grid with labels such as 'Wks', 'Bittern', and 'nys'.

- **Paul Baynham**

- *eSpatial* Senior Consultant
- Architect: DoD Military Homefront Military Installations Application
- Focus on routing implementation

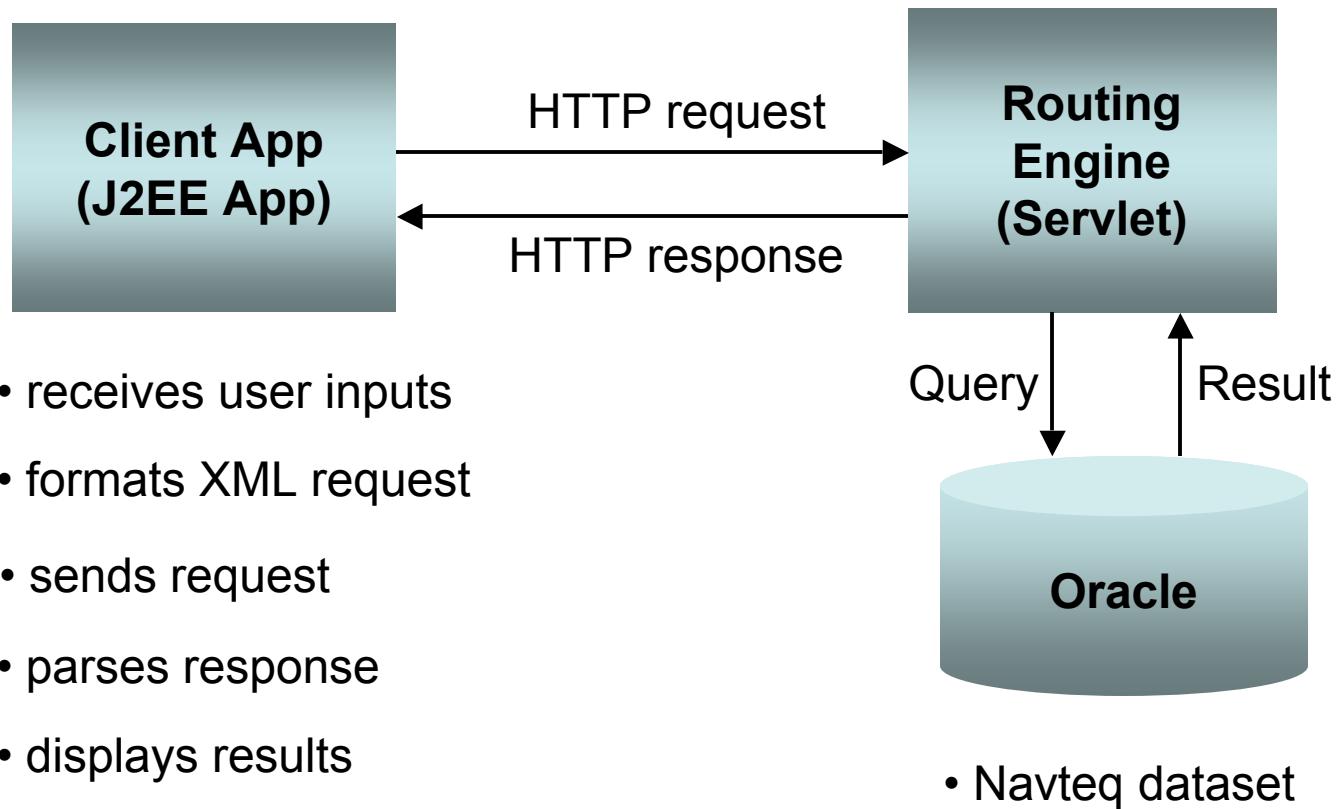
# Overview

- J2EE application
- In support of military families
- Source for installation services and contacts
- Oracle database with Spatial, Application Server, NAVTEQ data

# Oracle Routing Engine

- Start location = address or geocode
- End location = address or geocode
- Returns route information
  - driving distances
  - estimated driving times
  - directions
  - geometries

# Architecture

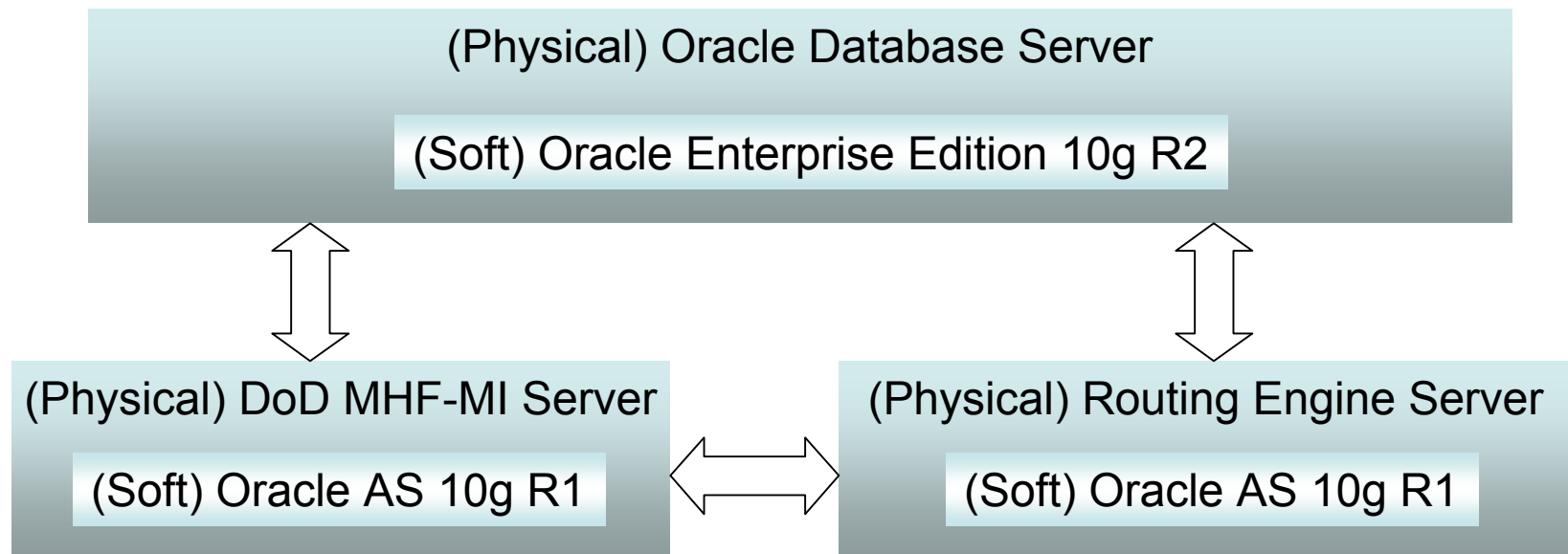


# Sending Request

## Sample URL:

http:// hostname:port/route-server-servlet-path?xml\_request=xml\_document

## Tiers:





# MilitaryHOMEFRONT

Supporting our Troops & their Families

Home | Feedback | MilitaryHOMEFRONT

Troops & Families

Leadership

Service Providers

Search

## MilitaryINSTALLATIONS

"Take a Stand Against Domestic Violence"

### Lookup Installations & Directories of Services

With information on over 250 military installations and communities worldwide, we have the information you're looking for. Make your selections from the following options:

<b>Program or Service</b> All	<b>Branch of Service/Agency</b> All
<b>Location</b> Enter an Installation, select a Country or State, click a state on the map, or simply enter your zip code below.	
Installation: <a href="#">Installation/Agency Lookup</a> <input type="text"/>	
Country United States	
State/Provinces All	
Postal Code <input type="text"/>	
Within 25 mi	
<a href="#">Reset Form</a>	<a href="#">Search</a>

For information on the GeoSpatial Application Contact [eSpatial](#) | Map Data Information Contact [NAVTEQ](#) | Installation/Contact Directory Questions Contact [Webmaster](#)



[About US](#) / [Privacy Policy & Security](#) / [Disclaimer](#) / [Subscriptions](#)  
[Link to Us](#) / [Plug-Ins](#)



Contact MilitaryHOMEFRONT by sending email to the [Webmaster](#).



# MilitaryHOMEFRONT

Supporting our Troops & their Families

Home | Feedback | MilitaryHOMEFRONT

Troops & Families

Leadership

Service Providers

Search

## MilitaryINSTALLATIONS

Information on Identity Theft from the Director of the Office of Family Policy, DoD

United States Army » United States » Virginia » Fort Myer Military Community (FMMC)

### Installations & Directories of Services

25 Services found for 1 Installations [Download Results](#)

[Conduct another search »](#)

United States Army

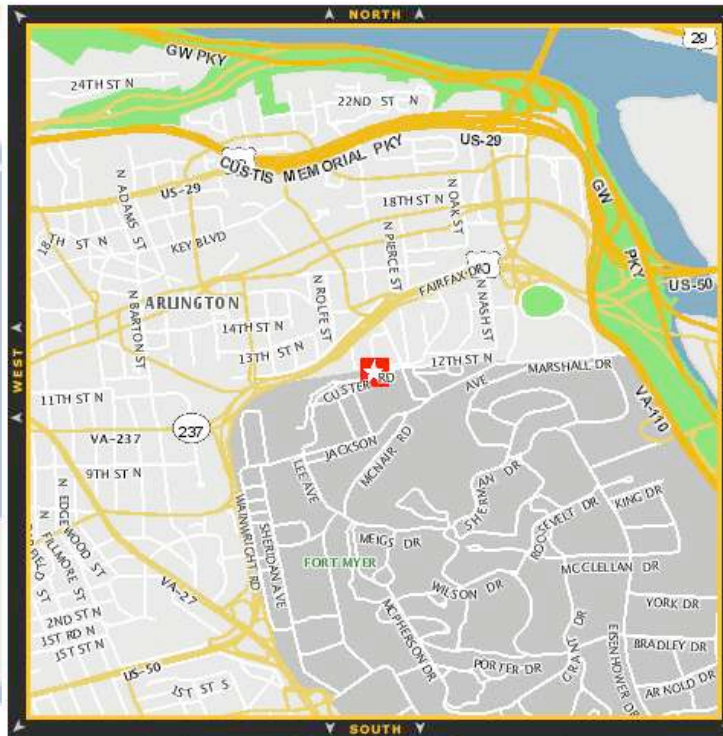
Virginia United States

#### ★ Fort Myer Military Community (FMMC)

102 Custer Road [Installation Overview](#)  
Bldg 201 [Weather](#)  
Fort Myer, VA 22211-1199 [Mapped on right](#)  
[Directions From / To](#)

- ▶ [Adult Education Centers](#)
- ▶ [Automotive Services](#)
- ▶ [Child Development Centers](#)
- ▶ [Commissary/Shoppette](#)
- ▶ [Emergency Relief Services](#)
- ▶ [Exceptional Family Member Program/Special Needs](#)
- ▶ [Exchange\(s\)](#)
- ▶ [Family Advocacy Program](#)
- ▶ [Family Center](#)
- ▶ [Gymnasiums/Fitness Centers](#)
- ▶ [Health Benefits Advisory](#)
- ▶ [Hospital/Medical Treatment Facility\(s\)](#)
- ▶ [Household Goods/Transportation Office \(inbound\)](#)
- ▶ [Household Goods/Transportation Office](#)

[Conduct another search »](#)



#### Find on the map

Click a link to plot up to 5 nearest locations on the map.

- ▶ [Cultural](#)
- ▶ [Local Government](#)
- ▶ [Local Services](#)
- ▶ [Nearby Installations](#)
- ▶ [Recreation](#)
- ▶ [Travel](#)

zoom IN + | | | | | - OUT zoom

For information on the GeoSpatial Application Contact [eSpatial](#) | Map Data Information Contact [NAVTEQ](#) | Installation/Contact Directory Questions Contact [Webmaster](#)



[About US](#) / [Privacy Policy & Security](#) / [Disclaimer](#) / [Subscriptions](#)  
[Link to Us](#) / [Plug-Ins](#)







# Military HOMEFRONT

Supporting our Troops & their Families

Troops & Families

Leadership

Service Providers

Search



## MilitaryINSTALLATIONS

Information on Identity Theft from the Director of the Office of Family Policy, DoD

### Directions Finder

	Start	End	
Place Name	<input type="text" value="Fort Myer Military Community (FMM)"/>	<input type="text"/>	<b>Route Preference</b> <input checked="" type="radio"/> Fastest Route <input type="radio"/> Shortest Route <b>Road Preference</b> <input checked="" type="radio"/> Highway <input type="radio"/> Local Roads
Street	<input type="text" value="102 Custer Road, Bldg 201"/>	<input type="text"/>	
City	<input type="text" value="Fort Myer"/>	<input type="text"/>	
State	<input type="text" value="VA"/>	<input type="text"/>	
Zip Code	<input type="text" value="22211-1199"/>	<input type="text"/>	

Get Directions

For information on the GeoSpatial Application Contact [eSpatial](#) | Map Data Information Contact [NAVTEQ](#) | Installation/Contact Directory Questions Contact [Webmaster](#)



[About US](#) / [Privacy Policy & Security](#) / [Disclaimer](#) / [Subscriptions](#)  
[Link to Us](#) / [Plug-Ins](#)

Contact MilitaryHOMEFRONT by sending email to the [Webmaster](#).





# MilitaryHOMEFRONT

Supporting our Troops & their Families

Troops & Families

Leadership

Service Providers

Search

## MilitaryINSTALLATIONS

Information on Identity Theft from the Director of the Office of Family Policy, DoD

[Printable Version](#)

**Start**

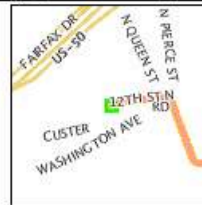
Fort Myer Military Community (FMMC)  
102 Custer Road, Bldg 201  
Fort Myer  
VA 22211-1199

**End**

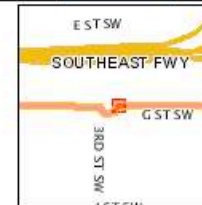
287 G St SW  
Washington  
DC 20024

**Estimated time is:** 9 minutes. **Distance is:** 4.99 miles.

Seq	Instruction	Distance (miles)
1	Start out on CUSTER RD (Going East)	0.07
2	Turn RIGHT onto SHERMAN RD (Going Southeast)	0.14
3	Turn SLIGHT LEFT onto JACKSON AVE (Going Northeast)	0.23
4	Turn LEFT onto N MEADE ST (Going North)	0.19
5	Take US-50 E RAMP US-50 E RAMP	0.15
6	Turn SLIGHT RIGHT onto ARLINGTON BLVD/US-50 (Going Southeast)	0.12
7	Take RAMP toward MEMORIAL BR	0.32
8	Stay STRAIGHT to go onto GEORGE WASHINGTON MEMORIAL PKY/GW PKY (Going Southeast)	1.63
9	Turn LEFT onto I-395/US-1/HENRY G SHIRLEY MEMORIAL HWY (Going Northeast)	0.07
10	Stay STRAIGHT to go onto I-395/US-1/ARLAND D WILLIAMS JR MEMORIAL BRG (Going Northeast)	0.43
11	Stay STRAIGHT to go onto I-395/US-1 (Going Northeast)	0.03
12	Take I-395 N RAMP I-395 N RAMP	0.37
13	Stay STRAIGHT to go onto I-395/FRANCIS CASE MEMORIAL BRG (Going Northeast)	0.06
14	Turn SLIGHT RIGHT onto RAMP (Going East)	0.20
15	Turn SLIGHT RIGHT onto I-395/SOUTHWEST FWY (Going East)	0.07
16	Turn SLIGHT RIGHT onto RAMP (Going Southeast)	0.13
17	Turn LEFT onto G ST SW (Going East)	0.77



Start Detail



End Detail

# Request XML

```
<route_request vendor="Oracle" id="1" distance_unit="MILE" return_driving_directions="true"
  return_route_geometry="true"
  return_segment_geometry="false" road_preference="HIGHWAY" route_preference="FASTEST"
  time_unit="HOUR">
```

## <start\_location>

```
<input_location id="1">
  <input_address>
    <us_form2 name="Fort Myer Military Community (FMMC)" street="102 Custer Road, Bldg 201"
  city="Fort Myer" state="VA" zip_code="22211-1199"/>
  </input_address>
</input_location>
</start_location>
```

## <end\_location>

```
<input_location id="2">
  <input_address>
    <us_form2 name="" street="287 G St SW" city="Washington" state="DC" zip_code="20024"/>
  </input_address>
</input_location>
</end_location>
```

```
</route_request>
```

# URL Encoded String

```
"POST /routeserver/servlet/RouteServerServlet?xml_request=%3C%3Fxml+version+%3D+%271.0%27+encoding+%3D+%27UTF-8%27%3F%3E%0D%0A%3Croute_request+vendor%3D%22Oracle%22+id%3D%221%22+distance_unit%3D%22MILE%22+return_driving_directions%3D%22true%22+return_route_geometry%3D%22true%22+return_segment_geometry%3D%22false%22+road_preference%3D%22HIGHWAY%22+route_preference%3D%22FASTEST%22+time_unit%3D%22HOUR%22%3E%0D%0A+++%3Cstart_location%3E%0D%0A+++++%3Cinput_location+id%3D%221%22%3E%0D%0A+++++%3Cinput_address%3E%0D%0A+++++%3Cus_form2+name%3D%22Fort+Myer+Military+Community+%28FMMC%29%22+street%3D%22102+Custer+Road%2C+Bldg+201%22+city%3D%22Fort+Myer%22+state%3D%22VA%22+zip_code%3D%2222221-1199%22%2F%3E%0D%0A+++++%3C%2Finput_address%3E%0D%0A+++++%3C%2Finput_location%3E%0D%0A+++%3C%2Fstart_location%3E%0D%0A+++%3Cend_location%3E%0D%0A+++++%3Cinput_location+id%3D%222%22%3E%0D%0A+++++%3Cinput_address%3E%0D%0A+++++%3Cus_form2+name%3D%22%22+street%3D%22287+G+St+SW%22+city%3D%22Washington%22+state%3D%22DC%22+zip_code%3D%2220024%22%2F%3E%0D%0A+++++%3C%2Finput_address%3E%0D%0A+++++%3C%2Finput_location%3E%0D%0A+++%3C%2Fend_location%3E%0D%0A%3C%2Froute_request%3E HTTP/1.1[r][n]"
```

# XML Response

```
<route_response>
  <route id="1" step_count="17" distance="4.986976031407289" distance_unit="mile"
    time="0.1503575473361545" time_unit="hour">
    <route_geometry>
      <LineString>
        <coordinates> -77.07789439541523,38.88723559035048 ... -
          77.01495021058797,38.88130952631652 </coordinates>
      </LineString>
    </route_geometry>
    <segment sequence="1" instruction="Start out on CUSTER RD (Going East)"
      distance="0.07163934471193424"/>
    <segment sequence="2" instruction="Turn RIGHT onto SHERMAN RD (Going Southeast)"
      distance="0.14436853003829306"/>
    <segment sequence="3" instruction="Turn SLIGHT LEFT onto JACKSON AVE (Going Northeast)"
      distance="0.22539866390618205"/>
    ...
    <segment sequence="15" instruction="Turn SLIGHT RIGHT onto I-395/SOUTHWEST FWY (Going
      East)" distance="0.06965888944339153"/>
    <segment sequence="16" instruction="Turn SLIGHT RIGHT onto RAMP (Going Southeast)"
      distance="0.130846813735009"/>
    <segment sequence="17" instruction="Turn LEFT onto G ST SW (Going East)"
      distance="0.7734555587147508"/>
  </route>
</route_response>
```

# Client Responsibilities

- Acquire properly formatted data
  - Oracle's routing engine expects a predefined set of tables to exist in the database
- Install the routing engine servlet
  - Package is delivered with Oracle 10gR2 as an EAR file
  - Installation instructions in Spatial User Guide
- Manage XML request/response
- Display results

# MHF-MI Application

- J2EE architecture using Struts and eSpatial
- Built in the Eclipse IDE
- All Java/JSP in the midtier
- <http://www.militaryinstallations.dod.mil>
- pbaynham@espatial.com