

## OSGeo.JP カンファレンス

関西オープンフォーラム (KOF) 2007

### PostLBS 新情報 ーオープンソースで作る経路探索サイト

#### Shortest Path Search in Real Road Networks with pgRouting



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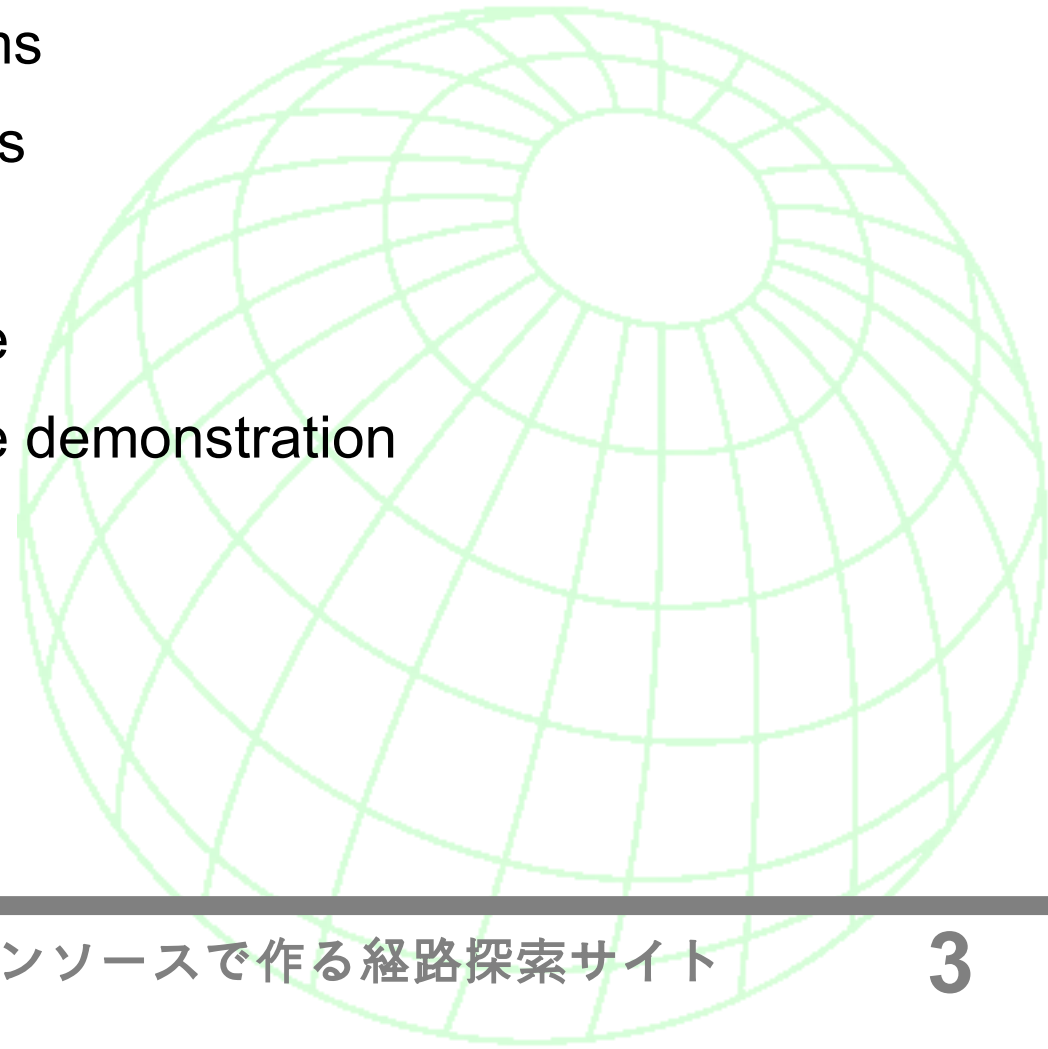
簡単な日本語で  
難しそうなテーマを  
説明するつもりです。



がんばりましょう！

## Today's Schedule

- What is pgRouting?
- The routing algorithms
- pgRouting demo sites
  
- Web Routing Service
- Web Routing Service demonstration



## What is pgRouting?

- Open Source project under GPL
- Extension of PostgreSQL and PostGIS
- Originally written as pgDijkstra by Camptocamp CA
- Extended by Orkney and renamed to pgRouting
- pgRouting is part of PostLBS

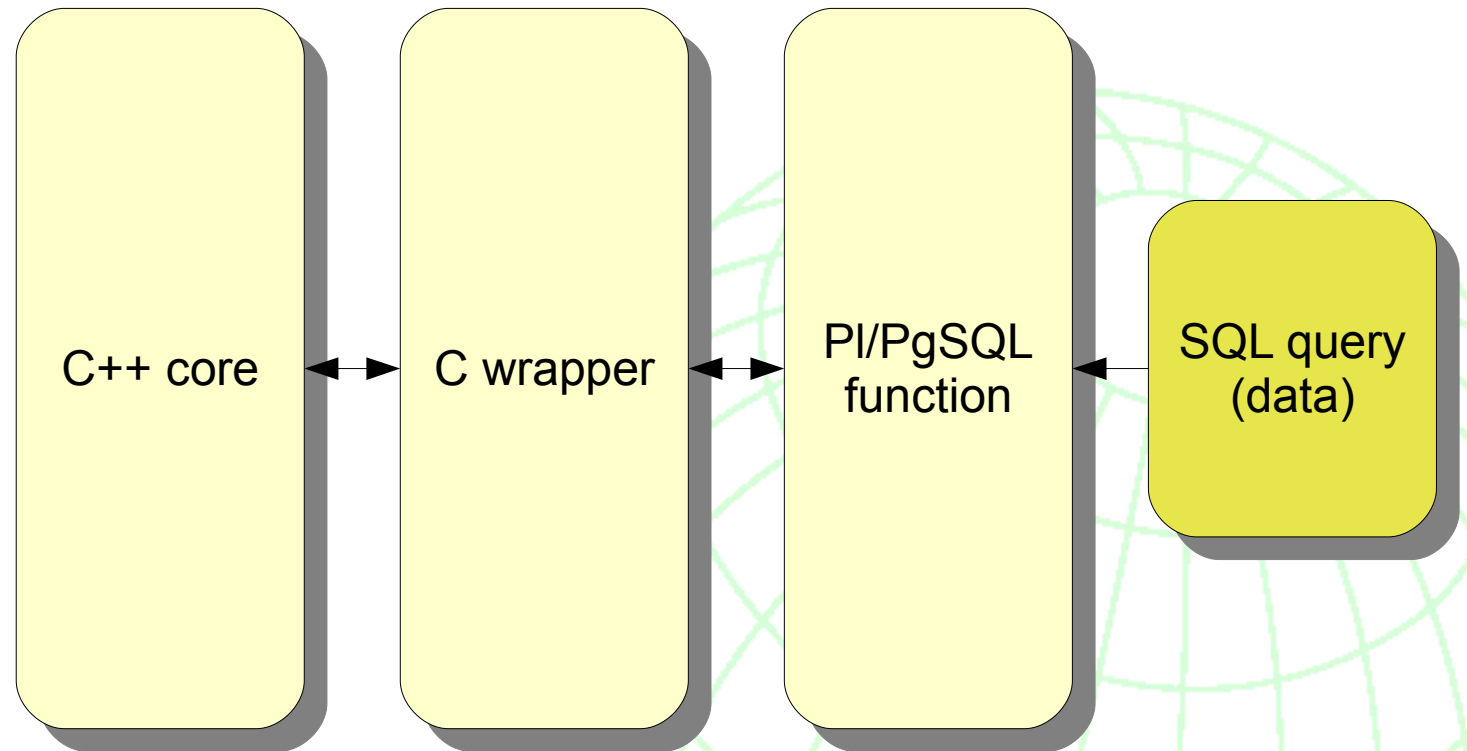
## pgRouting Functionality

### pgRouting includes:

- Shortest Path Search - 最短距離  
(Dijkstra, A Star, Shooting Star)
- Traveling Salesperson Problem (TSP)  
巡回セールスマン探索
- Driving Distance polygon calculation  
到達圏探索

Some online demos: << BROWSER >>

## How does pgRouting work?



## Shortest Path algorithms (1)

### pgRouting “Dijkstra”

- Well known and fair shortest path algorithm
- Always finds mathematically shortest path
- Good for sparse networks

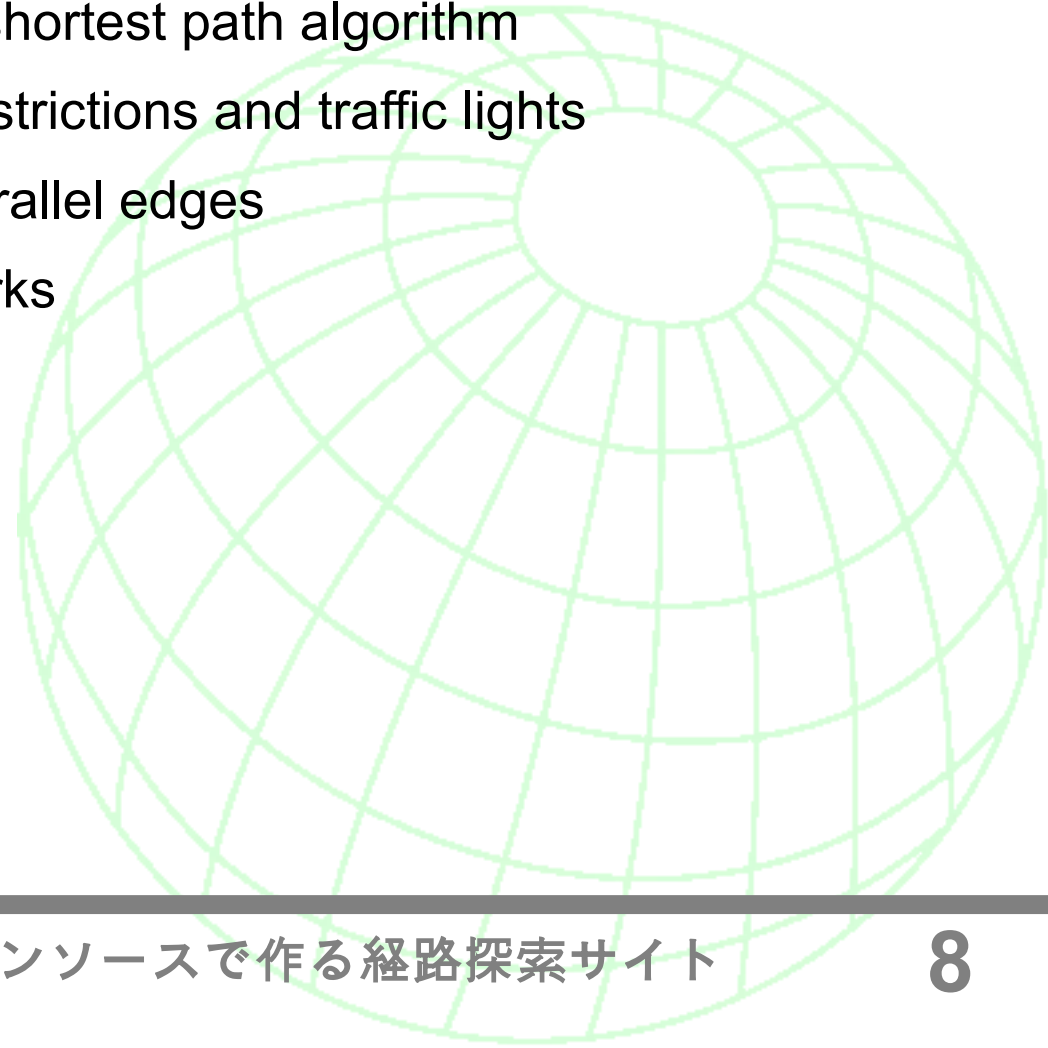
### pgRouting “A star”

- Well known heuristic shortest path algorithm
- Needs vertex geometry information
- Searches through less number of vertexes
- Good for dense networks

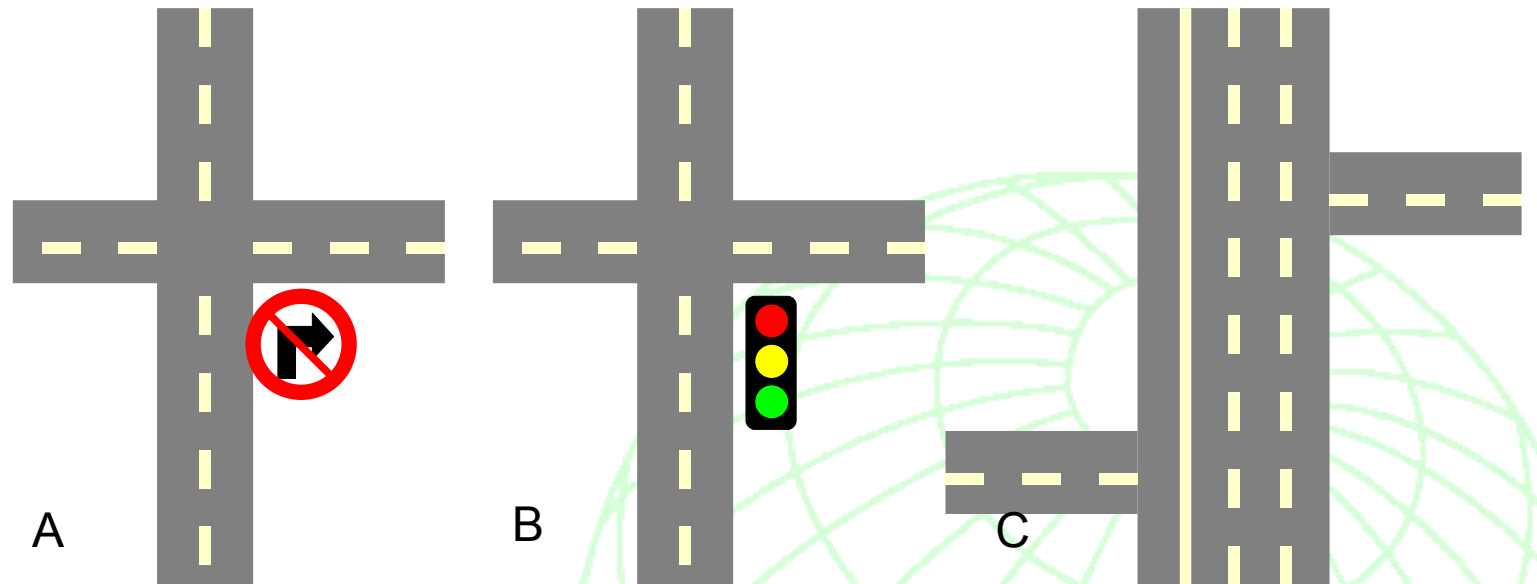
## Shortest Path algorithms (2)

### pgRouting “Shooting star”

- Edge-based heuristic shortest path algorithm
- Supports maneuver restrictions and traffic lights
- Properly processes parallel edges
- Good for dense networks



## Real road networks



- A) Signs (restricted maneuver)
- B) Traffic lights (delay)
- C) Road marking (restricted maneuver)

## pgRouting Data structure

### Dijkstra

#### Edge

- id
- cost
- reverse\_cost
- Source vertex
  - id
- Target vertex
  - id

### A\*

#### Edge

- id
- cost
- reverse\_cost
- Source vertex
  - id
  - x
  - y
- Target vertex
  - id
  - x
  - y

### Shooting\*

#### Edge

- id
- cost
- reverse\_cost
- Adjacent edge
  - rule
  - to\_cost
- Source vertex
  - id
  - x
  - y
- Target vertex
  - id
  - x
  - y

## MapMobility Demo

### MapMobility

(in cooperation with DM Solutions Group)

[maps.mapmobility.com](http://maps.mapmobility.com)

## pgRouting Preview

### Web Routing Service



# What does “Web Routing Service” stand for?

- RESTful web service implementation based on Java Restlet technology (restlet.org)
- Support of several **input** / **output** formats:  
=> GeoJSON, GML, WKT, KML, XML, LatLon, Text
- Accepts http POST and GET requests
- Easy way to make pgRouting requests (“API”)
- Easy way to setup and offer a pgRouting service
- Convenient to call from client applications

# How does it work?

## Request:

```
http://url:8182/<provider>/<format>/<function>.<format>  
+ data (routing parameters)
```

## Examples:

- Closest Edge Search

```
http://localhost:  
8182/ipc/lonlat/closest_edge.geojson?  
data=15091994.392123375 4124331.843866217
```

- Shortest Path Search

```
http://localhost:  
8182/geobase/kml/shortest_path_smart.gml?  
start= ... &end= ...
```

## Web Routing Service Demo

**Client App.:** OpenLayers  
**Server:** pgRouting Web Routing Service  
**Map data:** Google Maps  
**Road data:** IPC (Japan) / Geobase (Canada)

<<Browser>>

Remark: uses proxy for cross-domain request

## pgRouting - The Future?

**OSGeo incubation?**

**Chinese Postman Algorithm?**

**Database independent routing solution?**

**Large networks layered routing?**

**Do you want to help?**



# Orkney

## Join us!

日本語でもいいですよ！

[pgrouting.postlbs.org](http://pgrouting.postlbs.org)

[orkney.co.jp](http://orkney.co.jp)



Thank you!