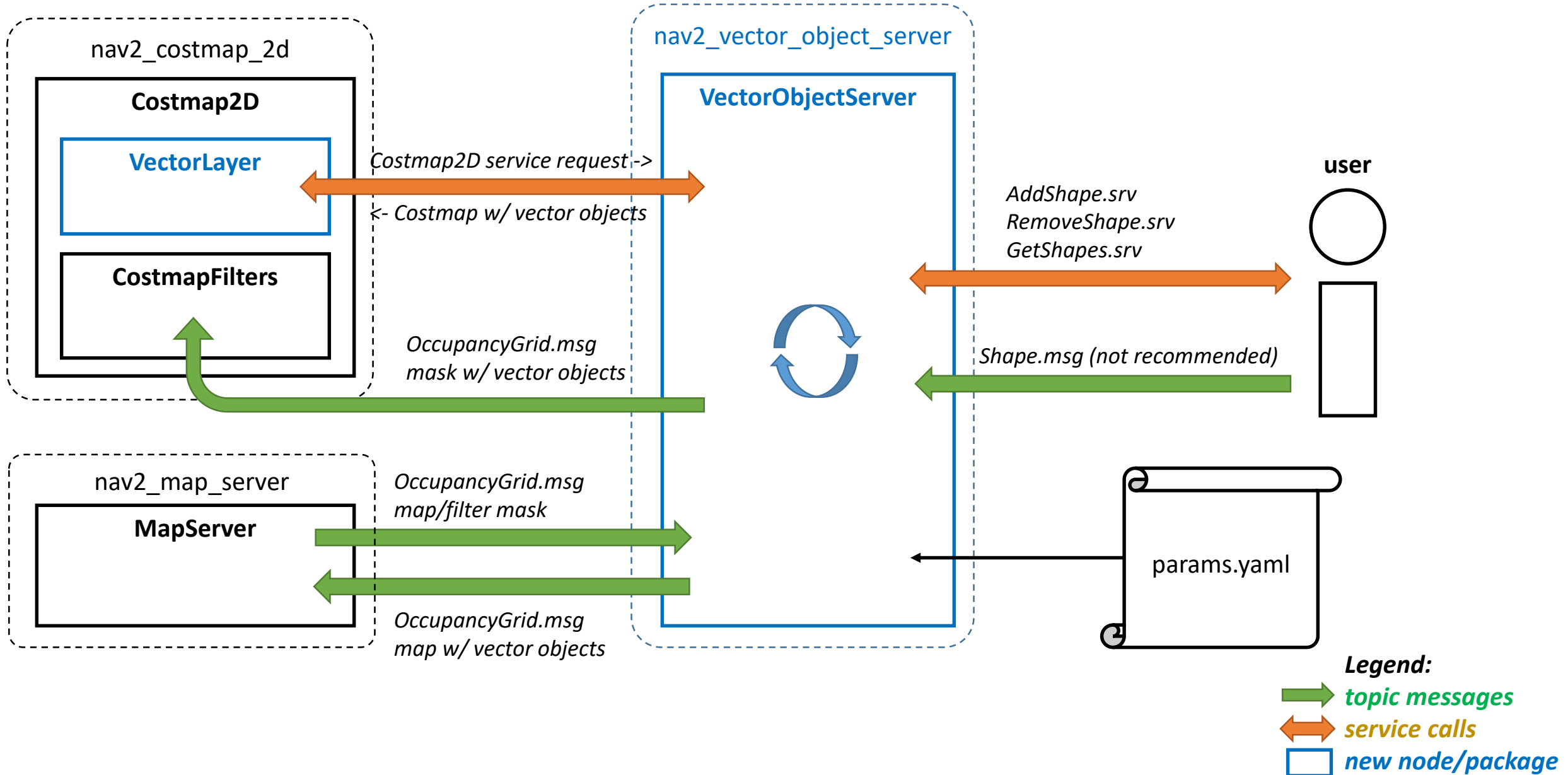


Vector Objects in Nav2 Maps

Alexey Merzlyakov
Samsung Research, 2023

Overall Architecture



API Design

Raster Maps API

nav_msgs/msg/OccupancyGrid.msg

nav2_msgs/msg/Costmap.msg

nav2_msgs/srv/VectorizeOccupancyGrid.srv
nav2_msgs/srv/VectorizeCostmap.srv

nav_msgs/msg/OccupancyGrid.msg
nav2_msgs/msg/Costmap.msg

VectorObjectServer

map

+

vector shapes

nav_msgs/msg/OccupancyGrid.msg

nav2_msgs/msg/Costmap.msg

Republished on each vector shape or map update

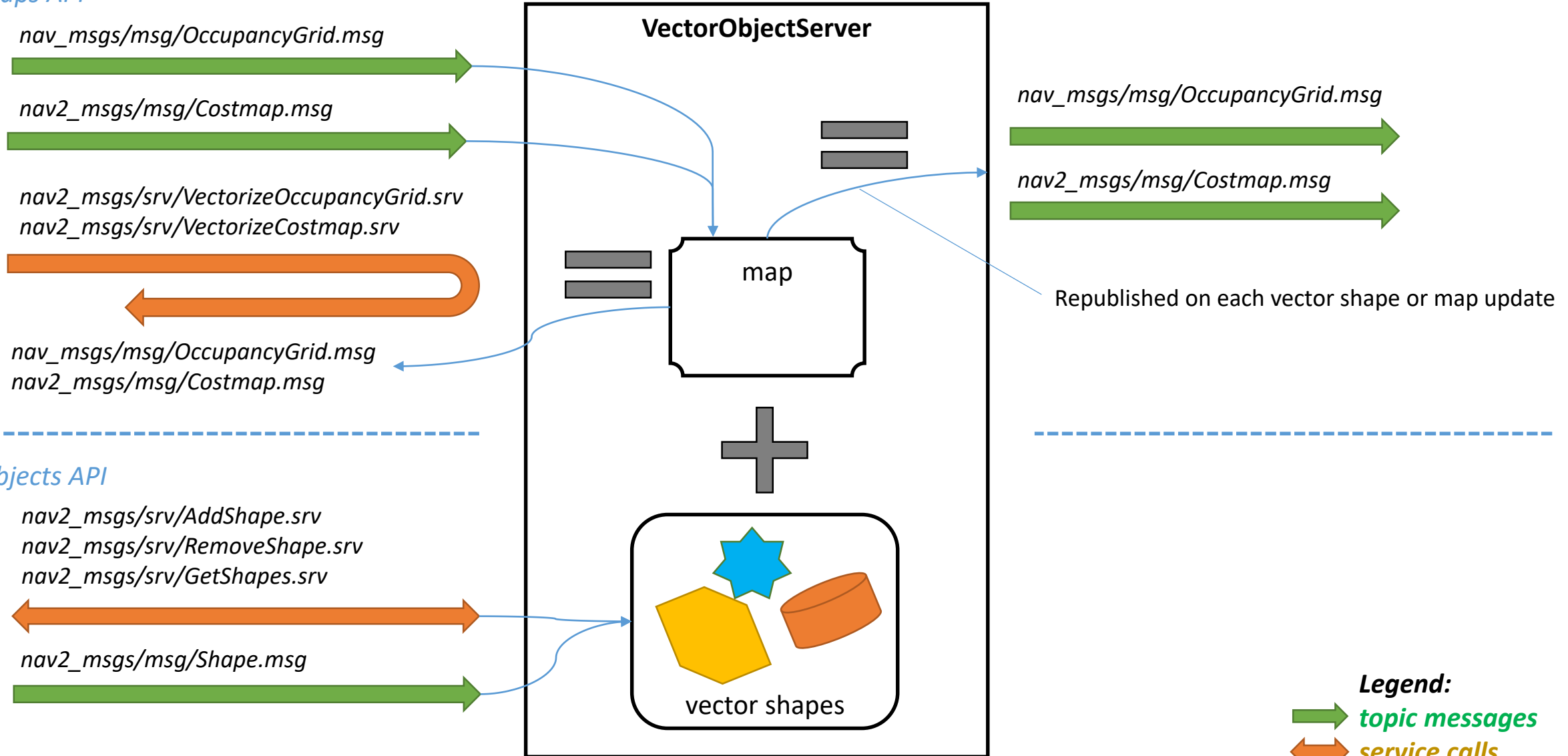
Vector Objects API

nav2_msgs/srv/AddShape.srv
nav2_msgs/srv/RemoveShape.srv
nav2_msgs/srv/GetShapes.srv

nav2_msgs/msg/Shape.msg

Legend:

 **topic messages**
 **service calls**



API Details: Shape.msg

nav2_msgs/msg/Shape.msg

std_msgs/Header header

uint8 SHAPE_POLYGON=0

uint8 SHAPE_BROKEN_LINE=1

uint8 SHAPE_CIRCLE=2

uint8 shape_type

string uuid

string description # Shape description/name/comment

uint32 priority # Priority of overlay order

geometry_msgs/Point32[] points # Points for different shapes (corners for polygons, center of the circle)

uint8[] data # Any data for vector shapes

bool is_bigendian # Is this data bigendian?

uint8 OVERLAY_ADD=0

uint8 OVERLAY_MAX=1

uint8 OVERLAY_MIN=2

uint8 OVERLAY_INVERT=3

uint8 OVERLAY_TRANSPARENT=4

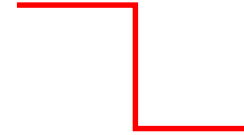
uint8 overlay_type # Type of overlay with underlying shapes

uint8 value # Value to be filled with

uint8 shape_type



polygon



broken line



circle



ellipse
(example)



3D-object
(example)

Geometry_msgs/Point32[] points

[p1, p2, p3, ...] points of polygon and broken line

[center] for circle

uint8[] data

[float32]: [radius] for circle

[float32, float32, float32]: [a, b, angle] for ellipse (example)

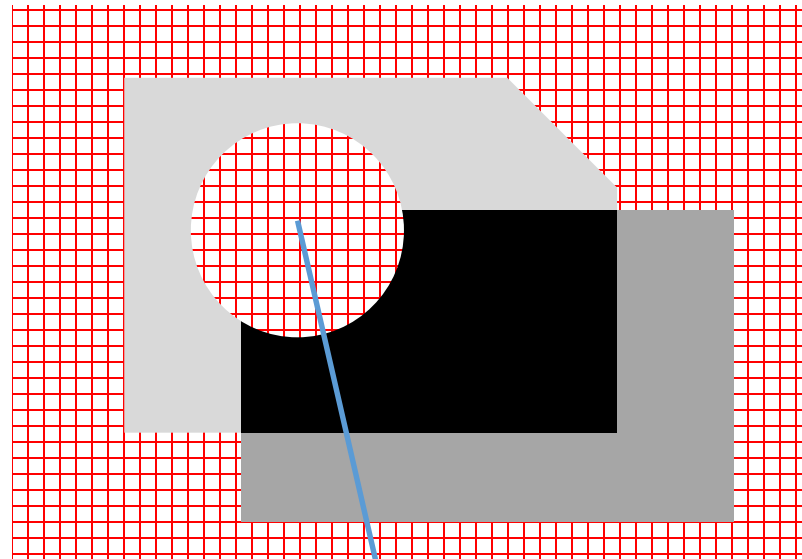
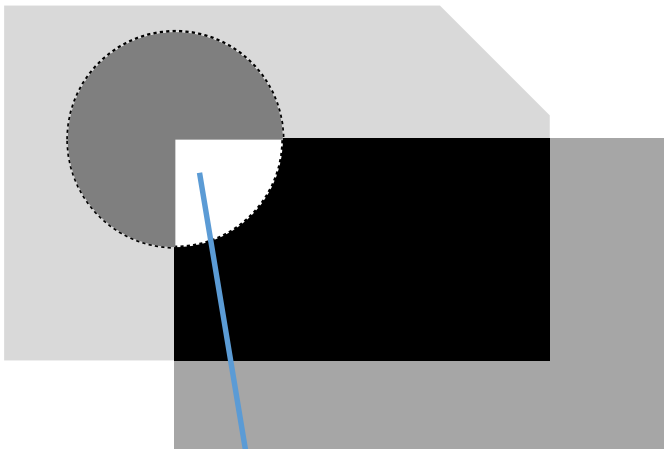
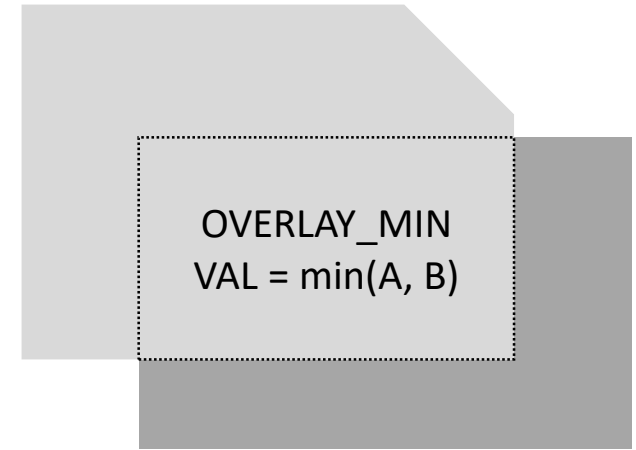
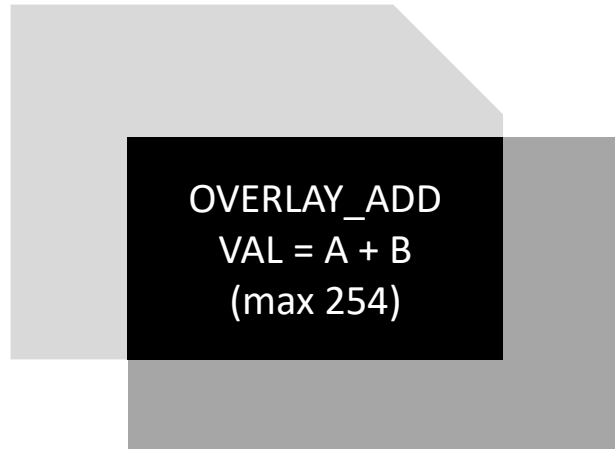
[float32, float32, float32]: [boxX, boxY, boxZ] for 3D-object (example)

uint8 value

(0..254) the same as for Costmap2D maps; 255 – unknown;

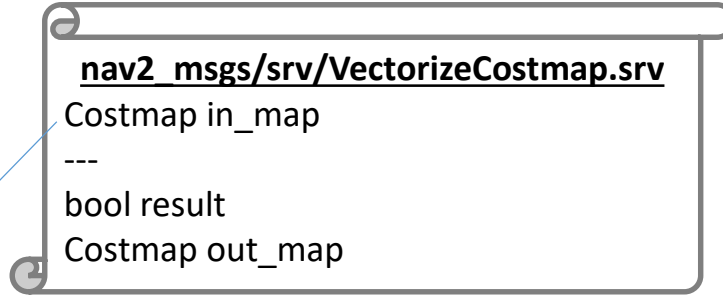
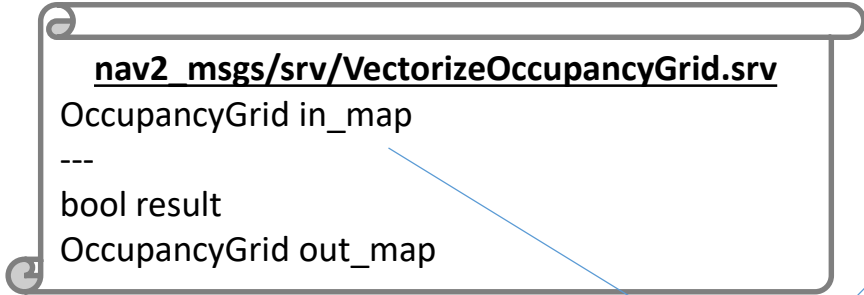
to be converted to (-1; 0..100) OccupancyGrid values when necessary

API Details: Overlay Type



API Details: Services

Raster Maps API



To be stored at VectorObjectsServer after service call

Vector Objects API

