Stack

Functions (CAS SA TM)		

GPS RTC	Dict of Peers	Message Q
	Peer Discovery	

Network overlay

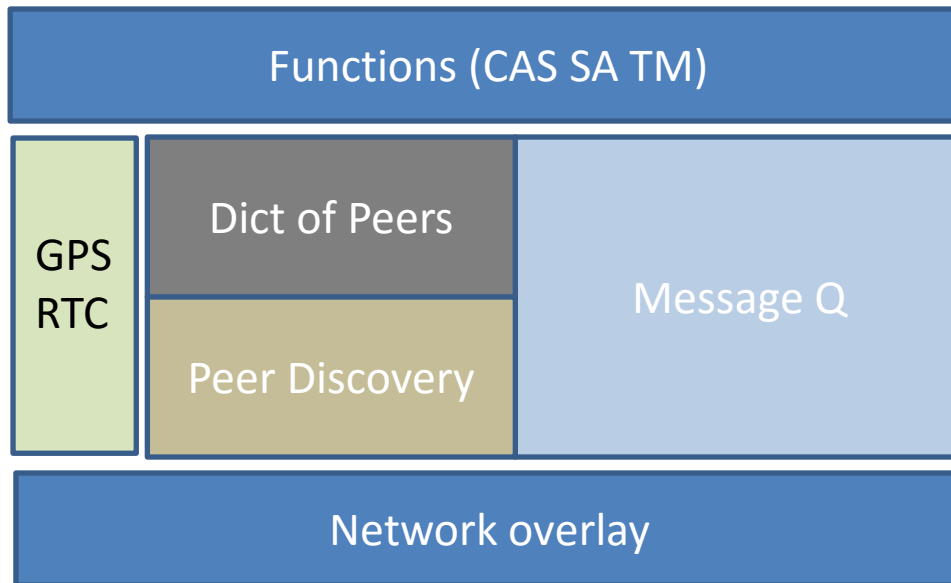**Peer Discovery**
SCTP broadcast of basic data, with multi-homing.

Dict of Peers
Store of all known peers and latest basic data.

Message Q
Passes messages and data between Functions and know peers, based on unique Dict of Peers content.

Functions
- CAS -Collision Avoidance System
- SA - Situational Awareness
- TM - Traffic Management

"Peer Discovery" basic broadcast data
{Time, PeerID, Location, $\overline{V}$elocity}
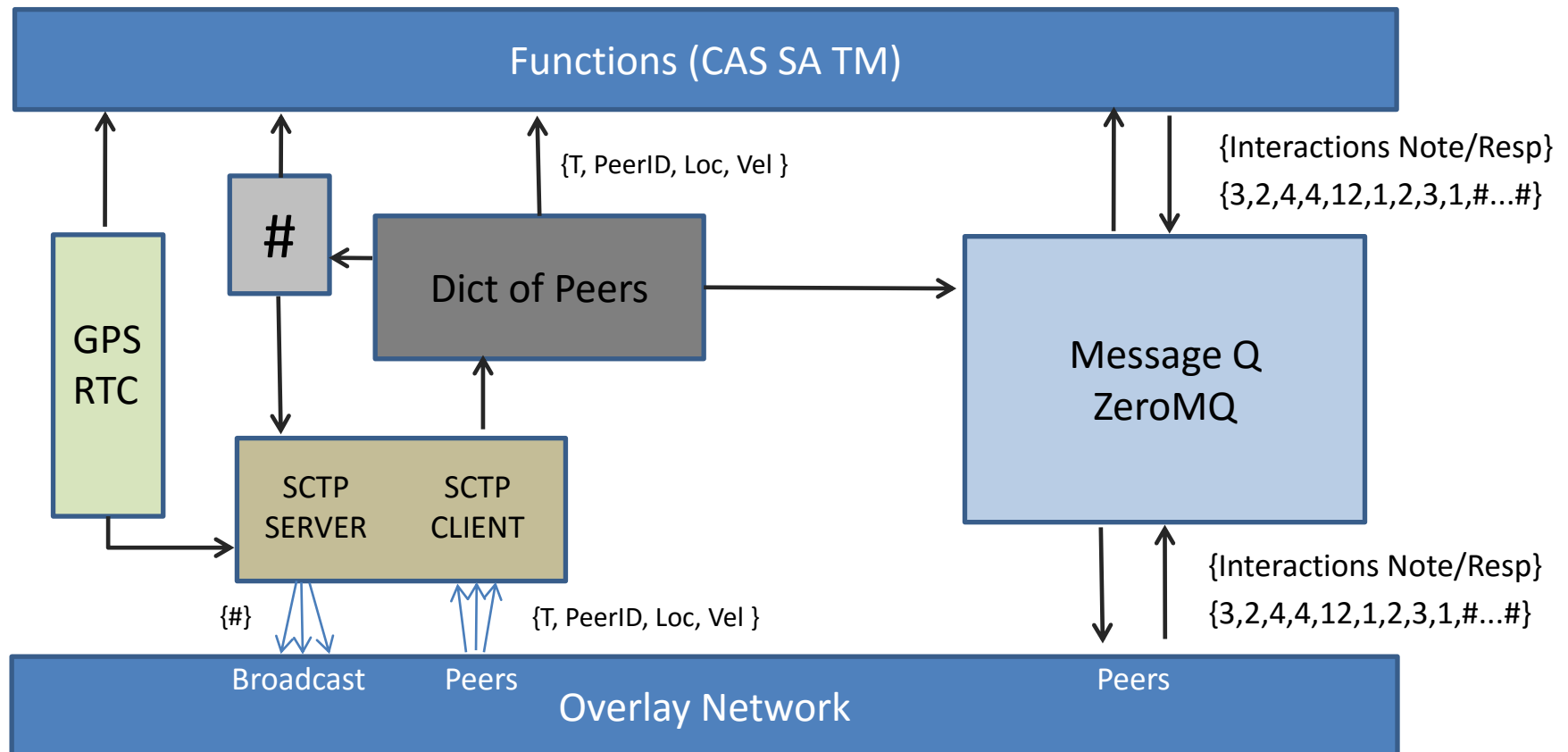
From Header

Detail of Stack

Dict of Peers
Provides dictionary of known peers and basic data.
Basic data is used directly by higher functions
Known PeerID's are used to address Message Q request

Functions (CAS SA TM)

{T, PeerID, Loc, Vel }

#

GPS
RTC

Dict of Peers

Message Q
ZeroMQ

{Interactions Note/Resp}
{3,2,4,4,12,1,2,3,1,#...#}

SCTP
SERVER   SCTP
CLIENT

{#}   {T, PeerID, Loc, Vel }

{Interactions Note/Resp}
{3,2,4,4,12,1,2,3,1,#...#}

Broadcast   Peers   Overlay Network   Peers

Messaging:

Basic Data
>{Time, PeerID, Location, Velocity}

Broadcast Peer Discovery
>Hash of known peer names

MessageQ Messages:

>Req. Data (Pull or sub? To new peers)
>>'Hash of unique Peer Dict keys'

>Response Req. Data (Push or pub to requestor?)
>>{Last node vertex, Next node vertex, Destination node vertex, Probable next nodes exit1, Probable next nodes exit2, Probable next nodes exit3, Hash of unique Peer Dict keys}

>Update (Push to all known peers)
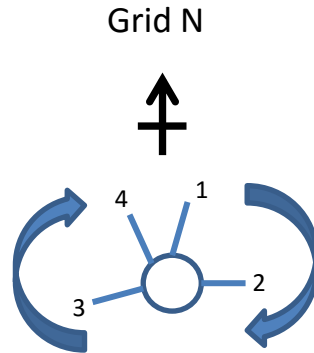>>Any changes in Response Req. Data since last transmission.

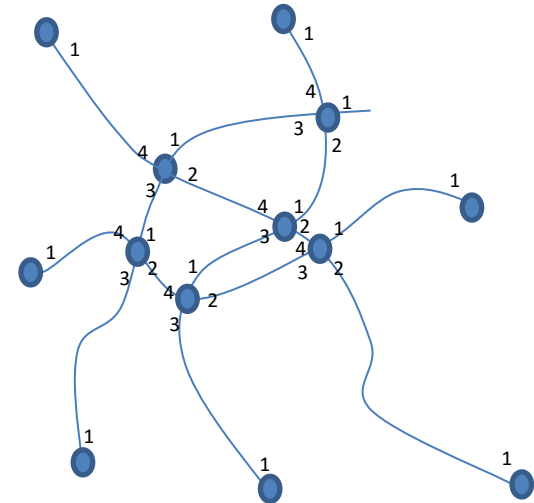>Interaction Notification Offer (Push to potential interacting peers)
>>To be determined

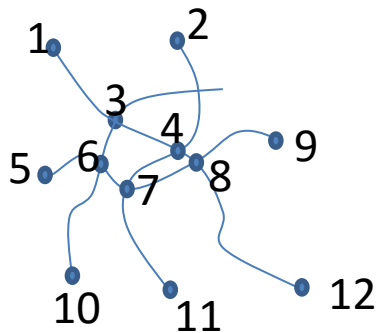>Interaction Notification Response (Push to potential interacting peers)
>>To be determined

NODES
Mapping

Grid N

Node exits labelled clockwise from grid North.

Nodes identified by lat, long. Can be mapped to numbers.
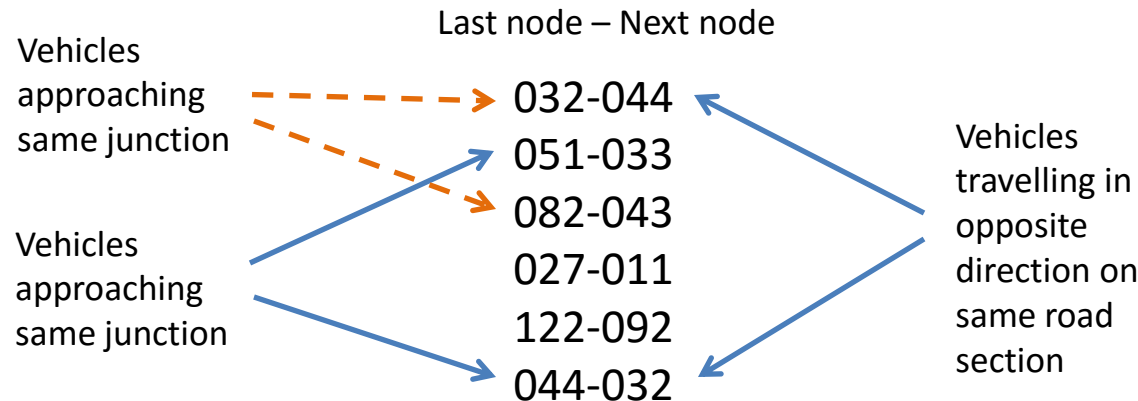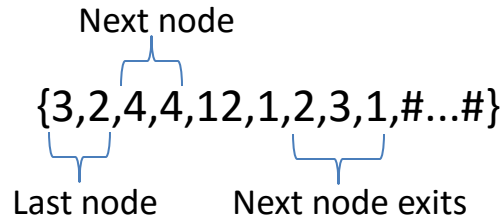
Response Req. Data

{Last node vertex, Next node vertex, Destination node vertex, Probable next nodes exit1, Probable next nodes exit2, Probable next nodes exit3, Hash of unique Peer Dict keys}
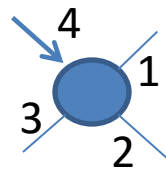
{3,2,4,4,12,1,2,3,1,#...#}

I am travelling from node 3 exit 2 to node 4 exit 4, final destination node 12 exit 1, my probably exit from the next node is exit2 , less likely exit 3 and improbably exit 1, do you know anyone I don't?

Usage of last node, next node & node exit

Next node

{3,2,4,4,12,1,2,3,1,#...#}

Last node   Next node exits

Last node – Next node

Vehicles approaching same junction

032-044
051-033
082-043
027-011
122-092
044-032

Vehicles travelling in opposite direction on same road section

Vehicles approaching same junction

Next node exits

4
3   1
2

231 = probably going straight ahead, may turn right, unlikely left.
321 = probably turn right, may go straight ahead, unlikely left.
123 = probably turn left, may go straight ahead, unlikely right.
120 = probably turn left, may go straight ahead.
…