



Interrelationship of Water and Electricity Services in Comprehensive Security

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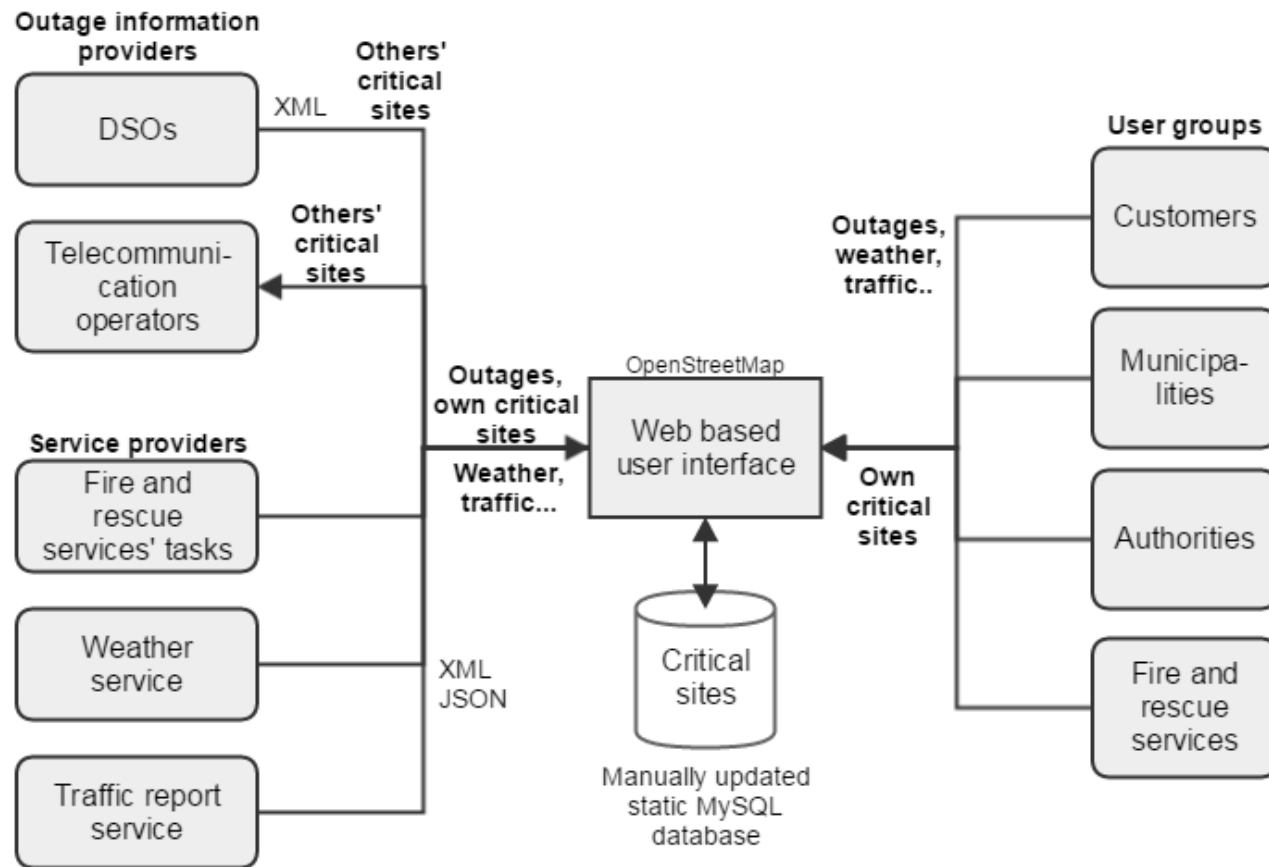
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Content

- Background
 - Electricity distribution
 - Information systems for asset management and network operation
 - Reliability
 - Major disturbances (blackouts) as research topic
 - Reasons and consequences of major disturbances
 - Lot of practical cases available
 - Development of situation awareness system
 - Interrelationship of electricity and telecommunication system



Situation awareness system



User interface example

Situation awareness system demonstration - Situation Awareness Mode

User: verkkoyhtiö - ELECTRICITY NETWORK COMPANY

Dynamic data

Current Outages

All Outages

Warnings

Hide Outages

Others

Upcoming Outages

Rescue Services

Weather

Traffic Reports

[Load Data](#)

Current Warnings (5) | Becoming Warnings (1)

5 warnings!

Warning 1:

Virrat Water Company Oy (pumping station)
 Transformer: 34321
 Outage started: 26.07.2013 12:05
 Outage ends: 26.07.2013 15:58 (estimated)
 Interruption time: 03:53
 Critical time: 02:00
 Description: Equipment failure.

Warning 2:

Televärkkyöhtiö (Tukiasema 12)
 Transformer: 77889
 Outage started: 26.07.2013 12:05
 Outage ends: 26.07.2013 15:58 (estimated)
 Interruption time: 03:53
 Critical time: 02:30
 Description: Equipment failure.

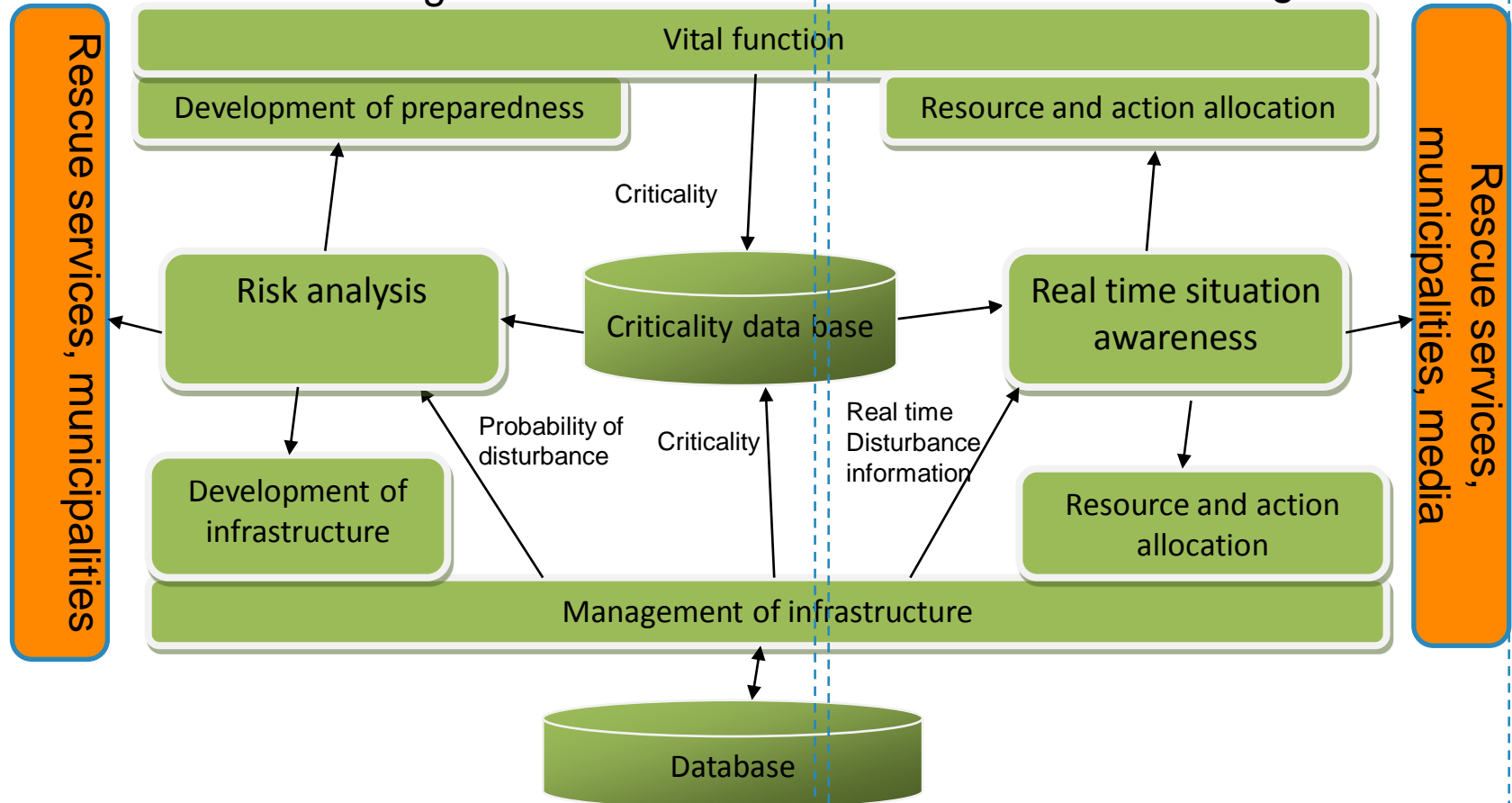
Area	Transformer stations in outage	Customers in outage
North	31	239
East	2	10
South	131	1007
West	49	390

General information sharing model

Continuity management

Risk management

Disturbance management



Interrelationship of Water and Electricity Services

- Water service needs electrical power
 - Pumping of water and waste water
- In the case of blackout something else is required
 - Water tower
 - Back up power for pumping (fixed or mobile)
 - Alternative distribution of (drinking water)
- Information is important
 - Interrelationship
 - Critical pumping stations
 - Probability of blackouts
 - In the case of blackout
 - Forecast on the duration

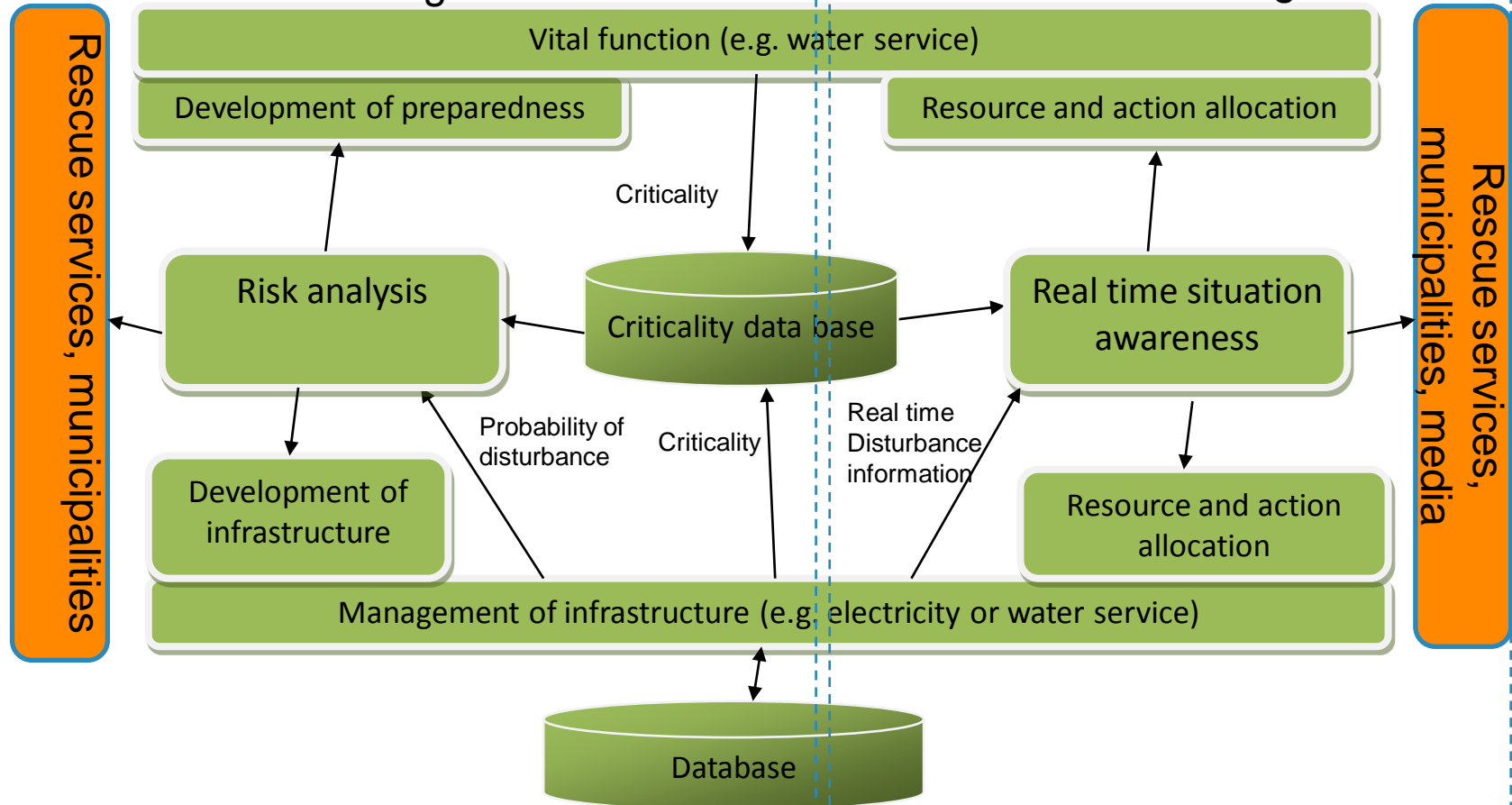


General information sharing model

Continuity management

Risk management

Disturbance management



Practical experience

- Experience on long lasting blackouts in rural areas (caused by storm or snow burden)
 - Some cases with real water service problems
 - In rural areas the problems are quite easy to solve
 - Communication is important and also dependent on electricity
- The big risk is in urban areas
 - No experience on blackouts (in Finland)
 - Backup power is limited
 - There is lot of problems at the same time
 - Communication, traffic, heating, lighting, heating,... **and water service**
 - Can be seen as comprehensive security risk
 - Preparedness is needed and it requires cooperation

