What is LASAGNE?

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COSY
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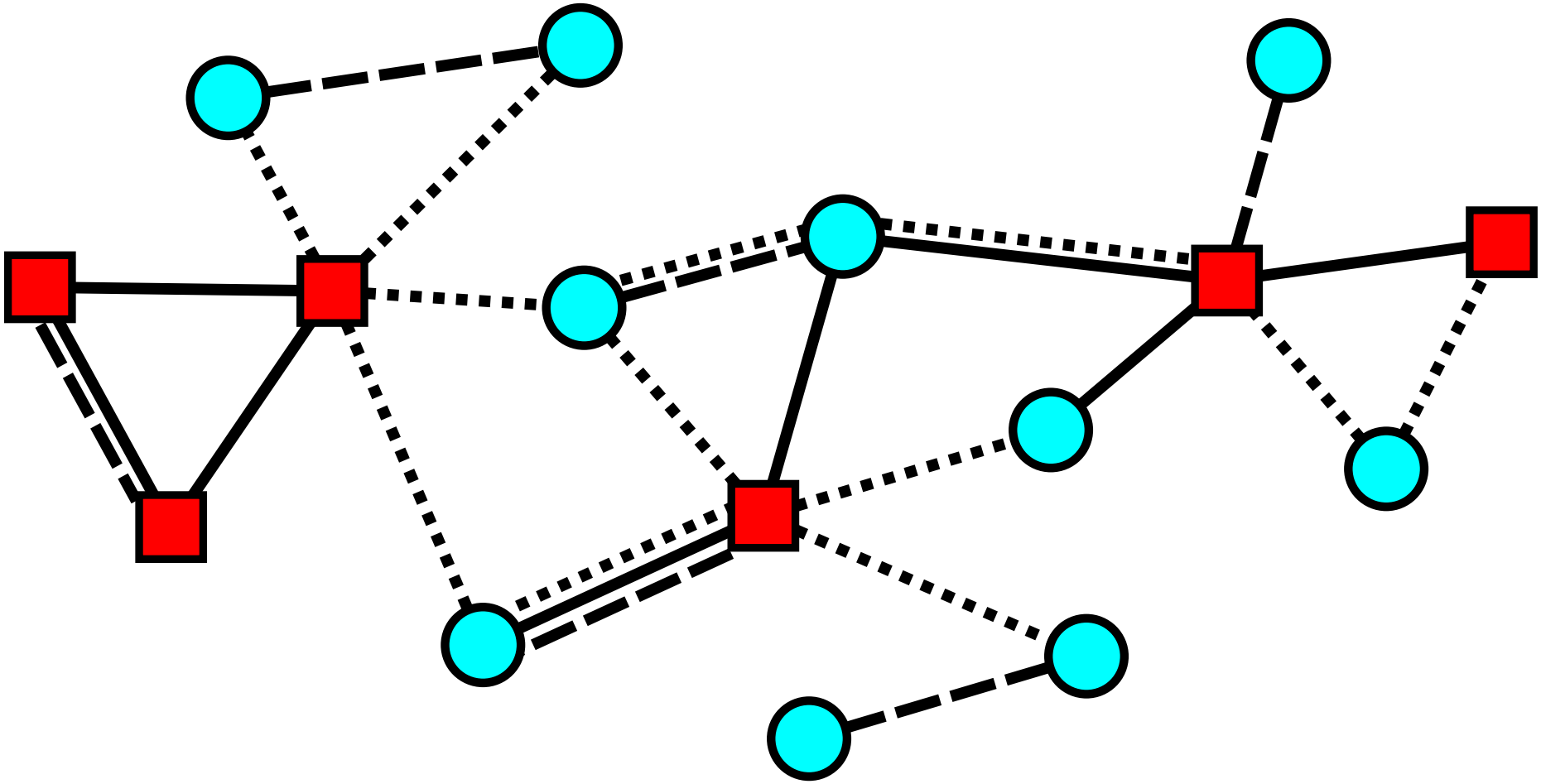
multi-LAyer SpAtiotemporal Generalized NEtwork M



M

$$M_{ij}$$

$$M_{ij}(t)$$

$$M_{ij}^{\alpha}(t)$$

$$M^{\alpha}_{i(t)j(t)}(t)$$

$$M^{\alpha\beta}_{i(t)j(t)}(t)$$

$$M^{\alpha\beta}_{i(x,t)j(x,t)}(t)$$

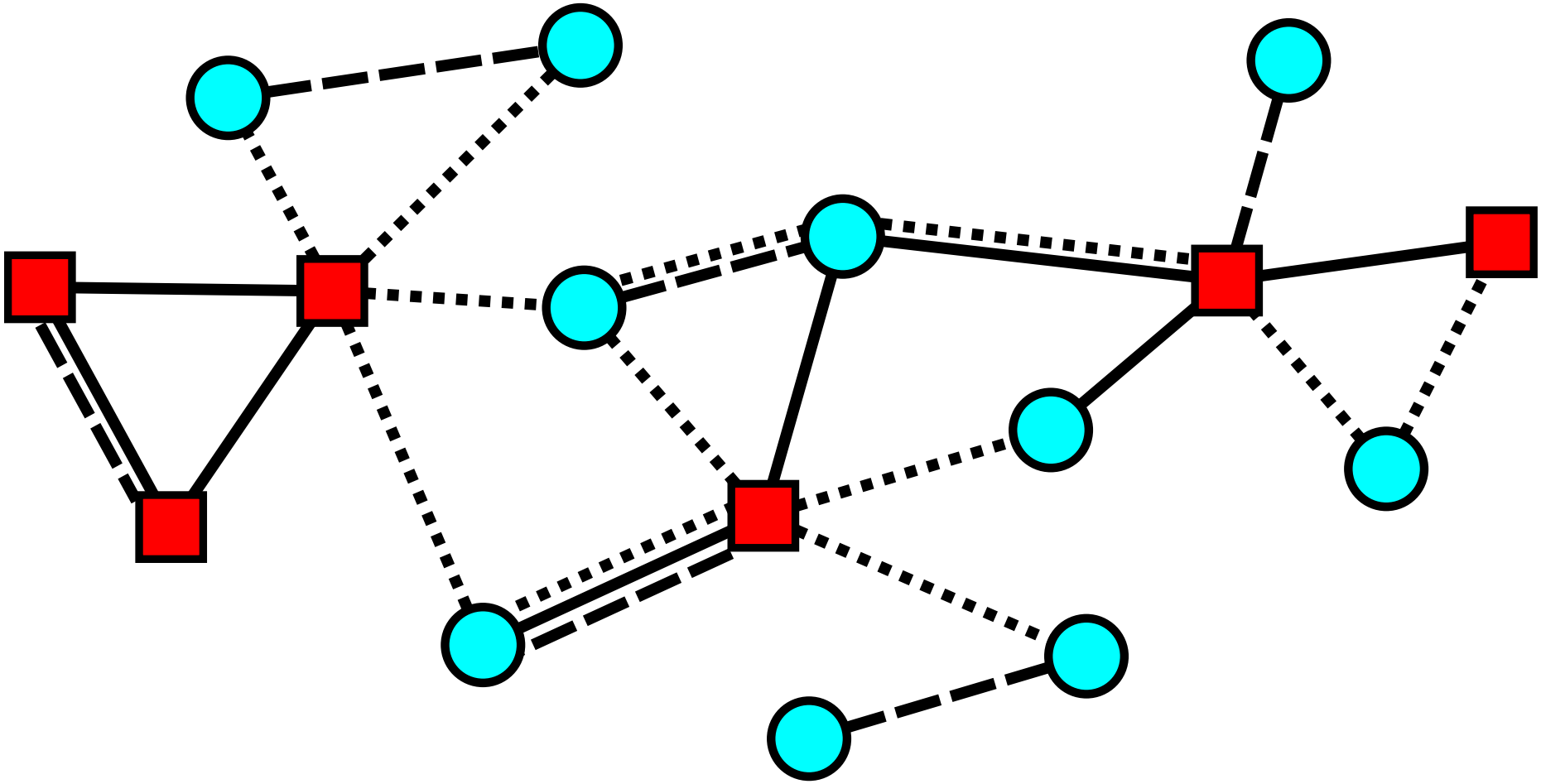
The structure: WP1-WP3

New generation datasets $\rightarrow M^{\alpha\beta}_{i(t)j(t)}(t)$

Develop algebra of M

Dynamics of M

Node colors = states of nodes σ_i



$$\sigma_i(t, x)$$

What is a Complex System?

Co-evolution of the multiplex with the states of the system

$$\frac{d}{dt}\sigma_i(t) = F\left(\sigma_i(t), M^{\alpha\beta}_{i(t)j(t)}(t)\right)$$

and

$$\frac{d}{dt}M^{\alpha\beta}_{i(t)j(t)}(t) = G\left(\sigma_i(t), M^{\alpha\beta}_{i(t)j(t)}(t)\right)$$

The structure

New generation datasets $\rightarrow M^{\alpha\beta}_{i(t)j(t)}(t)$

Develop algebra of M

Dynamics of M

Coevolution of M and σ

Validitation on data

The data

- Google+ and geo-localized social multiplex data
- MMOG data from the Pardus game
- Large scale patient treatment-flow data
- Human mobility: Foursquare data, urban mobility data
- Brain multi-level data: BOLD, MEG, DTI

The team

Vito Latora	Queen Mary, University of London	PD + PhD
Albert Diaz-Guilera	University of Barcelona	PD + PhD
Maxi San-Miguel	University of the Baleares	PD + PhD
Cecilia Mascolo	University of Cambridge	PD
Mirco Musolesi	University of Birmingham	PD
Mario Chavez	CNRS Paris	PD
Stefan Thurner	Medical University of Vienna	PD + PhD + Admin

Immediate proposals for joint tasks

- Conference around M25
- Exchange of PD and PhD information
- Identified most interest in MULTIPLEX and PLEXMATH