Getting Real – Self-Organized Resource Allocation on Second Life Avatar Traces

Jean Botev
University of Luxembourg

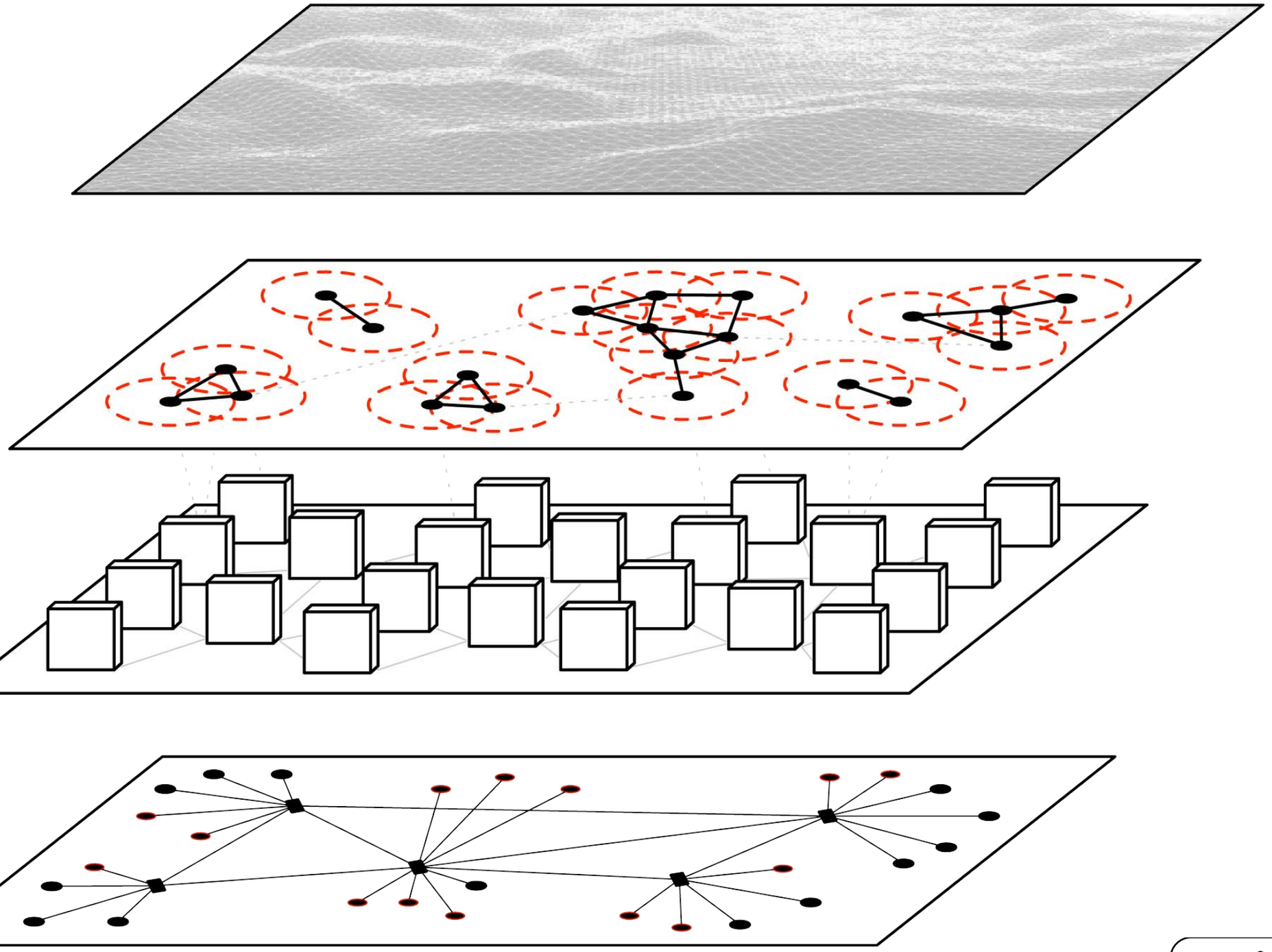
Wei Tsang Ooi
National University of Singapore

Ingo Scholtes
University of Trier

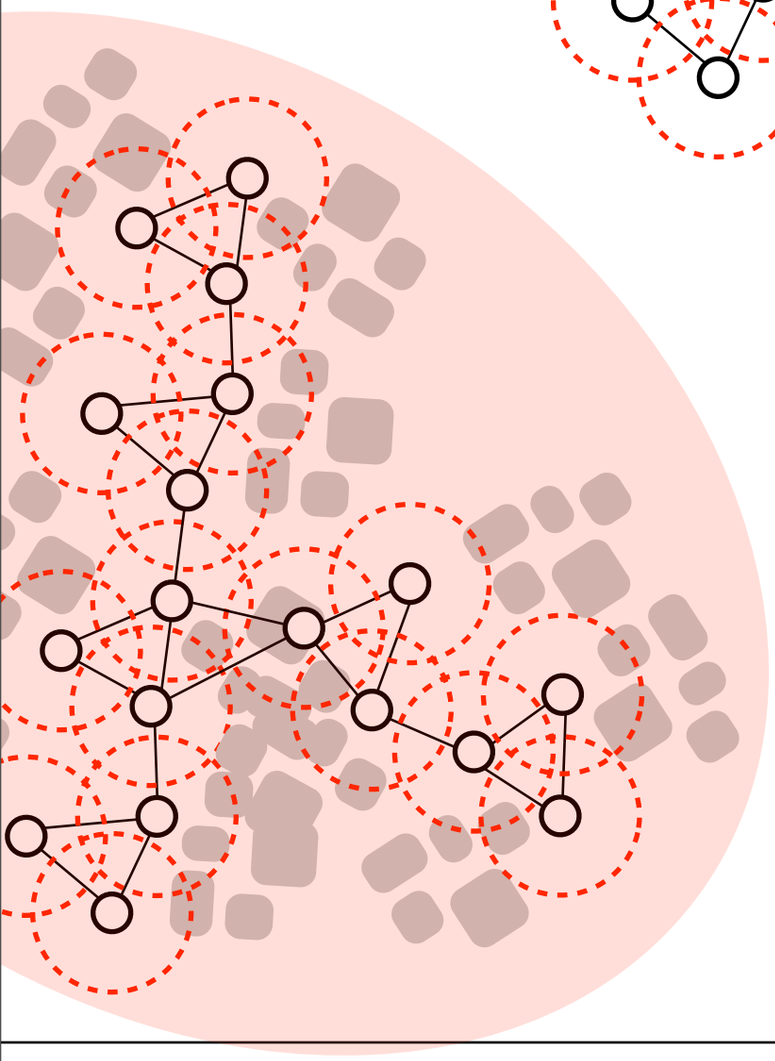
Overview

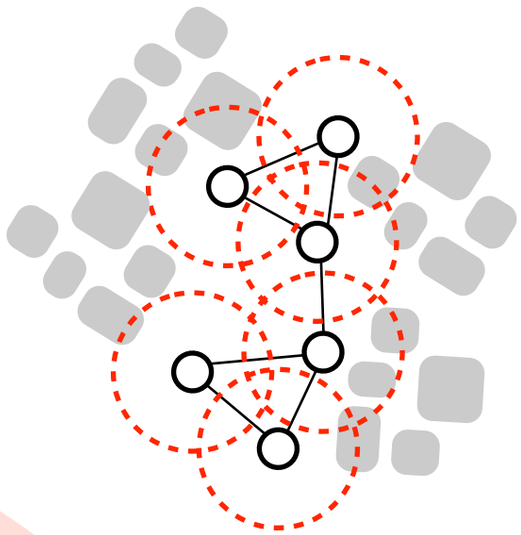
- HyperVerse
- Resource Allocation
  - PhyRA / FloRA
- Comparative Evaluation
  - Second Life Avatar Traces
  - Quantitative Measurements
  - Qualitative Characteristics

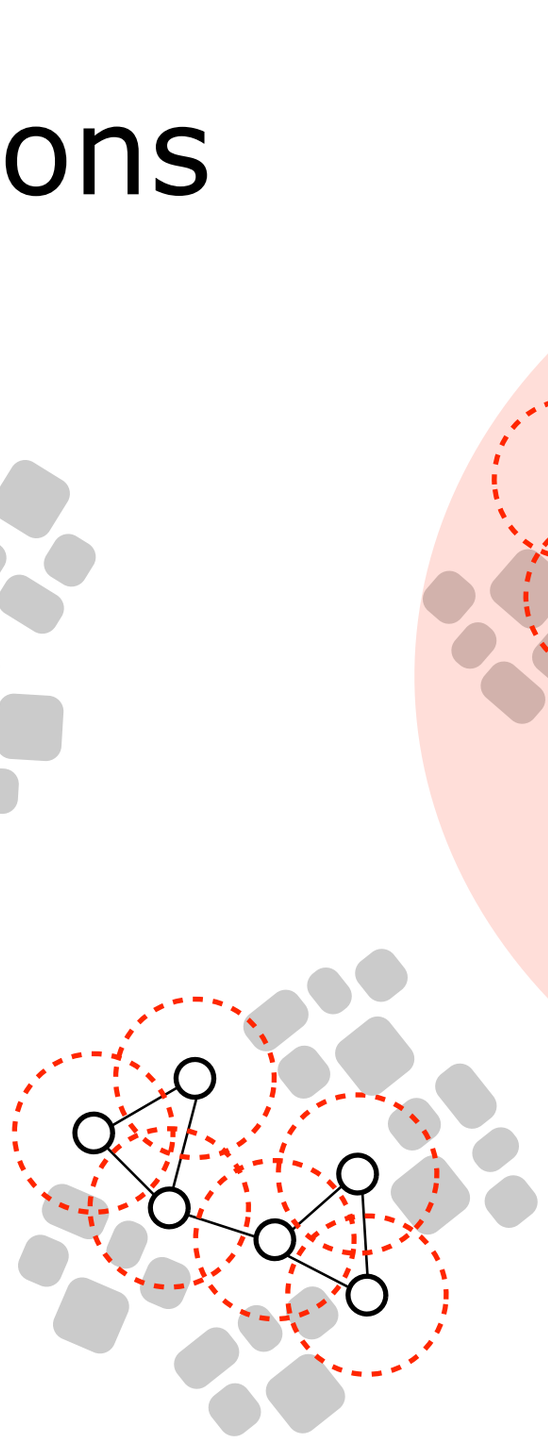
HyperVerse

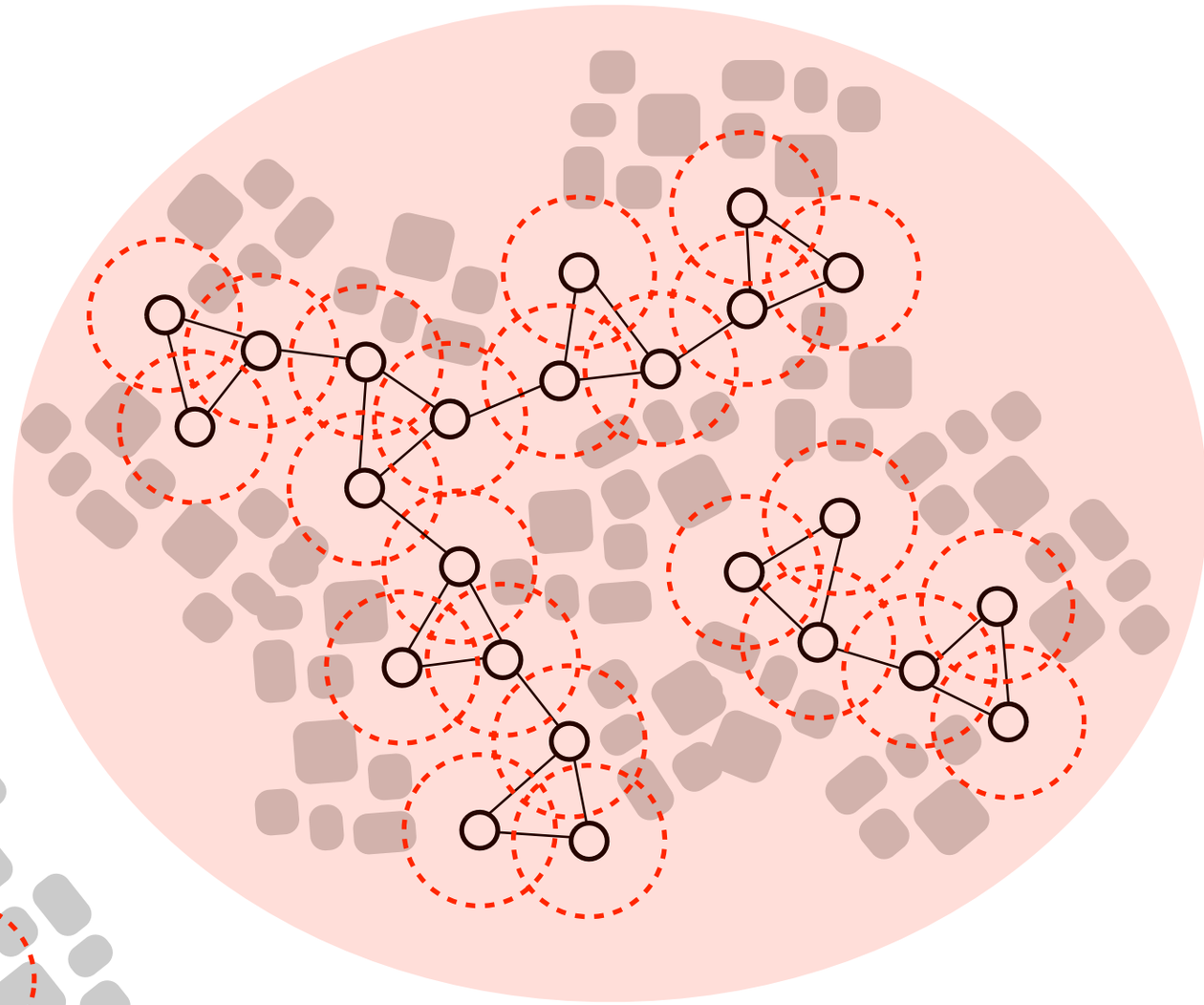


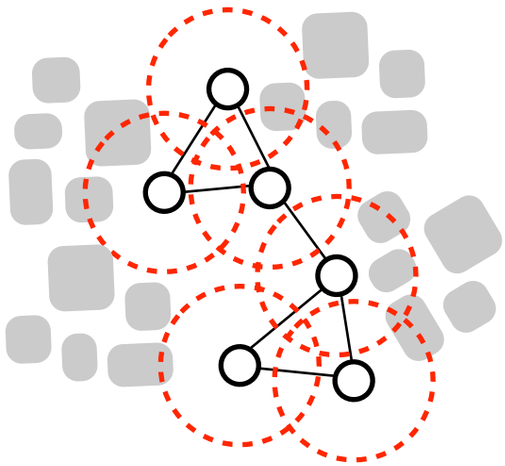
Critical Regions



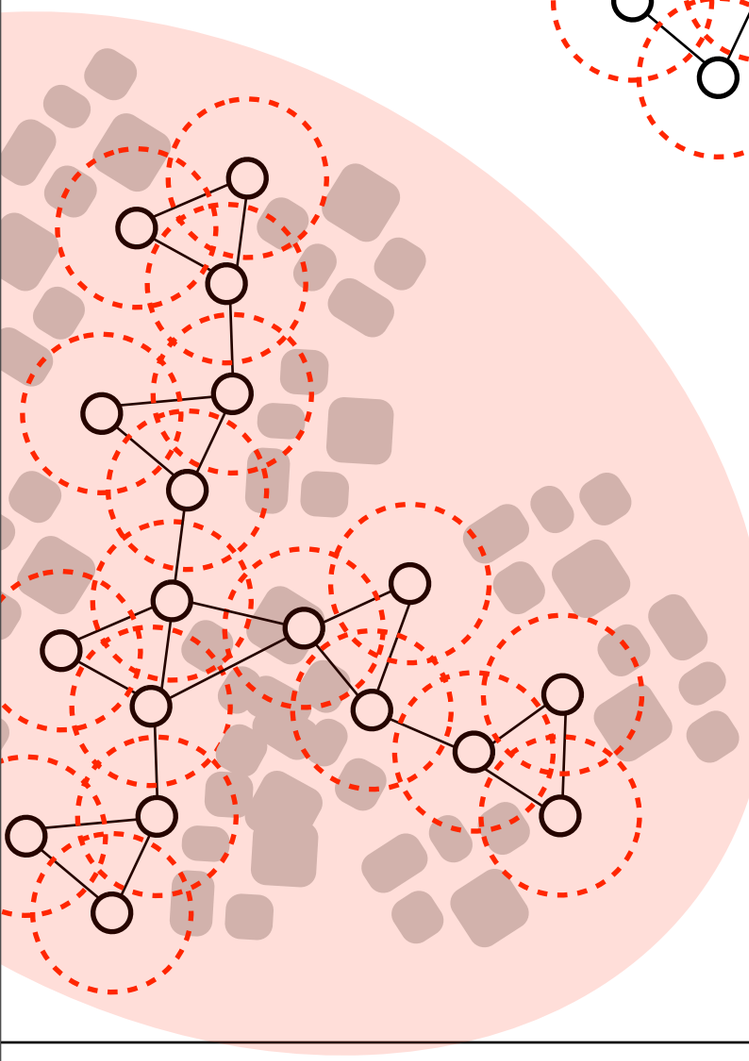


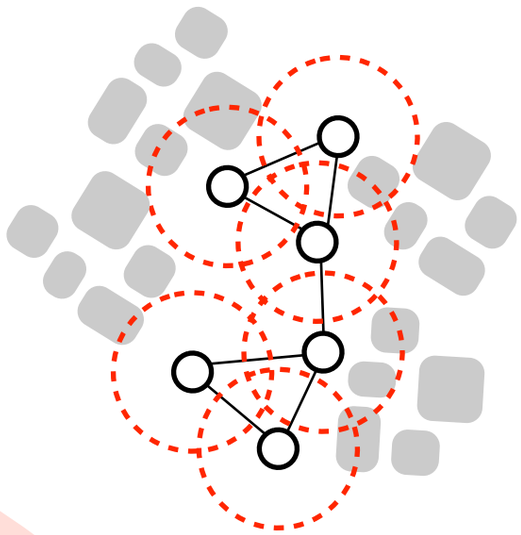


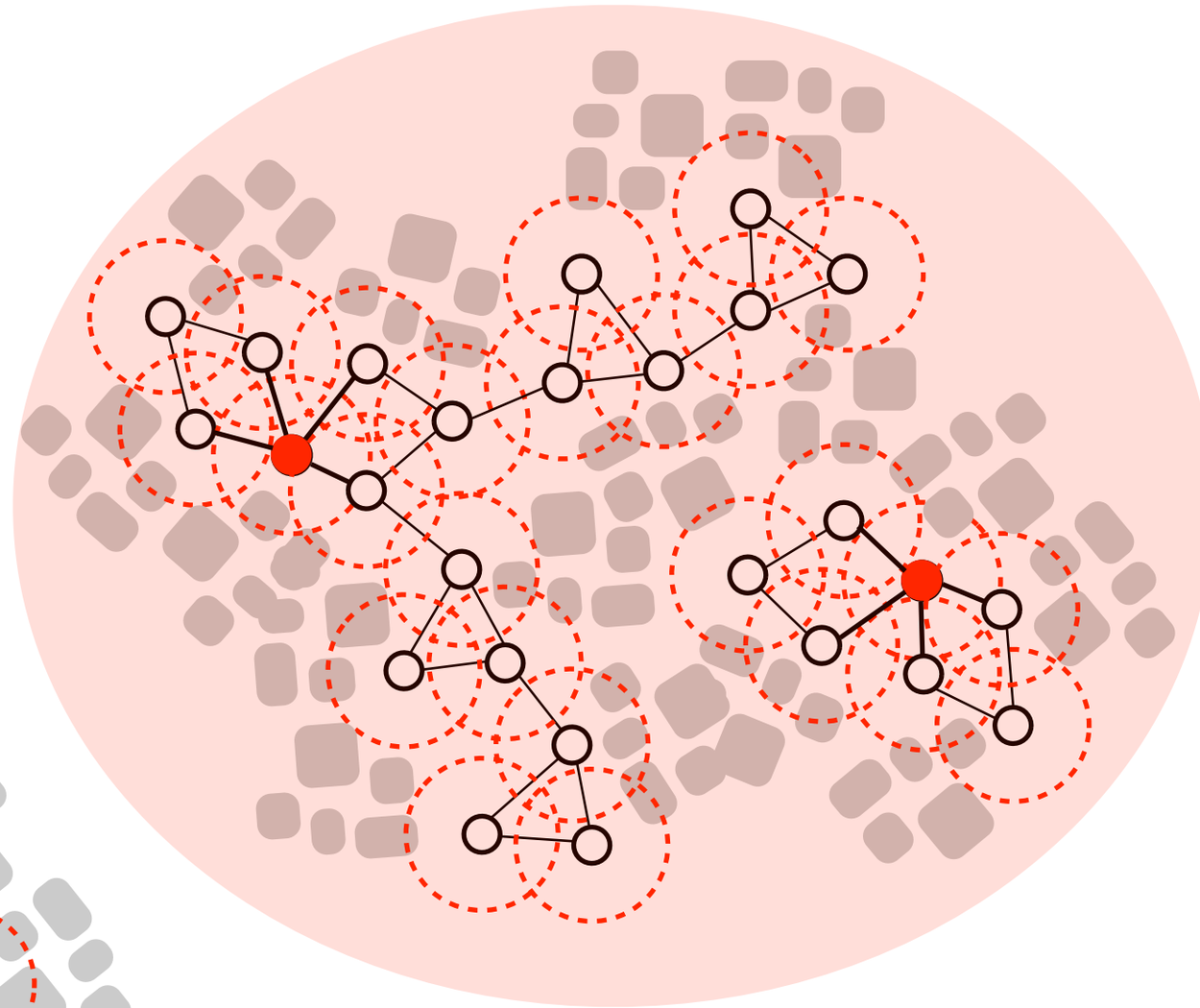


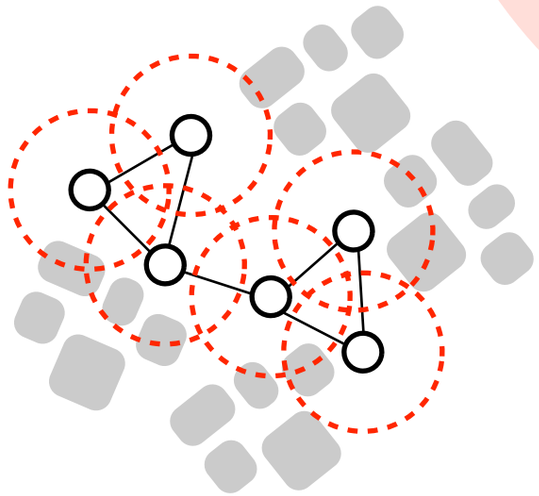


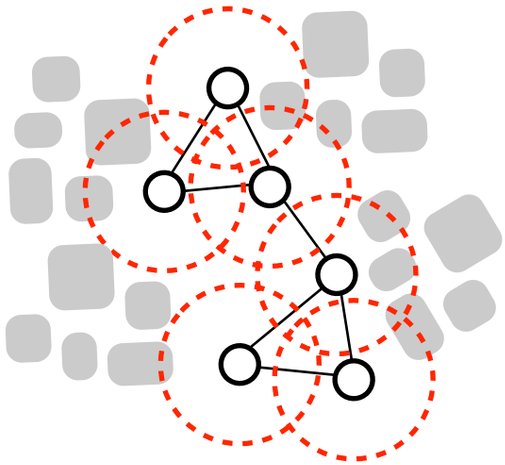
Virtual Peers











Epidemic Hot Spot Detection

Gossip-based aggregation with two values:

$$M_i = \sum_{i=1}^{n} m_i \qquad C_i = \frac{\sum_{j=1}^{n} l_j \cdot m_j}{M_i}$$

PhyRA

< DEMO MOVIE >

http://mocca.uni.lu/resourceallocation/

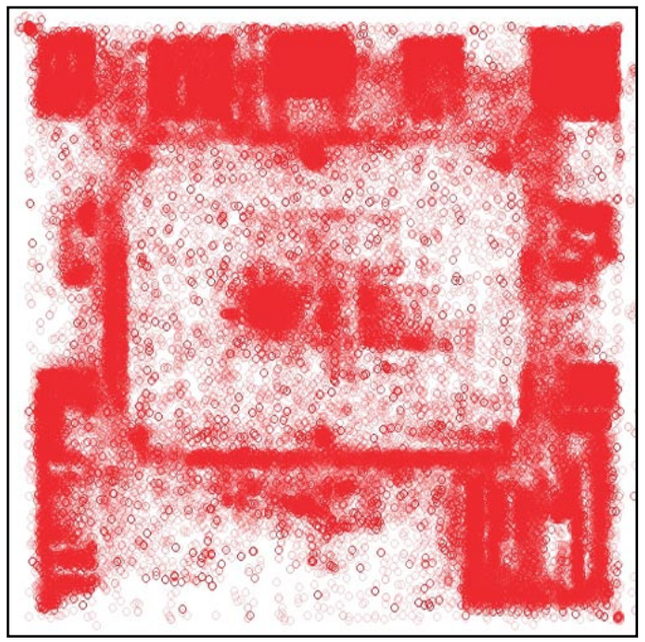
FloRA

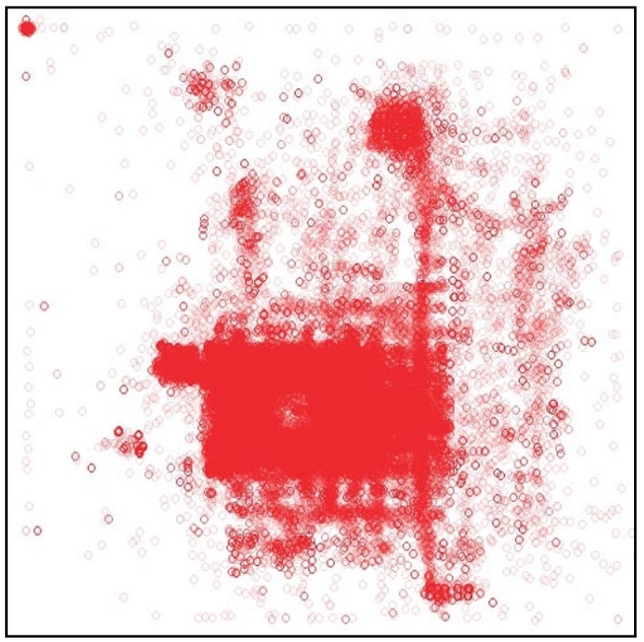
< DEMO MOVIE >

http://mocca.uni.lu/flora/

Second Life Avatar Traces

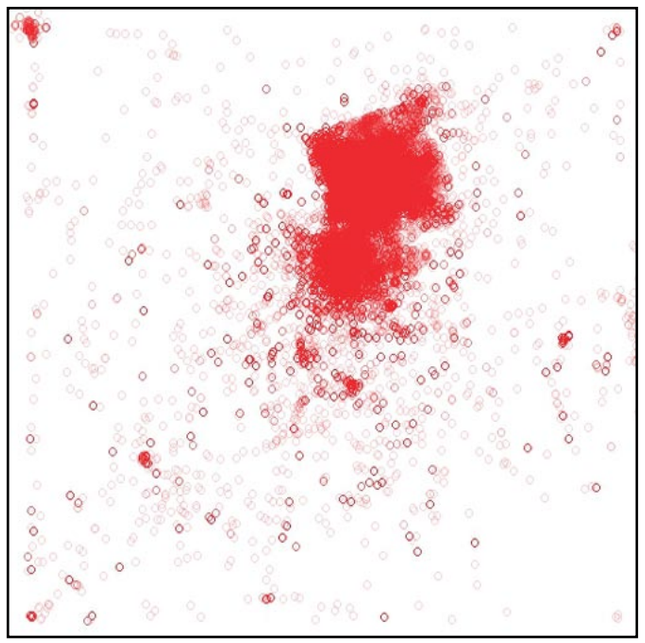
Freebies

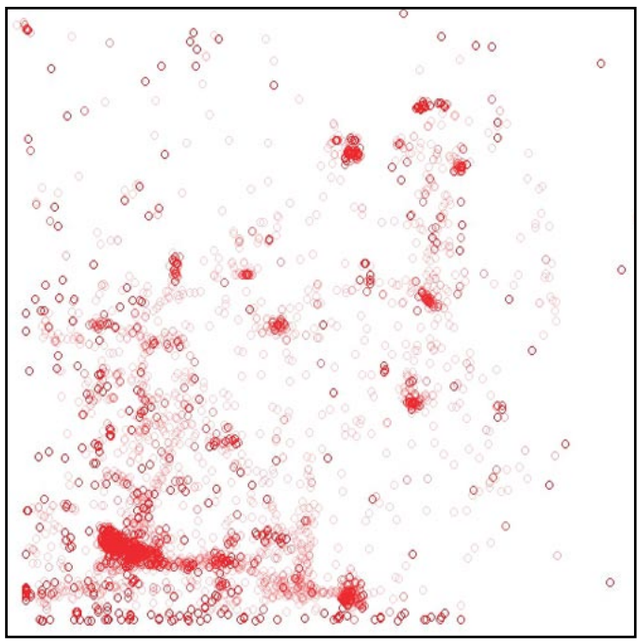




Isis

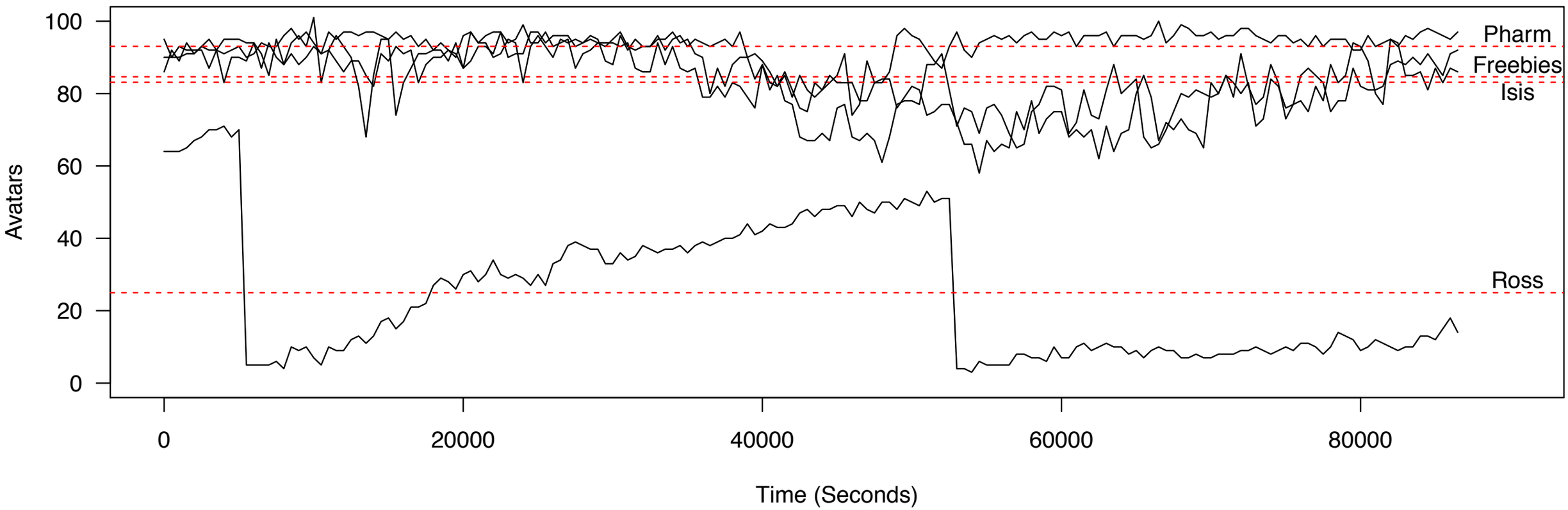
Pharm





Ross

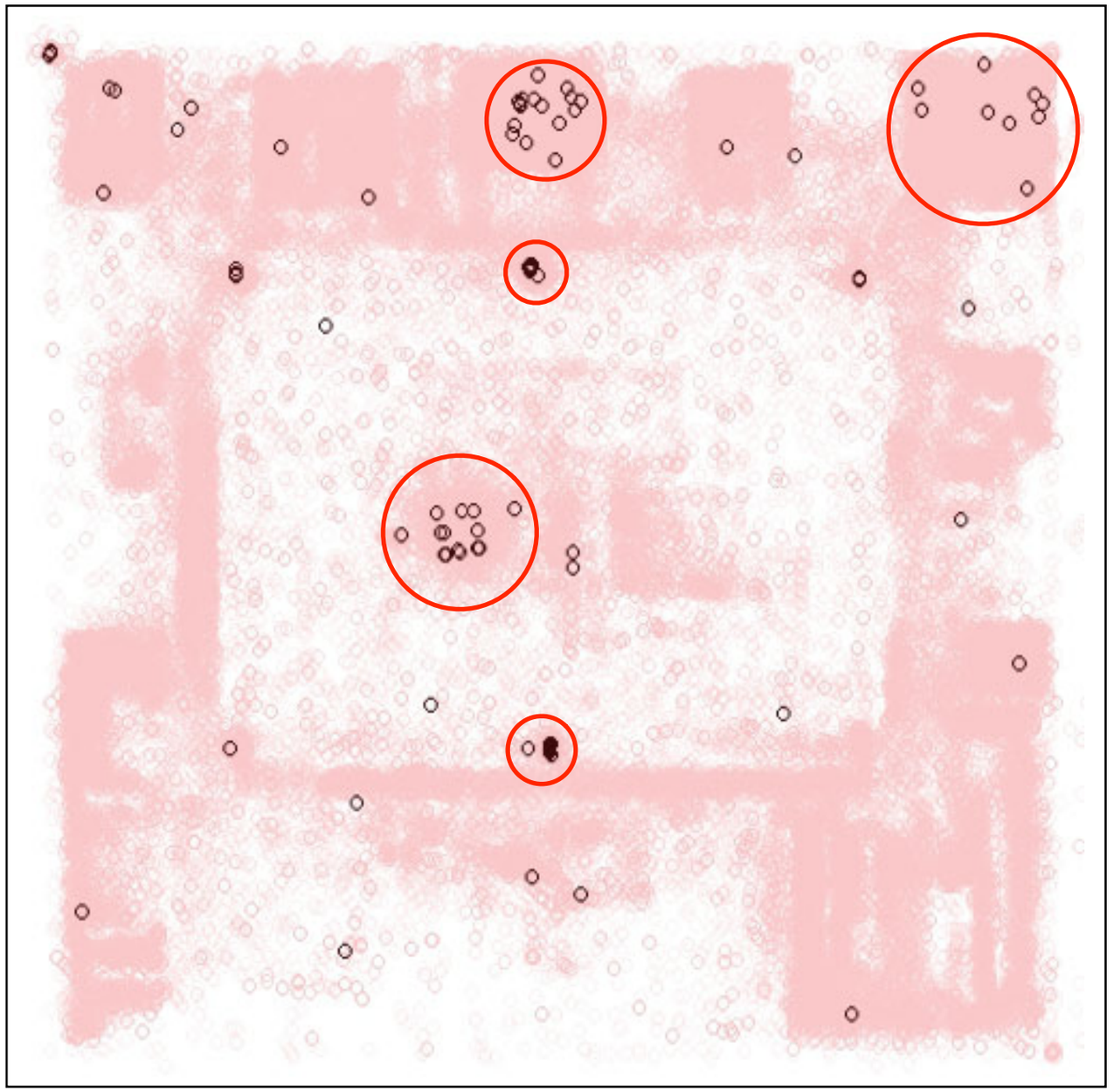
Regional Density



Regional Density

Region	Peers	∅ Peers	∅ Peers (Top 5 HS)
Freebies	3153	84.53852	63.30%
Isis	2735	83.1019	81.02%
Pharm	1537	92.9652	91.04%
Ross	560	25.20552	28.76%

Example Situation



Freebies (09:33:09)

Churn

$$C(t) = \frac{|V_t \triangle V_{t-1}|}{|V_t| + |V_{t-1}|}$$

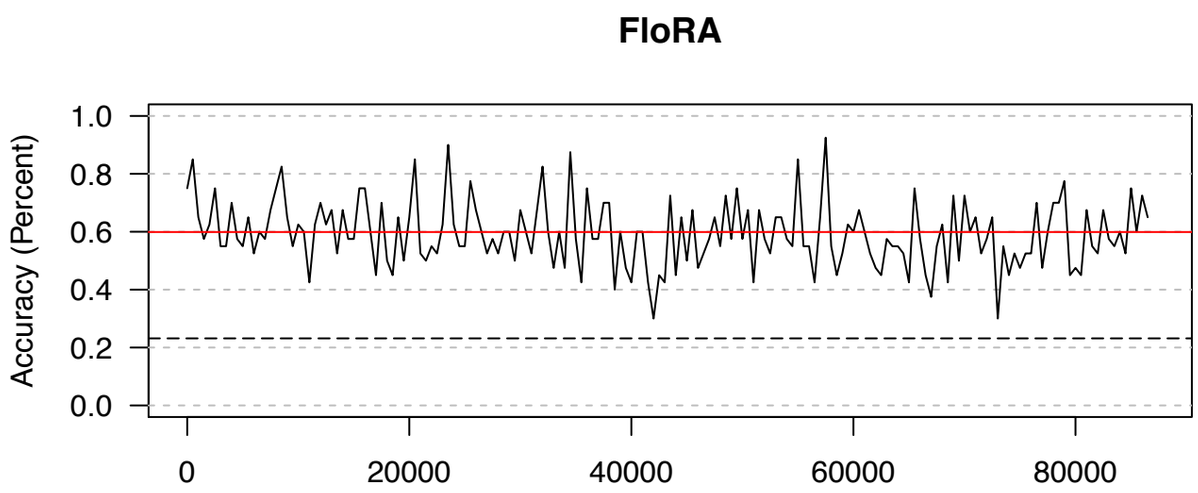
$$C(t, \delta) = \sum_{i=t}^{t+\delta} C(i)$$

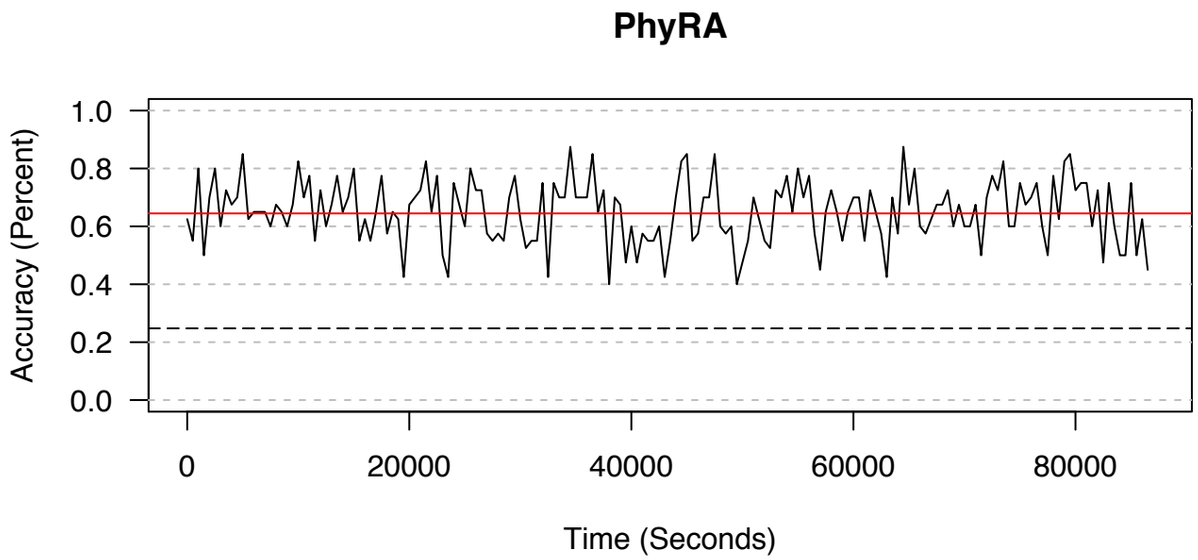
Churn

Region	∅ Churn Rate		
	1min	10min	1h
Freebies	3.70%	22.60%	46.58%
Isis	3.52%	22.41%	45.20%
Pharm	1.64%	10.36%	26.51%
Ross	2.91%	12.47%	28.52%

Accuracy Development

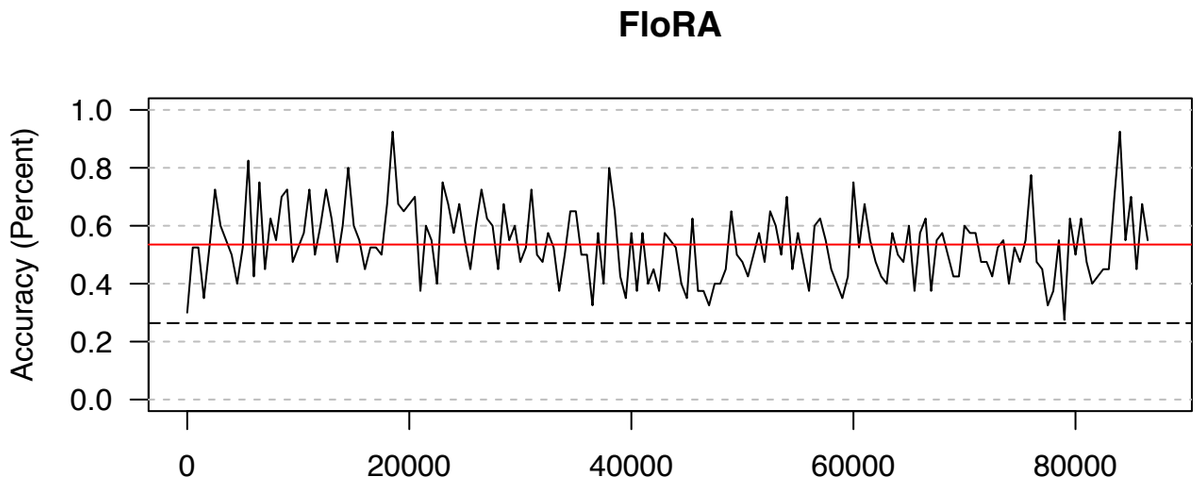
Freebies

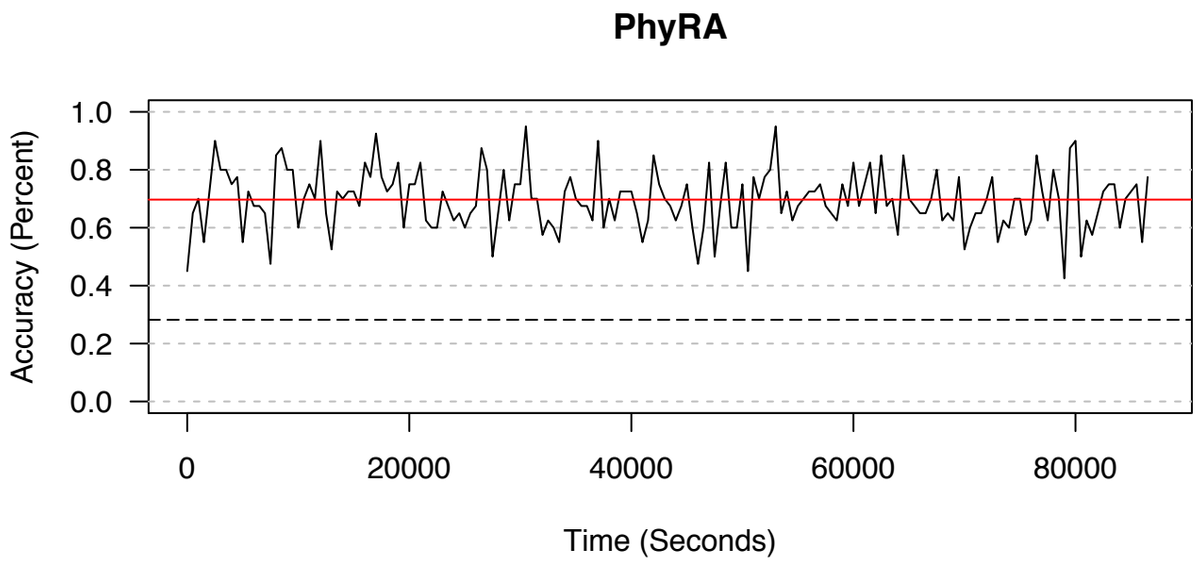




Accuracy Development

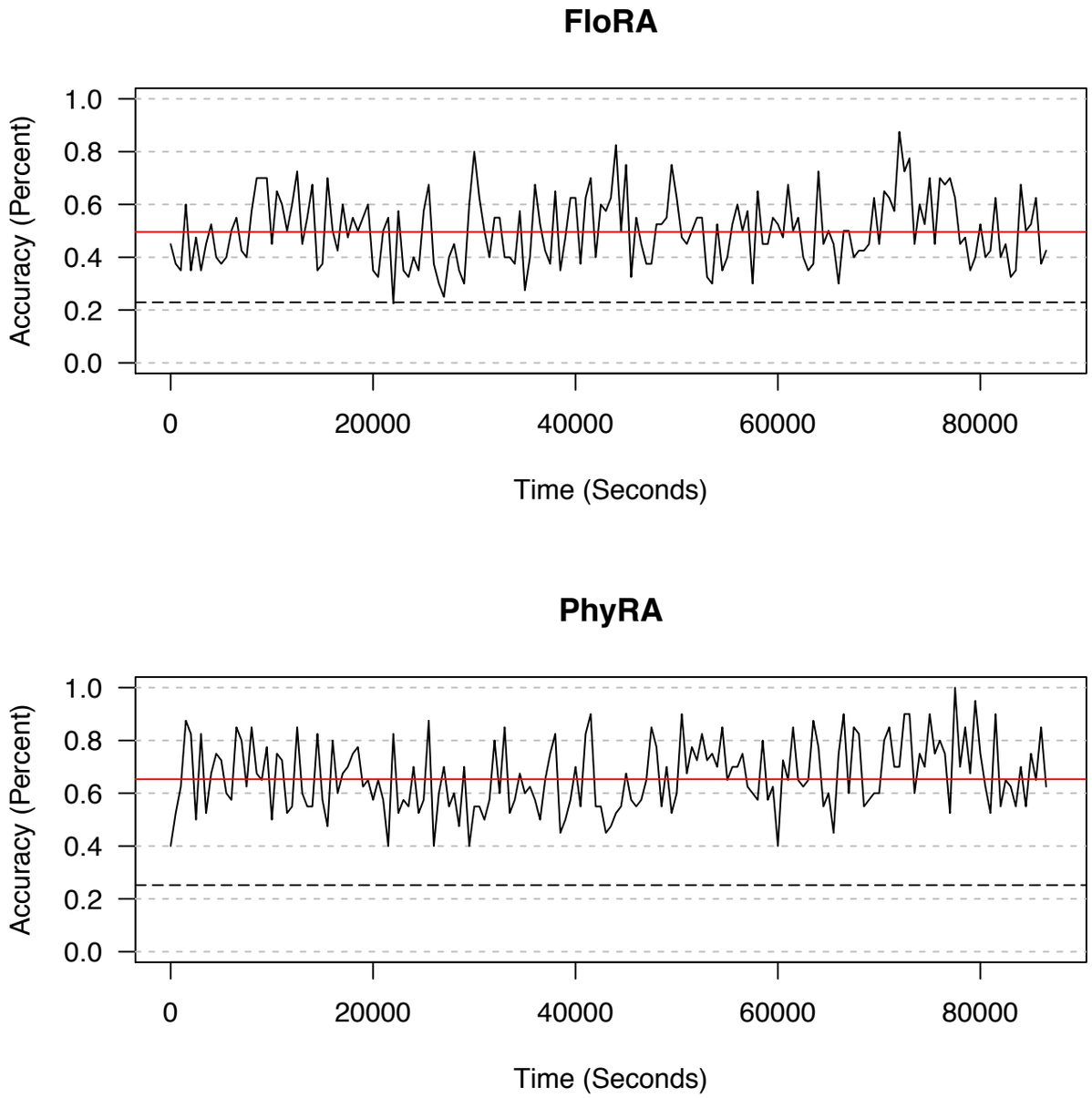
Isis





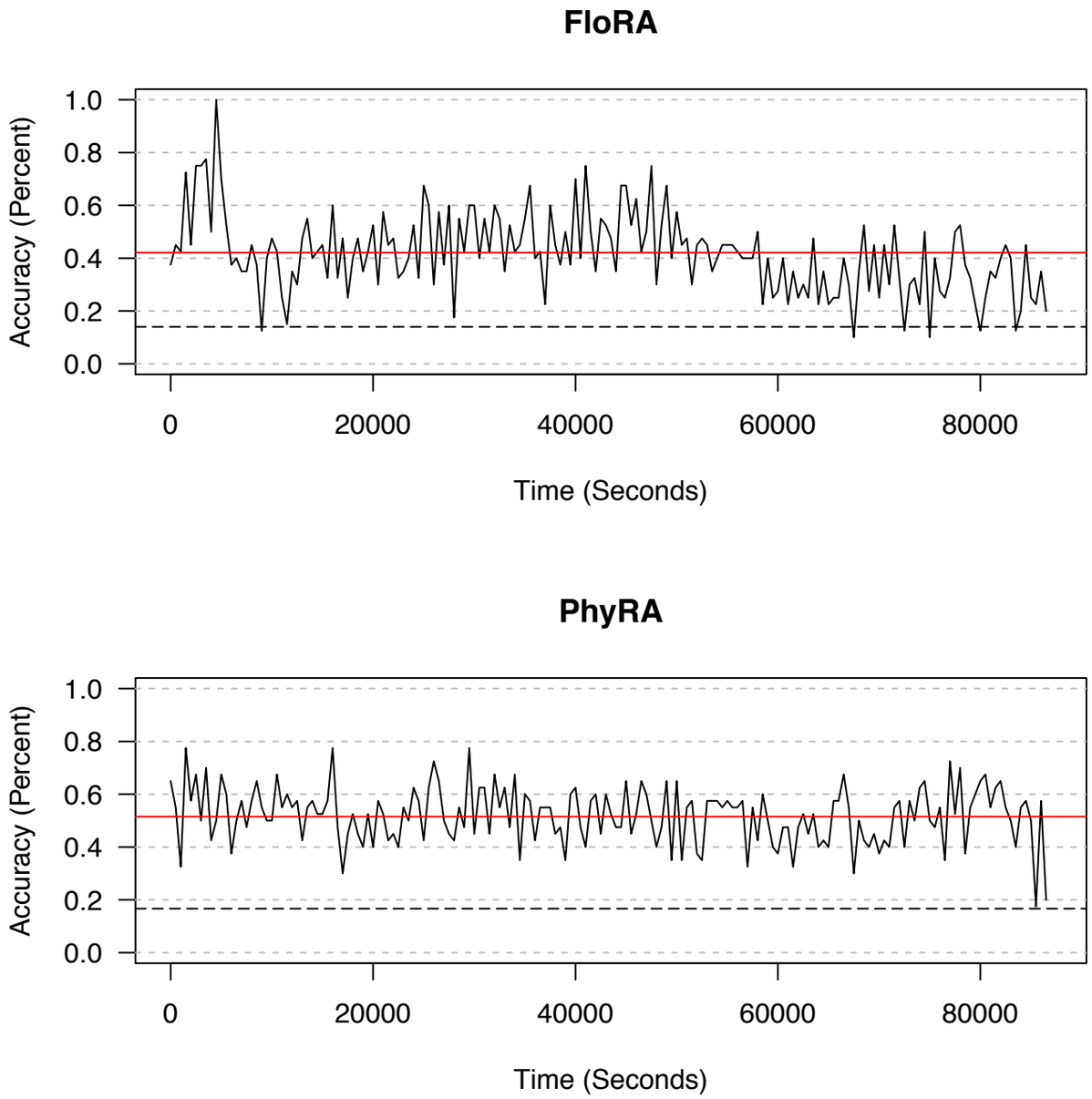
Accuracy Development

Pharm



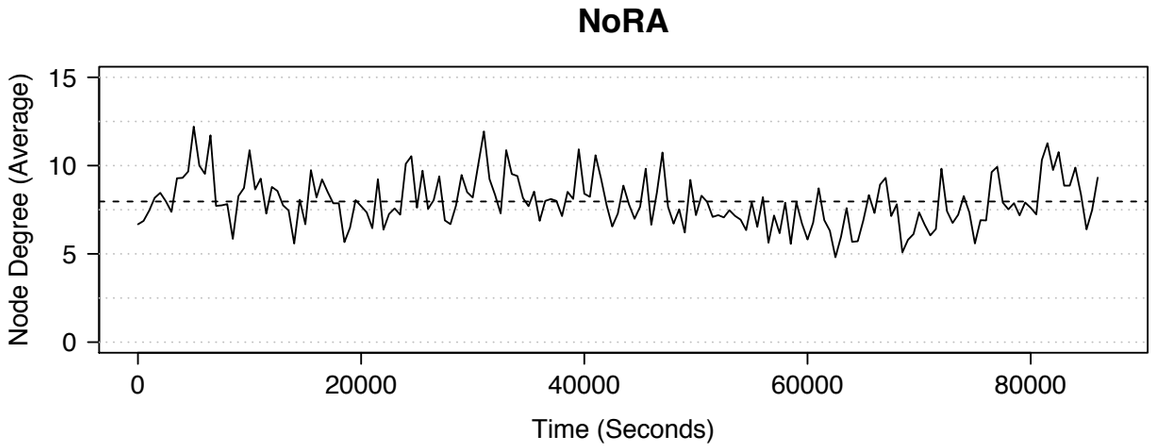
Accuracy Development

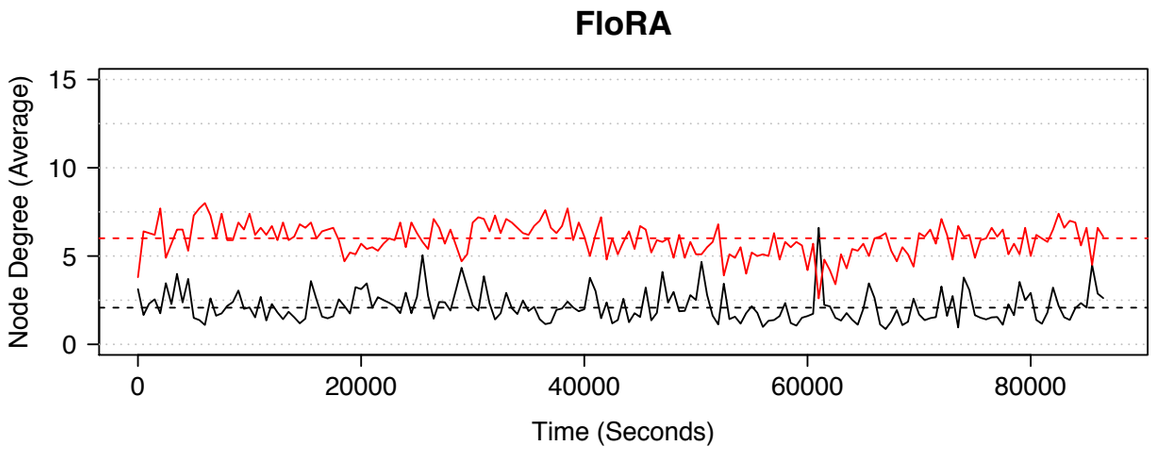
Ross

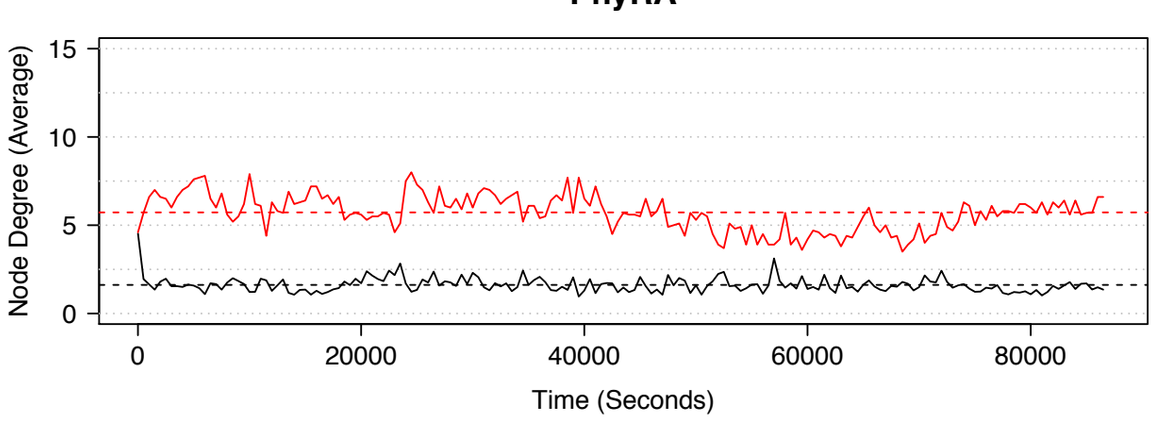


Degree Development

Freebies

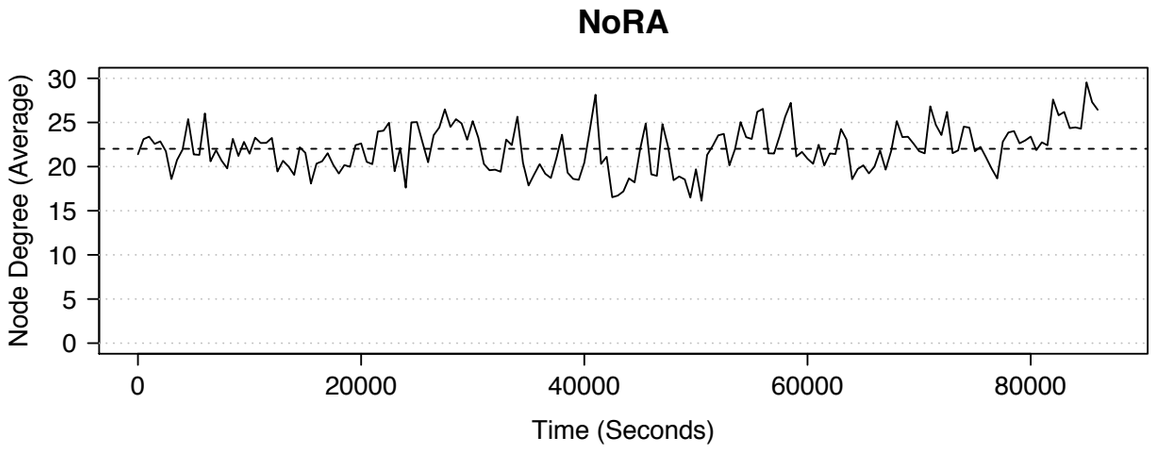


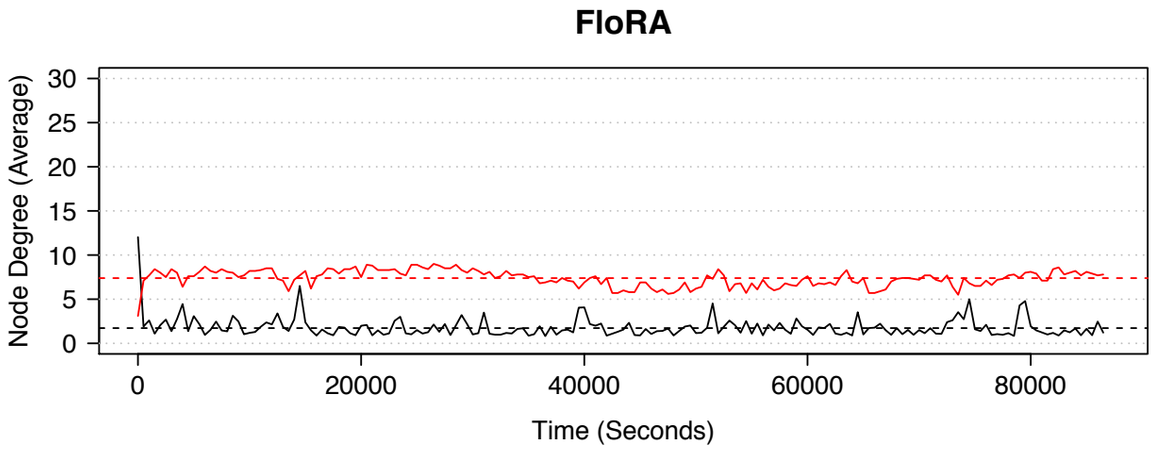


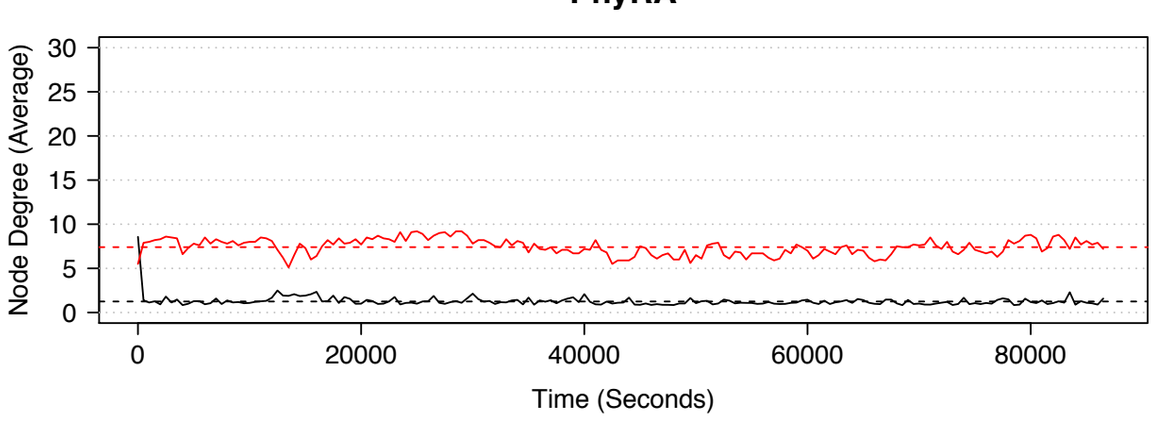


Degree Development

Isis

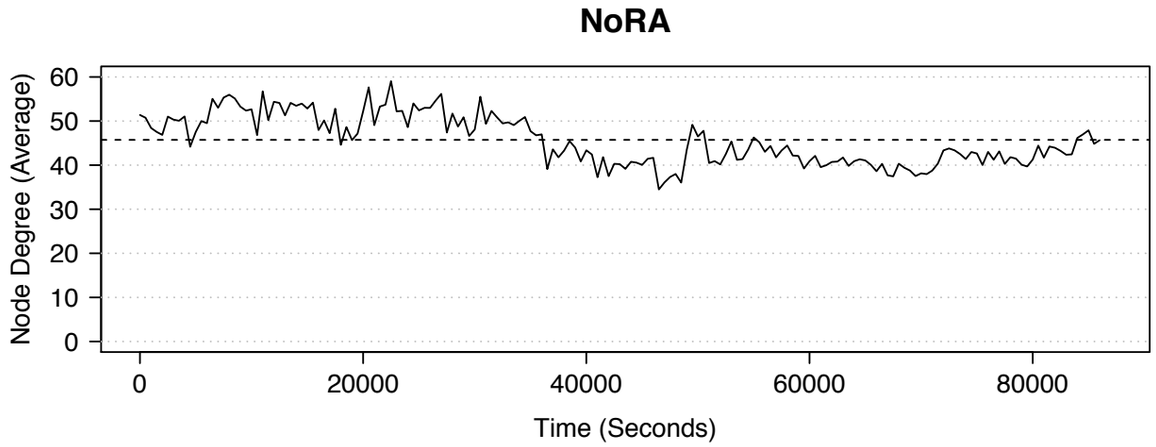


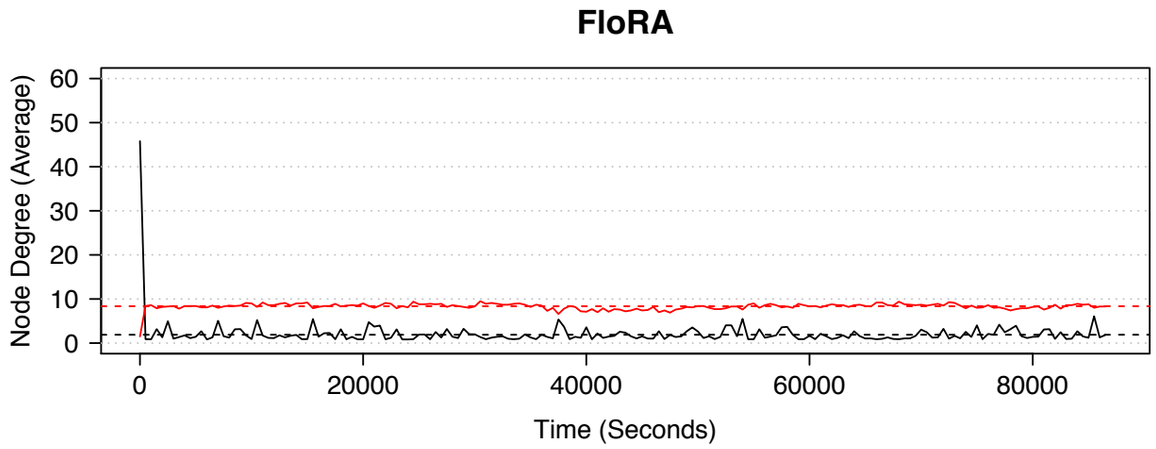


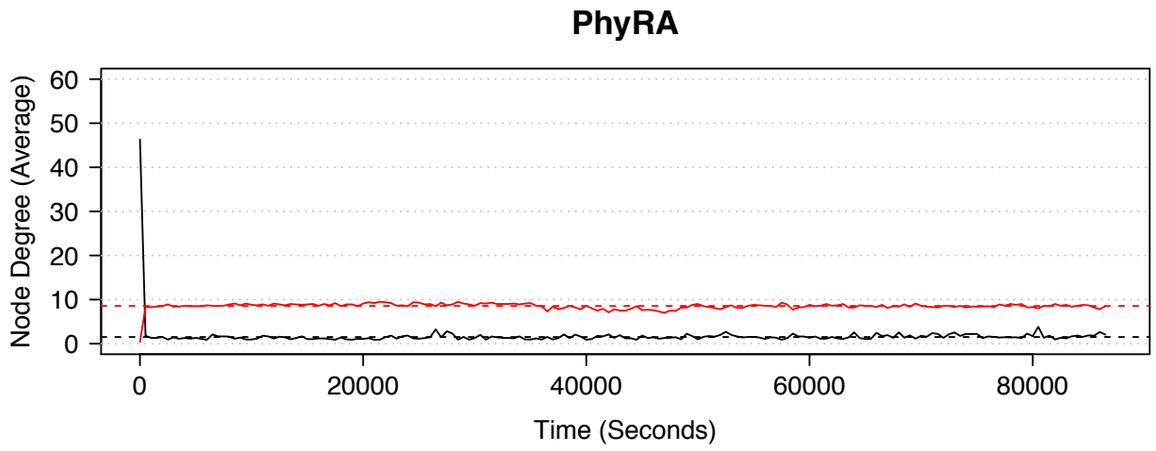


Degree Development

Pharm

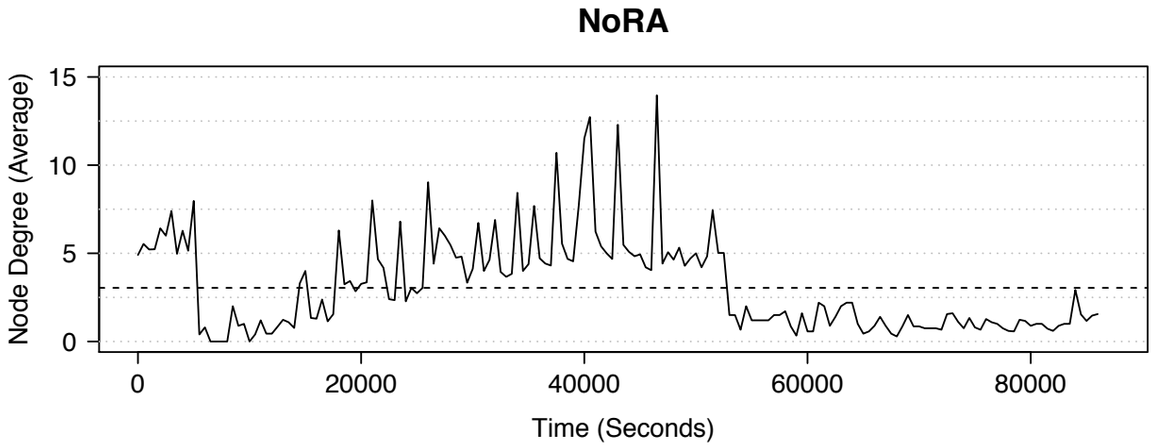


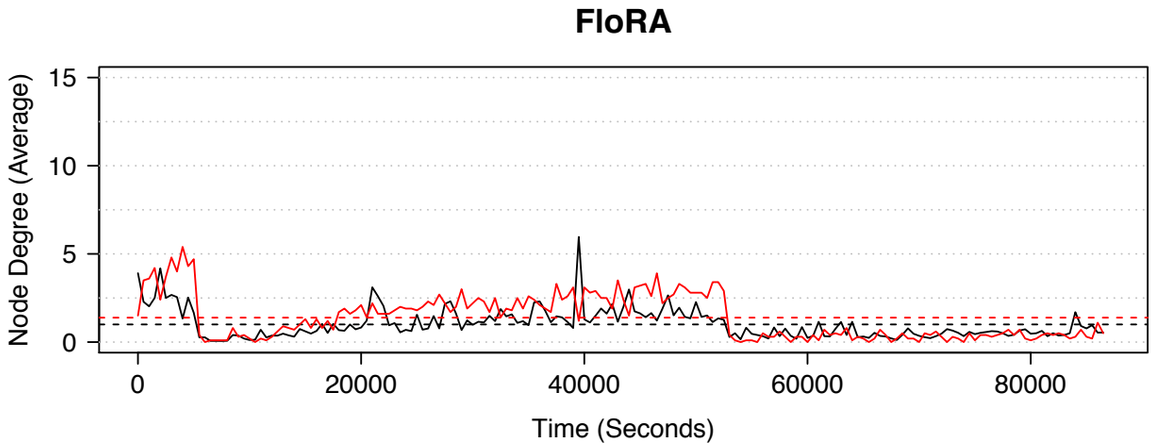


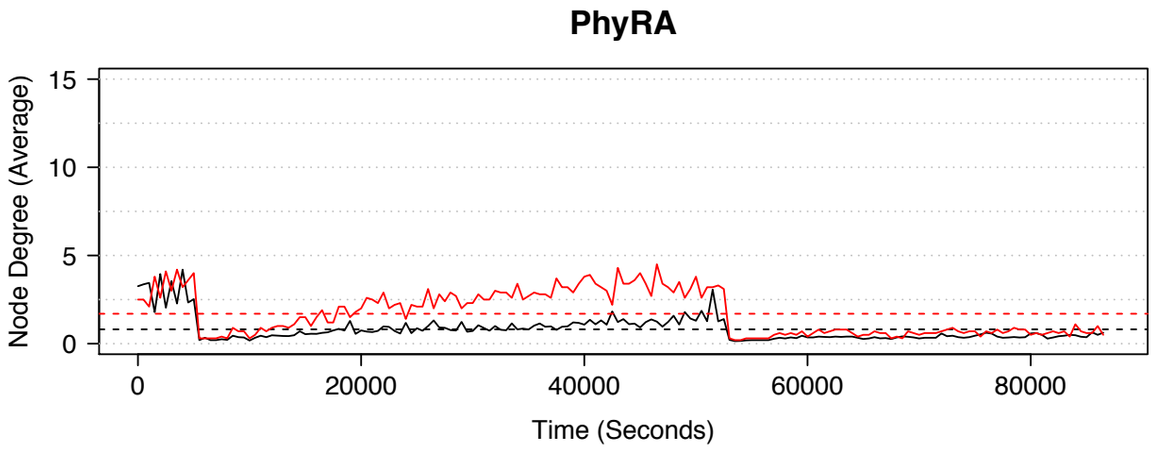


Degree Development

Ross

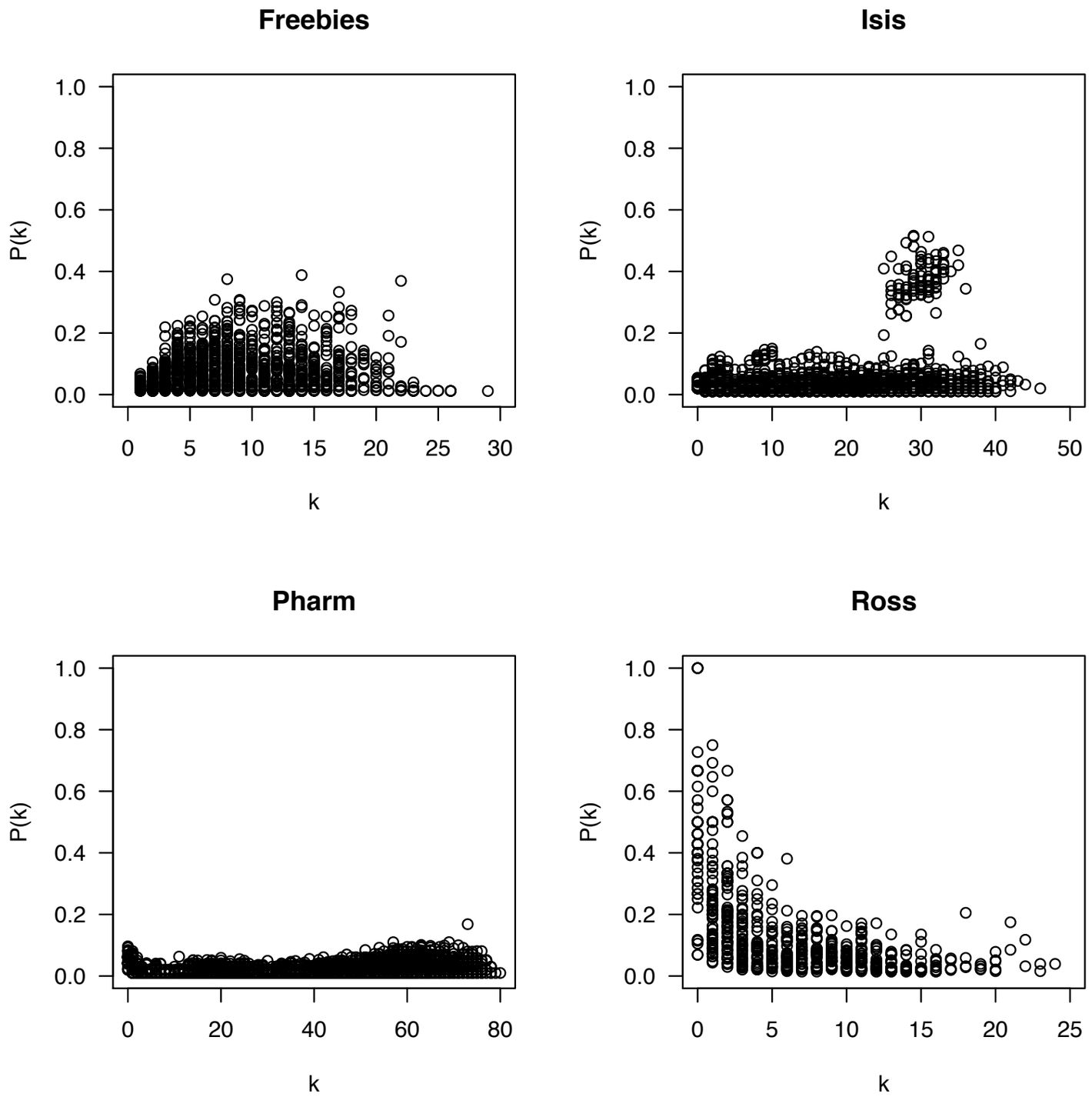






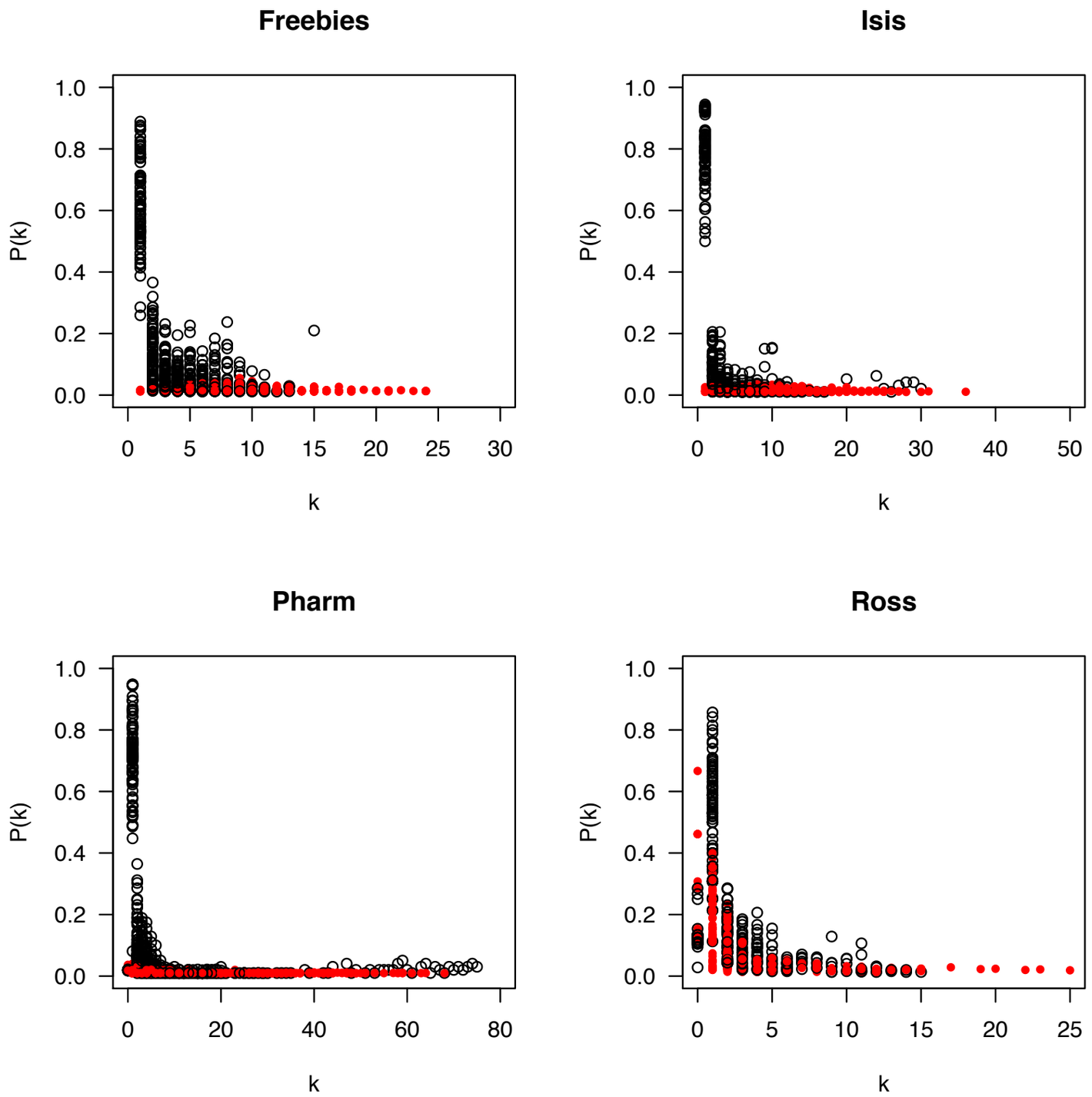
Degree Distribution

NoRA



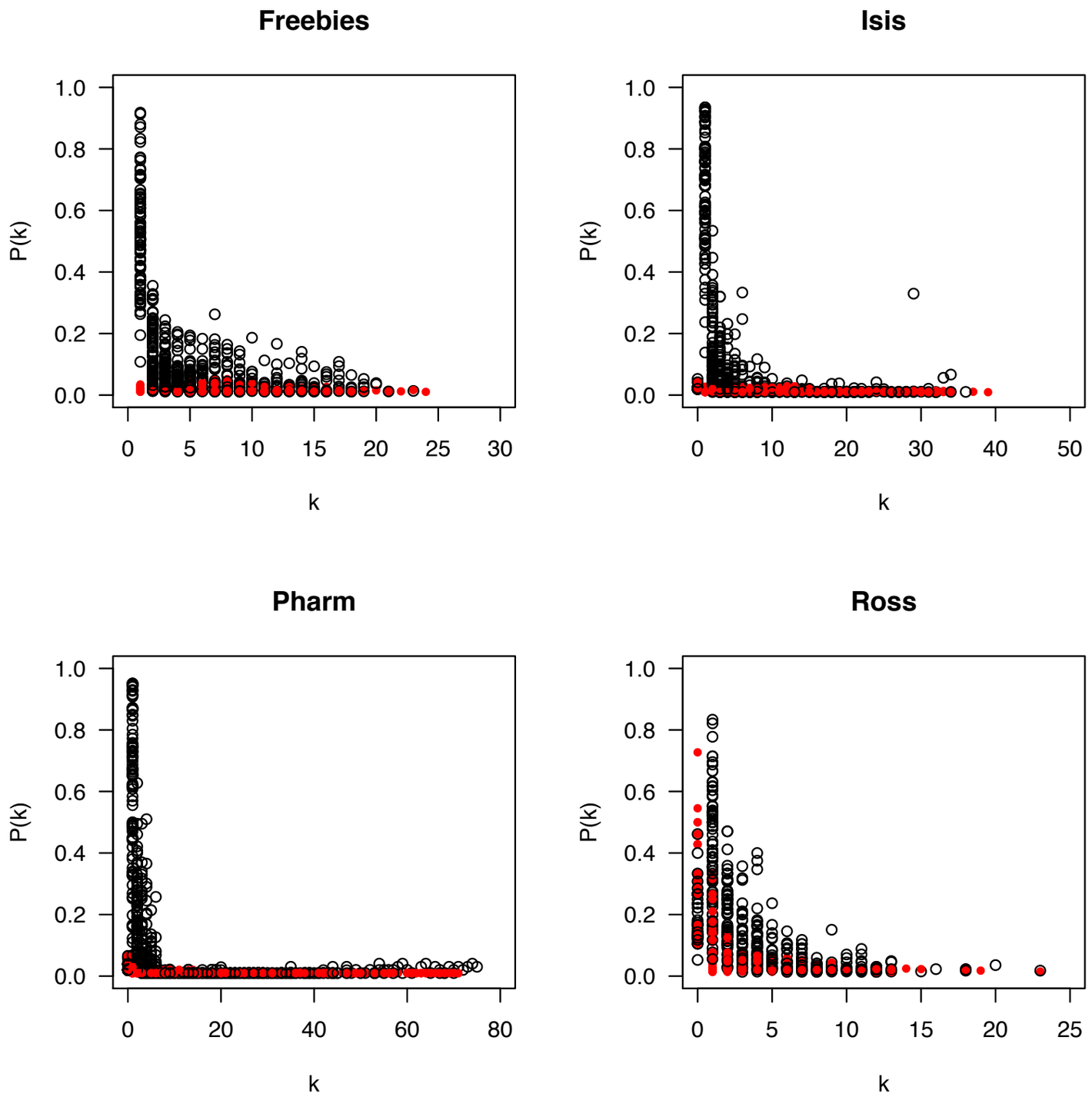
Degree Distribution

PhyRA



Degree Distribution

FloRA



Algebraic Connectivity

$$L_{ij}(G) = \begin{cases} 1 & i = j \text{ and } d_j \neq 0 \\ -\dfrac{1}{\sqrt{d_i d_j}} & (i,j) \in E \\ 0 & \text{else} \end{cases}$$

Algebraic Connectivity

Region	NoRA	FloRA	PhyRA
Freebies	0.64	0.63	0.66
Isis	0.82	0.83	0.84
Pharm	0.36	0.85	0.91
Ross	0.83	0.91	1.10

Summary

Resilient, Self-Organized Resource Allocation

Accurate Placement of Virtual Peers

Substantial Node Degree Reduction

Improved Connectivity

Constant Communication Cost

Thank you...

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aides à la formation recherche

Fonds National de la Recherche Luxembourg

jean.botev@ uni.lu UNIVERSITÉ DU LUXEMBOURG

FACULTY OF SCIENCES, TECHNOLOGY AND COMMUNICATION