

Full Experiment Data for Highly Dynamic Communication Network Optimization

Appendix for the submission “On the Automated and Reactive Optimization of Highly-Dynamic Communication Network Infrastructures” for the Journal of Universal Computer Science

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1 Introduction

The intention of this document is to offer comprehensive additional information about the submission “On the Automated and Reactive Optimization of Highly-Dynamic Communication Network Infrastructures” for the Journal of Universal Computer Science¹. Here, the complete set of experiment results will be presented for each of the individual experiments.

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2 Common EA

Table 1: Experimental results of the optimization analysis for the common EA results on highly dynamic communication networks.

INSTANCE	VOLATILITY	USED MONITORS		EDGE COVERAGE	
		MEDIAN	IQR	MEDIAN	IQR
NREN	5	0.43	0.01	1.00	0.00
NREN	10	0.46	0.01	1.00	0.00
NREN	25	0.52	0.02	1.00	0.00
tech-routers-rf	5	0.52	0.01	1.00	0.00
tech-routers-rf	10	0.55	0.01	1.00	0.00
tech-routers-rf	25	0.63	0.01	0.99	0.00
tech-WHOIS	5	0.61	0.01	1.00	0.00
tech-WHOIS	10	0.61	0.01	0.99	0.00
tech-WHOIS	25	0.59	0.01	0.97	0.01
internet-as	5	0.54	0.00	0.97	0.00
internet-as	10	0.53	0.00	0.96	0.00
internet-as	25	0.51	0.00	0.88	0.01
p2p-Gnutella04	5	0.69	0.01	0.97	0.00
p2p-Gnutella04	10	0.67	0.01	0.95	0.00
p2p-Gnutella04	25	0.64	0.01	0.90	0.01
p2p-Gnutella05	5	0.69	0.01	0.98	0.00
p2p-Gnutella05	10	0.68	0.01	0.97	0.00
p2p-Gnutella05	25	0.65	0.01	0.92	0.01
p2p-Gnutella06	5	0.69	0.01	0.98	0.00
p2p-Gnutella06	10	0.68	0.01	0.97	0.00
p2p-Gnutella06	25	0.65	0.01	0.92	0.01
p2p-Gnutella08	5	0.66	0.01	0.99	0.00
p2p-Gnutella08	10	0.66	0.01	0.99	0.00
p2p-Gnutella08	25	0.64	0.01	0.95	0.01
p2p-Gnutella09	5	0.66	0.01	0.99	0.00
p2p-Gnutella09	10	0.66	0.01	0.98	0.00
p2p-Gnutella09	25	0.63	0.01	0.94	0.01
p2p-Gnutella24	5	0.61	0.00	0.93	0.00
p2p-Gnutella24	10	0.60	0.00	0.90	0.01
p2p-Gnutella24	25	0.58	0.00	0.83	0.01
p2p-Gnutella25	5	0.62	0.00	0.94	0.00
p2p-Gnutella25	10	0.61	0.01	0.91	0.01
p2p-Gnutella25	25	0.58	0.00	0.84	0.01
p2p-Gnutella30	5	0.60	0.00	0.90	0.00

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INSTANCE	VOLATILITY	USED MONITORS		EDGE COVERAGE	
		MEDIAN	IQR	MEDIAN	IQR
p2p-Gnutella30	10	0.59	0.00	0.87	0.01
p2p-Gnutella30	25	0.56	0.00	0.80	0.01
p2p-Gnutella31	5	0.58	0.00	0.84	0.01
p2p-Gnutella31	10	0.57	0.00	0.81	0.01
p2p-Gnutella31	25	0.55	0.00	0.74	0.01
delaunay_n10	5	0.76	0.01	1.00	0.00
delaunay_n10	10	0.76	0.01	1.00	0.00
delaunay_n10	25	0.80	0.01	1.00	0.00
delaunay_n11	5	0.78	0.01	1.00	0.00
delaunay_n11	10	0.79	0.01	1.00	0.00
delaunay_n11	25	0.80	0.01	0.98	0.00
delaunay_n12	5	0.80	0.00	0.99	0.00
delaunay_n12	10	0.80	0.01	0.99	0.00
delaunay_n12	25	0.76	0.01	0.95	0.01
delaunay_n13	5	0.77	0.00	0.97	0.00
delaunay_n13	10	0.75	0.01	0.95	0.01
delaunay_n13	25	0.70	0.01	0.89	0.01
delaunay_n14	5	0.72	0.00	0.91	0.00
delaunay_n14	10	0.70	0.01	0.88	0.01
delaunay_n14	25	0.65	0.00	0.81	0.01
delaunay_n15	5	0.66	0.00	0.83	0.00
delaunay_n15	10	0.65	0.00	0.80	0.01
delaunay_n15	25	0.61	0.00	0.74	0.01
delaunay_n16	5	0.62	0.00	0.76	0.00
delaunay_n16	10	0.61	0.00	0.73	0.00
delaunay_n16	25	0.58	0.00	0.68	0.01
delaunay_n17	5	0.58	0.00	0.69	0.00
delaunay_n17	10	0.58	0.00	0.67	0.00
delaunay_n17	25	0.56	0.00	0.63	0.00
delaunay_n18	5	0.56	0.00	0.64	0.00
delaunay_n18	10	0.55	0.00	0.62	0.00
delaunay_n18	25	0.54	0.00	0.60	0.00
delaunay_n19	5	0.54	0.00	0.60	0.00
delaunay_n19	10	0.54	0.00	0.59	0.00
delaunay_n19	25	0.53	0.00	0.57	0.00
delaunay_n20	5	0.53	0.00	0.57	0.00
delaunay_n20	10	0.53	0.00	0.56	0.00
delaunay_n20	25	0.52	0.00	0.55	0.00

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INSTANCE	VOLATILITY	USED MONITORS		EDGE COVERAGE	
		MEDIAN	IQR	MEDIAN	IQR
frb30-15-1	5	0.98	0.01	1.00	0.00
frb30-15-1	10	0.98	0.01	1.00	0.00
frb30-15-1	25	0.98	0.01	1.00	0.00
frb30-15-2	5	0.98	0.01	1.00	0.00
frb30-15-2	10	0.98	0.01	1.00	0.00
frb30-15-2	25	0.98	0.01	1.00	0.00
frb30-15-3	5	0.98	0.00	1.00	0.00
frb30-15-3	10	0.98	0.01	1.00	0.00
frb30-15-3	25	0.98	0.01	1.00	0.00
frb30-15-4	5	0.98	0.01	1.00	0.00
frb30-15-4	10	0.98	0.01	1.00	0.00
frb30-15-4	25	0.98	0.01	1.00	0.00
frb30-15-5	5	0.98	0.01	1.00	0.00
frb30-15-5	10	0.98	0.00	1.00	0.00
frb30-15-5	25	0.98	0.01	1.00	0.00
frb35-17-1	5	0.99	0.01	1.00	0.00
frb35-17-1	10	0.99	0.01	1.00	0.00
frb35-17-1	25	0.98	0.01	1.00	0.00
frb35-17-2	5	0.99	0.01	1.00	0.00
frb35-17-2	10	0.98	0.01	1.00	0.00
frb35-17-2	25	0.98	0.01	1.00	0.00
frb35-17-3	5	0.99	0.01	1.00	0.00
frb35-17-3	10	0.99	0.00	1.00	0.00
frb35-17-3	25	0.98	0.01	1.00	0.00
frb35-17-4	5	0.99	0.01	1.00	0.00
frb35-17-4	10	0.99	0.01	1.00	0.00
frb35-17-4	25	0.98	0.01	1.00	0.00
frb35-17-5	5	0.99	0.01	1.00	0.00
frb35-17-5	10	0.99	0.01	1.00	0.00
frb35-17-5	25	0.98	0.01	1.00	0.00
frb40-19-1	5	0.99	0.01	1.00	0.00
frb40-19-1	10	0.99	0.00	1.00	0.00
frb40-19-1	25	0.98	0.01	1.00	0.00
frb40-19-2	5	0.99	0.01	1.00	0.00
frb40-19-2	10	0.99	0.01	1.00	0.00
frb40-19-2	25	0.98	0.01	1.00	0.00
frb40-19-3	5	0.99	0.01	1.00	0.00
frb40-19-3	10	0.99	0.01	1.00	0.00
frb40-19-3	25	0.99	0.01	1.00	0.00

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INSTANCE	VOLATILITY	USED MONITORS		EDGE COVERAGE	
		MEDIAN	IQR	MEDIAN	IQR
frb40-19-4	5	0.99	0.00	1.00	0.00
frb40-19-4	10	0.99	0.00	1.00	0.00
frb40-19-4	25	0.98	0.01	1.00	0.00
frb40-19-5	5	0.99	0.00	1.00	0.00
frb40-19-5	10	0.99	0.00	1.00	0.00
frb40-19-5	25	0.99	0.01	1.00	0.00

3 BMS EA

Table 2: Experimental results of the optimization analysis for the BMS LS results on highly dynamic communication networks.

INSTANCE	VOLATILITY	USED MONITORS		EDGE COVERAGE	
		MEDIAN	IQR	MEDIAN	IQR
NREN	5	0.52	0.02	0.63	0.04
NREN	10	0.52	0.02	0.62	0.04
NREN	25	0.52	0.02	0.59	0.05
tech-routers-rf	5	0.52	0.01	0.61	0.03
tech-routers-rf	10	0.51	0.01	0.60	0.03
tech-routers-rf	25	0.51	0.01	0.58	0.04
tech-WHOIS	5	0.50	0.01	0.59	0.02
tech-WHOIS	10	0.51	0.01	0.59	0.03
tech-WHOIS	25	0.50	0.01	0.57	0.03
internet-as	5	0.50	0.00	0.62	0.02
internet-as	10	0.50	0.00	0.61	0.03
internet-as	25	0.50	0.00	0.58	0.04
p2p-Gnutella04	5	0.51	0.01	0.54	0.01
p2p-Gnutella04	10	0.51	0.00	0.53	0.01
p2p-Gnutella04	25	0.51	0.01	0.53	0.01
p2p-Gnutella05	5	0.51	0.01	0.54	0.01
p2p-Gnutella05	10	0.51	0.00	0.54	0.01
p2p-Gnutella05	25	0.51	0.01	0.53	0.02
p2p-Gnutella06	5	0.51	0.00	0.54	0.01
p2p-Gnutella06	10	0.51	0.01	0.54	0.01
p2p-Gnutella06	25	0.51	0.01	0.53	0.01
p2p-Gnutella08	5	0.51	0.01	0.55	0.01
p2p-Gnutella08	10	0.51	0.01	0.55	0.01
p2p-Gnutella08	25	0.51	0.01	0.54	0.02
p2p-Gnutella09	5	0.51	0.01	0.55	0.01
p2p-Gnutella09	10	0.51	0.01	0.54	0.02
p2p-Gnutella09	25	0.51	0.01	0.54	0.02
p2p-Gnutella24	5	0.50	0.00	0.53	0.01
p2p-Gnutella24	10	0.50	0.00	0.53	0.01
p2p-Gnutella24	25	0.50	0.00	0.52	0.01
p2p-Gnutella25	5	0.51	0.00	0.53	0.01
p2p-Gnutella25	10	0.51	0.00	0.53	0.01
p2p-Gnutella25	25	0.50	0.00	0.52	0.01
p2p-Gnutella30	5	0.50	0.00	0.52	0.01

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INSTANCE	VOLATILITY	USED MONITORS		EDGE COVERAGE	
		MEDIAN	IQR	MEDIAN	IQR
p2p-Gnutella30	10	0.50	0.00	0.52	0.01
p2p-Gnutella30	25	0.50	0.00	0.52	0.01
p2p-Gnutella31	5	0.50	0.00	0.52	0.00
p2p-Gnutella31	10	0.50	0.00	0.52	0.00
p2p-Gnutella31	25	0.50	0.00	0.51	0.01
delaunay_n10	5	0.54	0.01	0.60	0.02
delaunay_n10	10	0.54	0.01	0.59	0.02
delaunay_n10	25	0.53	0.01	0.57	0.03
delaunay_n11	5	0.53	0.01	0.57	0.01
delaunay_n11	10	0.53	0.01	0.56	0.02
delaunay_n11	25	0.52	0.01	0.55	0.02
delaunay_n12	5	0.52	0.01	0.55	0.01
delaunay_n12	10	0.52	0.01	0.54	0.01
delaunay_n12	25	0.52	0.01	0.54	0.01
delaunay_n13	5	0.51	0.00	0.53	0.01
delaunay_n13	10	0.51	0.00	0.53	0.01
delaunay_n13	25	0.51	0.01	0.53	0.01
delaunay_n14	5	0.51	0.00	0.52	0.01
delaunay_n14	10	0.51	0.00	0.52	0.01
delaunay_n14	25	0.51	0.00	0.52	0.01
delaunay_n15	5	0.51	0.00	0.52	0.00
delaunay_n15	10	0.51	0.00	0.52	0.00
delaunay_n15	25	0.51	0.00	0.52	0.00
delaunay_n16	5	0.50	0.00	0.51	0.00
delaunay_n16	10	0.50	0.00	0.51	0.00
delaunay_n16	25	0.50	0.00	0.51	0.00
delaunay_n17	5	0.50	0.00	0.51	0.00
delaunay_n17	10	0.50	0.00	0.51	0.00
delaunay_n17	25	0.50	0.00	0.51	0.00
delaunay_n18	5	0.50	0.00	0.51	0.00
delaunay_n18	10	0.50	0.00	0.51	0.00
delaunay_n18	25	0.50	0.00	0.50	0.00
delaunay_n19	5	0.50	0.00	0.50	0.00
delaunay_n19	10	0.50	0.00	0.50	0.00
delaunay_n19	25	0.50	0.00	0.50	0.00
delaunay_n20	5	0.50	0.00	0.50	0.00
delaunay_n20	10	0.50	0.00	0.50	0.00
delaunay_n20	25	0.50	0.00	0.50	0.00

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INSTANCE	VOLATILITY	USED MONITORS		EDGE COVERAGE	
		MEDIAN	IQR	MEDIAN	IQR
frb30-15-1	5	0.64	0.06	0.75	0.09
frb30-15-1	10	0.58	0.02	0.65	0.04
frb30-15-1	25	0.56	0.02	0.62	0.03
frb30-15-2	5	0.65	0.07	0.76	0.09
frb30-15-2	10	0.58	0.03	0.66	0.05
frb30-15-2	25	0.56	0.02	0.62	0.04
frb30-15-3	5	0.65	0.06	0.76	0.08
frb30-15-3	10	0.58	0.02	0.65	0.04
frb30-15-3	25	0.57	0.02	0.63	0.03
frb30-15-4	5	0.65	0.06	0.76	0.08
frb30-15-4	10	0.59	0.02	0.66	0.04
frb30-15-4	25	0.56	0.02	0.62	0.03
frb30-15-5	5	0.64	0.07	0.74	0.10
frb30-15-5	10	0.59	0.03	0.66	0.05
frb30-15-5	25	0.56	0.02	0.62	0.04
frb35-17-1	5	0.59	0.03	0.67	0.06
frb35-17-1	10	0.57	0.02	0.62	0.03
frb35-17-1	25	0.55	0.01	0.60	0.02
frb35-17-2	5	0.60	0.04	0.68	0.07
frb35-17-2	10	0.57	0.02	0.63	0.03
frb35-17-2	25	0.56	0.02	0.61	0.03
frb35-17-3	5	0.59	0.03	0.67	0.05
frb35-17-3	10	0.57	0.02	0.63	0.04
frb35-17-3	25	0.55	0.02	0.61	0.03
frb35-17-4	5	0.60	0.04	0.68	0.06
frb35-17-4	10	0.57	0.02	0.62	0.03
frb35-17-4	25	0.56	0.02	0.61	0.03
frb35-17-5	5	0.59	0.03	0.67	0.05
frb35-17-5	10	0.57	0.02	0.63	0.03
frb35-17-5	25	0.55	0.02	0.60	0.03
frb40-19-1	5	0.57	0.02	0.63	0.03
frb40-19-1	10	0.55	0.01	0.60	0.03
frb40-19-1	25	0.55	0.01	0.59	0.03
frb40-19-2	5	0.57	0.02	0.63	0.04
frb40-19-2	10	0.56	0.01	0.61	0.03
frb40-19-2	25	0.55	0.01	0.59	0.02
frb40-19-3	5	0.57	0.02	0.63	0.04
frb40-19-3	10	0.56	0.01	0.61	0.03
frb40-19-3	25	0.54	0.02	0.59	0.03

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INSTANCE	VOLATILITY	USED MONITORS		EDGE COVERAGE	
		MEDIAN	IQR	MEDIAN	IQR
frb40-19-4	5	0.57	0.03	0.63	0.05
frb40-19-4	10	0.56	0.01	0.61	0.02
frb40-19-4	25	0.55	0.01	0.59	0.03
frb40-19-5	5	0.57	0.02	0.63	0.04
frb40-19-5	10	0.56	0.01	0.61	0.02
frb40-19-5	25	0.55	0.01	0.59	0.02

4 LS EA

Table 3: Experimental results of the optimization analysis for the LS EA results on highly dynamic communication networks.

INSTANCE	VOLATILITY	USED MONITORS		EDGE COVERAGE	
		MEDIAN	IQR	MEDIAN	IQR
NREN	5	0.43	0.01	1.00	0.00
NREN	10	0.46	0.01	1.00	0.00
NREN	25	0.52	0.02	1.00	0.00
tech-routers-rf	5	0.52	0.01	1.00	0.00
tech-routers-rf	10	0.55	0.01	1.00	0.00
tech-routers-rf	25	0.63	0.01	0.99	0.00
tech-WHOIS	5	0.61	0.00	1.00	0.00
tech-WHOIS	10	0.62	0.01	0.99	0.00
tech-WHOIS	25	0.59	0.01	0.97	0.00
internet-as	5	0.54	0.00	0.97	0.00
internet-as	10	0.53	0.00	0.96	0.00
internet-as	25	0.51	0.00	0.88	0.01
p2p-Gnutella04	5	0.69	0.01	0.97	0.00
p2p-Gnutella04	10	0.67	0.01	0.95	0.00
p2p-Gnutella04	25	0.64	0.01	0.90	0.01
p2p-Gnutella05	5	0.69	0.01	0.98	0.00
p2p-Gnutella05	10	0.68	0.01	0.97	0.00
p2p-Gnutella05	25	0.65	0.01	0.92	0.01
p2p-Gnutella06	5	0.69	0.00	0.98	0.00
p2p-Gnutella06	10	0.68	0.01	0.97	0.00
p2p-Gnutella06	25	0.65	0.01	0.92	0.01
p2p-Gnutella08	5	0.66	0.01	0.99	0.00
p2p-Gnutella08	10	0.66	0.01	0.99	0.00
p2p-Gnutella08	25	0.65	0.01	0.95	0.01
p2p-Gnutella09	5	0.66	0.01	0.99	0.00
p2p-Gnutella09	10	0.66	0.00	0.98	0.00
p2p-Gnutella09	25	0.63	0.01	0.94	0.01
p2p-Gnutella24	5	0.61	0.00	0.93	0.00
p2p-Gnutella24	10	0.60	0.00	0.90	0.01
p2p-Gnutella24	25	0.58	0.00	0.83	0.01
p2p-Gnutella25	5	0.62	0.00	0.94	0.00
p2p-Gnutella25	10	0.61	0.00	0.91	0.01
p2p-Gnutella25	25	0.58	0.00	0.84	0.01
p2p-Gnutella30	5	0.60	0.00	0.90	0.01

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Table 3 – continued from previous page

INSTANCE	VOLATILITY	USED MONITORS		EDGE COVERAGE	
		MEDIAN	IQR	MEDIAN	IQR
p2p-Gnutella30	10	0.59	0.00	0.87	0.01
p2p-Gnutella30	25	0.56	0.00	0.79	0.01
p2p-Gnutella31	5	0.58	0.00	0.84	0.00
p2p-Gnutella31	10	0.57	0.00	0.81	0.01
p2p-Gnutella31	25	0.55	0.00	0.74	0.01
delaunay_n10	5	0.75	0.01	1.00	0.00
delaunay_n10	10	0.76	0.01	1.00	0.00
delaunay_n10	25	0.80	0.01	1.00	0.00
delaunay_n11	5	0.78	0.01	1.00	0.00
delaunay_n11	10	0.79	0.01	1.00	0.00
delaunay_n11	25	0.80	0.01	0.98	0.00
delaunay_n12	5	0.80	0.00	0.99	0.00
delaunay_n12	10	0.80	0.01	0.98	0.00
delaunay_n12	25	0.76	0.01	0.95	0.01
delaunay_n13	5	0.77	0.00	0.97	0.00
delaunay_n13	10	0.75	0.00	0.95	0.00
delaunay_n13	25	0.70	0.01	0.89	0.01
delaunay_n14	5	0.72	0.00	0.91	0.00
delaunay_n14	10	0.69	0.01	0.88	0.01
delaunay_n14	25	0.65	0.01	0.81	0.01
delaunay_n15	5	0.66	0.00	0.83	0.00
delaunay_n15	10	0.65	0.00	0.80	0.01
delaunay_n15	25	0.61	0.00	0.74	0.01
delaunay_n16	5	0.62	0.00	0.76	0.00
delaunay_n16	10	0.60	0.00	0.73	0.00
delaunay_n16	25	0.58	0.00	0.68	0.01
delaunay_n17	5	0.58	0.00	0.69	0.00
delaunay_n17	10	0.58	0.00	0.67	0.00
delaunay_n17	25	0.56	0.00	0.63	0.00
delaunay_n18	5	0.56	0.00	0.64	0.00
delaunay_n18	10	0.55	0.00	0.62	0.00
delaunay_n18	25	0.54	0.00	0.59	0.00
delaunay_n19	5	0.54	0.00	0.60	0.00
delaunay_n19	10	0.54	0.00	0.59	0.00
delaunay_n19	25	0.53	0.00	0.57	0.00
delaunay_n20	5	0.53	0.00	0.57	0.00
delaunay_n20	10	0.53	0.00	0.56	0.00
delaunay_n20	25	0.52	0.00	0.55	0.00

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Table 3 – continued from previous page

INSTANCE	VOLATILITY	USED MONITORS		EDGE COVERAGE	
		MEDIAN	IQR	MEDIAN	IQR
frb30-15-1	5	0.98	0.01	1.00	0.00
frb30-15-1	10	0.98	0.01	1.00	0.00
frb30-15-1	25	0.98	0.01	1.00	0.00
frb30-15-2	5	0.98	0.01	1.00	0.00
frb30-15-2	10	0.98	0.01	1.00	0.00
frb30-15-2	25	0.98	0.01	1.00	0.00
frb30-15-3	5	0.98	0.01	1.00	0.00
frb30-15-3	10	0.98	0.01	1.00	0.00
frb30-15-3	25	0.98	0.01	1.00	0.00
frb30-15-4	5	0.98	0.01	1.00	0.00
frb30-15-4	10	0.98	0.01	1.00	0.00
frb30-15-4	25	0.98	0.01	1.00	0.00
frb30-15-5	5	0.98	0.01	1.00	0.00
frb30-15-5	10	0.98	0.01	1.00	0.00
frb30-15-5	25	0.98	0.01	1.00	0.00
frb35-17-1	5	0.99	0.01	1.00	0.00
frb35-17-1	10	0.99	0.01	1.00	0.00
frb35-17-1	25	0.98	0.01	1.00	0.00
frb35-17-2	5	0.99	0.01	1.00	0.00
frb35-17-2	10	0.99	0.01	1.00	0.00
frb35-17-2	25	0.98	0.01	1.00	0.00
frb35-17-3	5	0.99	0.00	1.00	0.00
frb35-17-3	10	0.99	0.01	1.00	0.00
frb35-17-3	25	0.98	0.01	1.00	0.00
frb35-17-4	5	0.99	0.01	1.00	0.00
frb35-17-4	10	0.99	0.01	1.00	0.00
frb35-17-4	25	0.98	0.01	1.00	0.00
frb35-17-5	5	0.99	0.01	1.00	0.00
frb35-17-5	10	0.99	0.01	1.00	0.00
frb35-17-5	25	0.98	0.01	1.00	0.00
frb40-19-1	5	0.99	0.00	1.00	0.00
frb40-19-1	10	0.99	0.01	1.00	0.00
frb40-19-1	25	0.99	0.01	1.00	0.00
frb40-19-2	5	0.99	0.01	1.00	0.00
frb40-19-2	10	0.99	0.01	1.00	0.00
frb40-19-2	25	0.99	0.01	1.00	0.00
frb40-19-3	5	0.99	0.00	1.00	0.00
frb40-19-3	10	0.99	0.01	1.00	0.00
frb40-19-3	25	0.99	0.01	1.00	0.00

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Table 3 – continued from previous page

INSTANCE	VOLATILITY	USED MONITORS		EDGE COVERAGE	
		MEDIAN	IQR	MEDIAN	IQR
frb40-19-4	5	0.99	0.01	1.00	0.00
frb40-19-4	10	0.99	0.01	1.00	0.00
frb40-19-4	25	0.99	0.01	1.00	0.00
frb40-19-5	5	0.99	0.00	1.00	0.00
frb40-19-5	10	0.99	0.00	1.00	0.00
frb40-19-5	25	0.99	0.01	1.00	0.00

5 Wall-clock runtime

Table 4: Experimental results of the wall-clock runtime analysis (in seconds) for the optimization for all methods under study on highly dynamic communication networks.

INSTANCE	VOLATILITY	COMMON EA		LS EA		BMS LS	
		MEAN	SD	MEAN	SD	MEAN	SD
NREN	5	4.87	1.44	4.72	1.30	5.82	2.13
NREN	10	4.75	1.27	5.06	1.50	5.84	2.05
NREN	25	5.62	1.40	5.44	1.40	6.44	1.77
tech-routers-rf	5	14.43	3.81	14.20	3.60	19.26	5.97
tech-routers-rf	10	14.94	4.66	14.44	4.12	20.81	9.71
tech-routers-rf	25	15.65	4.46	15.19	3.96	19.70	8.40
tech-WHOIS	5	119.35	178.25	101.12	29.71	165.23	53.77
tech-WHOIS	10	174.93	191.82	139.96	83.27	212.31	166.65
tech-WHOIS	25	215.85	141.23	241.07	181.94	254.79	180.26
internet-as	5	460.11	157.70	486.18	176.14	575.85	258.34
internet-as	10	616.30	233.37	624.62	487.13	819.18	649.40
internet-as	25	1048.75	517.40	1070.56	707.96	1017.95	823.71
p2p-Gnutella04	5	82.58	27.73	86.48	30.46	119.38	40.24
p2p-Gnutella04	10	112.04	56.90	123.01	98.31	146.68	80.44
p2p-Gnutella04	25	188.09	121.72	222.86	195.25	203.63	144.17
p2p-Gnutella05	5	63.44	22.38	62.26	24.11	96.12	39.65
p2p-Gnutella05	10	88.49	36.93	75.11	33.24	108.02	41.76
p2p-Gnutella05	25	155.81	204.48	145.07	126.35	159.00	133.46
p2p-Gnutella06	5	59.30	22.15	66.83	20.79	91.59	43.33
p2p-Gnutella06	10	77.45	32.85	79.81	31.02	103.44	39.48
p2p-Gnutella06	25	144.11	86.43	111.25	86.54	164.04	114.86
p2p-Gnutella08	5	42.80	11.87	45.64	13.81	59.16	25.95
p2p-Gnutella08	10	54.58	16.37	52.28	15.29	59.97	21.60
p2p-Gnutella08	25	78.44	59.77	75.83	75.91	80.59	42.06
p2p-Gnutella09	5	54.54	17.87	54.93	17.97	76.59	31.05
p2p-Gnutella09	10	62.43	24.00	67.35	23.93	85.43	36.47
p2p-Gnutella09	25	100.80	73.85	98.29	56.24	124.93	104.09
p2p-Gnutella24	5	292.08	135.72	281.80	158.70	349.38	173.62
p2p-Gnutella24	10	379.45	194.22	481.23	541.05	447.63	222.48
p2p-Gnutella24	25	622.89	453.97	631.94	457.27	693.00	399.82
p2p-Gnutella25	5	208.36	91.91	215.04	96.35	246.61	88.47
p2p-Gnutella25	10	314.59	198.87	338.80	223.35	323.86	178.33
p2p-Gnutella25	25	512.13	461.03	527.32	481.41	511.11	317.16
p2p-Gnutella30	5	476.97	329.04	472.64	180.28	508.01	196.48
p2p-Gnutella30	10	648.95	378.14	607.14	534.28	674.32	347.65
p2p-Gnutella30	25	938.43	448.77	964.05	709.39	920.92	576.65
p2p-Gnutella31	5	979.97	584.36	859.90	572.59	954.91	500.56
p2p-Gnutella31	10	1118.57	423.42	1229.79	758.71	1371.82	824.94
p2p-Gnutella31	25	2004.57	1059.25	1978.52	1205.57	1854.74	1022.97
deLaunay_n10	5	6.07	1.55	5.85	1.63	8.41	3.05
deLaunay_n10	10	6.08	1.66	6.18	1.64	8.71	2.91
deLaunay_n10	25	6.73	1.76	6.79	2.00	8.54	3.05
deLaunay_n11	5	12.99	3.48	13.67	3.99	18.03	5.66

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Table 4 – continued from previous page

INSTANCE	VOLATILITY	COMMON EA		LS EA		BMS LS	
		MEAN	SD	MEAN	SD	MEAN	SD
delaunay_n11	10	13.17	3.73	13.23	3.42	18.56	6.52
delaunay_n11	25	14.19	3.60	14.49	4.01	18.02	7.22
delaunay_n12	5	28.29	8.24	27.05	8.22	39.39	14.94
delaunay_n12	10	29.20	10.34	27.09	9.80	38.75	12.68
delaunay_n12	25	31.64	10.56	31.55	10.96	40.43	14.84
delaunay_n13	5	62.36	18.52	60.91	17.47	87.80	35.50
delaunay_n13	10	68.20	23.90	70.24	23.87	90.94	41.47
delaunay_n13	25	115.10	147.33	94.35	55.51	120.74	64.97
delaunay_n14	5	166.37	58.77	166.30	54.53	221.21	89.81
delaunay_n14	10	194.81	100.78	250.18	130.86	272.38	226.26
delaunay_n14	25	379.29	339.87	395.36	292.42	374.70	306.09
delaunay_n15	5	544.35	299.58	502.57	258.15	586.73	280.51
delaunay_n15	10	638.67	353.48	725.19	676.76	732.49	382.06
delaunay_n15	25	1091.20	877.26	1048.48	810.36	1025.39	521.14
delaunay_n16	5	1365.54	972.77	1166.26	328.53	1222.61	496.54
delaunay_n16	10	1642.90	837.02	1654.82	1236.81	1689.24	903.80
delaunay_n16	25	2604.93	1795.31	2415.55	1377.73	2406.78	1328.70
delaunay_n17	5	2866.97	1864.69	2651.20	1560.18	3491.69	2273.42
delaunay_n17	10	3552.65	2103.07	3651.16	1956.48	3819.97	1753.49
delaunay_n17	25	4901.22	2325.90	5212.61	2855.65	5624.14	3556.05
delaunay_n18	5	5845.83	2596.52	5908.51	3307.14	7505.13	4615.14
delaunay_n18	10	8421.14	5731.42	7956.01	4520.09	8187.56	5060.68
delaunay_n18	25	11155.57	7518.80	10716.99	6386.99	12100.95	6804.04
delaunay_n19	5	11963.20	5396.24	12420.14	7368.91	17230.69	9387.81
delaunay_n19	10	16523.01	10376.08	16016.71	9703.43	21696.65	12791.58
delaunay_n19	25	24890.77	16242.78	25443.93	15552.71	24746.98	12266.85
delaunay_n20	5	24847.52	13618.21	26479.99	13828.81	34504.07	11553.26
delaunay_n20	10	35865.43	20184.26	40076.38	27655.39	39259.47	12806.08
delaunay_n20	25	47206.42	29496.76	55988.19	34258.11	50066.57	18720.02
frb30-15-1	5	71.54	29.65	83.25	42.56	163.27	142.38
frb30-15-1	10	121.37	104.33	104.31	67.82	213.11	117.80
frb30-15-1	25	195.33	169.43	179.14	165.03	239.87	166.32
frb30-15-2	5	104.17	218.16	79.86	38.41	166.79	85.16
frb30-15-2	10	137.23	132.50	115.44	90.90	194.44	122.04
frb30-15-2	25	161.00	138.95	198.01	220.87	264.49	207.83
frb30-15-3	5	79.08	42.06	73.67	27.23	150.26	63.93
frb30-15-3	10	141.74	116.13	134.76	188.88	200.22	119.33
frb30-15-3	25	184.35	168.12	202.34	189.63	230.96	149.60
frb30-15-4	5	68.42	24.45	88.24	137.49	155.55	67.61
frb30-15-4	10	108.99	98.15	143.77	142.15	213.02	120.50
frb30-15-4	25	202.50	254.52	281.07	425.63	286.24	229.38
frb30-15-5	5	138.87	56.70	162.29	69.47	156.14	61.67
frb30-15-5	10	273.82	230.87	212.57	106.85	247.77	290.47
frb30-15-5	25	392.92	388.12	311.72	166.84	236.98	148.36
frb35-17-1	5	365.05	294.79	365.94	183.79	420.79	151.16
frb35-17-1	10	541.27	481.25	454.93	256.07	630.54	416.47
frb35-17-1	25	692.29	551.77	544.44	522.02	793.75	622.59
frb35-17-2	5	372.25	272.45	418.43	442.00	470.51	197.69

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Table 4 – continued from previous page
COMMON EA LS EA

INSTANCE	VOLATILITY	COMMON EA		LS EA		BMS LS	
		MEAN	SD	MEAN	SD	MEAN	SD
frb35-17-2	10	454.60	253.44	502.83	395.24	624.16	560.94
frb35-17-2	25	673.70	583.20	667.78	540.82	716.02	498.40
frb35-17-3	5	339.39	171.30	356.42	292.08	445.38	176.48
frb35-17-3	10	450.19	278.29	515.65	393.61	626.72	488.66
frb35-17-3	25	628.84	635.73	732.31	876.22	796.04	609.50
frb35-17-4	5	340.89	173.31	394.17	332.48	449.78	195.63
frb35-17-4	10	504.78	382.02	501.28	501.49	635.16	389.64
frb35-17-4	25	680.60	887.94	600.63	390.95	675.65	542.34
frb35-17-5	5	586.14	425.22	606.43	444.05	422.23	127.33
frb35-17-5	10	674.60	400.12	690.46	526.17	572.00	433.28
frb35-17-5	25	955.05	663.25	886.78	639.79	709.75	472.06
frb40-19-1	5	908.03	1034.21	757.15	433.00	909.46	560.28
frb40-19-1	10	909.70	705.36	992.70	800.62	1139.37	846.26
frb40-19-1	25	1457.86	1217.87	1179.24	1079.93	1473.71	1047.19
frb40-19-2	5	826.21	684.74	798.21	364.26	947.05	493.67
frb40-19-2	10	1033.22	843.71	972.57	737.27	1095.22	539.20
frb40-19-2	25	1327.76	1206.60	1271.90	963.77	1567.82	1521.94
frb40-19-3	5	771.36	437.91	685.62	302.99	894.06	447.66
frb40-19-3	10	977.70	634.23	921.00	667.25	1058.58	790.29
frb40-19-3	25	1350.90	1097.96	1374.83	1203.09	1441.30	835.91
frb40-19-4	5	898.80	324.07	1083.00	713.02	848.46	523.49
frb40-19-4	10	1310.37	829.11	1236.65	698.32	1080.71	554.48
frb40-19-4	25	1535.09	1056.41	1512.38	825.64	1281.61	839.29
frb40-19-5	5	879.86	1110.69	794.75	766.37	959.78	654.14
frb40-19-5	10	902.55	482.88	842.04	388.63	1003.64	439.52
frb40-19-5	25	1292.70	1262.29	1429.16	1332.40	1422.11	844.58