

"Cost Allocation in Vehicle Routing Problems with Time Windows"

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1 Cost allocation to customers in Solomon instances in a collaborative scenario

Other carriers'	lowest Cost	7.47	19.31	14.15	20.18	10.68	9.03	13.27	23.19	18.32	14.61	26.96	14.94	10.14	29.14	38.73	33.08	27.68	16.65
Stand-alone	Cost	8.10	24.43	41.48	22.39	10.09	11.17	17.08	19.20	41.63	23.26	34.21	17.19	4.19	35.86	39.12	28.32	22.59	22.82
Collaboration	Cost	6.56	16.14	16.13	18.20	14.61	10.36	20.53	18.44	17.84	27.66	28.62	13.70	2.54	20.46	28.44	28.64	20.40	20.05
Garrier	Carrier	C	Α	C	A	C	C	В	C	В	A	C	A	C	В	A	B	B	A
Service	time	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
Latest	service time	171	09	126	159	44	109	91	105	107	134	22	73	169	42	71	85	167	26
Earliest	service time	161	20	116	149	34	66	81	95	26	124	29	63	159	32	61	75	157	87
Demand	Demand	10	2	13	19	26	3	2	6	16	16	12	19	23	20	∞	19	2	12
Instance Node X coordinate V coordinate Demand		49	17	45	20	30	30	20	43	09	09	65	35	25	10	5	20	30	40
X coordinate	/ coordinate	41	35	55	55	15	25	20	10	55	30	20	20	30	15	30	10	ಬ	20
Node	anor I		2	က	4	2	9	7	∞	6	10	11	12	13	14	15	16	17	18
Instance	TIBRATICE	R101.50	R101.50	R101.50	R101.50	R101.50	R101.50	R101.50	R101.50	R101.50	R101.50	R101.50							

Appendix 1: Cost allocation to customers in Solomon instances in a collaborative scenario – continued from previous page.

Other carriers'	lowest Cost	26.40	26.37	14.88	24.18	35.74	26.31	30.74	7.63	2.08	4.18	26.66	12.24	10.74	30.09	15.72	31.14	42.46	37.22	16.33	Continued on next page
Stand-alone	Cost	26.57	31.45	21.86	17.12	48.40	37.83	33.46	9.56	5.25	3.36	38.92	16.52	24.64	34.75	21.03	65.70	62.28	45.16	22.07	Continue
Collaboration	Cost	17.64	35.85	14.25	21.93	29.00	30.31	25.03	8.28	1.90	2.28	25.54	16.45	9.21	25.10	13.34	27.42	43.12	31.00	12.51	
Carrior	Callici	A	C	В	A	В	A	В	A	A	B	В	C	B	C	A	C	A	A	C	
Service	time	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	
Latest	service time	98	136	72	107	78	163	182	142	47	49	73	81	09	151	47	127	153	51	144	
Earliest	service time	92	126	62	26	89	153	172	132	37	39	63	71	50	141	37	117	143	41	134	
Demand	Demand	17	6	11	18	29	3	9	17	16	16	6	21	27	23	11	14	∞	5	∞	
$^{ m V}$		09	65	20	10	5	35	20	30	40	37	42	09	52	69	52	55	92	09	20	
Inctance Node X coordinate	/ coordinate	15	45	45	45	55	65	65	45	35	41	64	40	31	35	53	65	63	2	20	
Node	TANGE	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	
Instance	TIBRATICE	R101.50	R101.50	R101.50																	

Appendix 1: Cost allocation to customers in Solomon instances in a collaborative scenario – continued from previous page.

83 93 10 C 46.20 37.18 60.52 44 54 10 A 23.71 47.41 25.33 85 95 10 B 9.44 11.13 12.38 97 107 10 B 25.21 27.51 26.08 31 41 10 A 13.48 19.19 20.67 132 142 10 C 25.66 41.97 26.08 132 142 10 C 25.66 41.97 35.34 69 79 10 C 26.64 41.97 35.34 117 127 10 C 24.13 26.24 18.11 117 127 10 C 26.41 31.59 36.09 118 10 C 26.41 31.59 17.74 118 10 C 12.29 12.73 17.98 124 11 A	Instance Node X coordinate Y coordinate
54 10 A 23.71 47.41 95 10 B 9.44 11.13 107 10 B 25.21 27.51 41 10 A 13.48 19.19 142 10 C 25.66 41.97 42 10 C 14.67 18.01 127 10 C 26.04 31.19 61 10 B 24.13 26.24 175 10 C 26.04 31.19 175 10 C 11.23 16.95 118 10 B 44.82 47.25 118 10 A 15.90 20.99 848 10 C 7.28 12.73 282 10 B 6.53 9.52 584 10 C 11.44 14.24 801 10 A 14.79 30.86 209 10 A 14.79 30.86 209 10 A 14.79	38 5 5 16
95 10 B 9.44 11.13 107 10 A 13.48 19.19 41 10 A 13.48 19.19 142 10 C 25.66 41.97 42 10 C 14.67 18.01 61 10 C 26.04 31.19 175 10 C 26.04 31.19 175 10 C 26.04 31.19 118 10 C 11.23 16.95 134 10 C 11.23 16.95 848 10 C 7.28 12.73 848 10 C 7.28 12.73 584 10 C 7.28 12.73 801 10 B 6.53 9.52 801 10 A 14.79 30.86 801 10 A 14.79 30.86 803 10 A 13.54 11.80	39 60 12 31
41 10 A 13.48 19.19 41 10 C 25.66 41.97 142 10 C 25.66 41.97 42 10 C 14.67 18.01 127 10 C 26.04 31.19 51 10 C 26.04 31.19 61 10 C 26.04 31.19 175 10 C 26.04 31.19 118 10 C 11.23 16.95 118 10 C 7.28 47.25 284 10 A 15.90 20.99 848 10 C 7.28 12.73 584 10 C 7.28 9.52 801 10 C 11.44 14.24 801 10 A 18.79 30.86 209 10 A 8.55 15.14 209 10 A 13.54 11.80	40 40 25 9
41 10 A 13.48 19.19 142 10 C 25.66 41.97 79 10 C 14.67 18.01 42 10 C 26.04 31.19 127 10 C 26.04 31.19 61 10 B 19.78 30.58 118 10 C 11.23 16.95 134 10 B 44.82 47.25 848 10 C 7.28 12.73 848 10 C 7.28 12.73 848 10 C 7.28 9.52 584 10 C 11.44 14.24 801 10 C 11.44 14.24 801 10 A 14.79 30.86 209 10 A 8.55 15.14 11 1 A 13.54 11.80	1 42 7
142 10 C 25.66 41.97 79 10 C 14.67 18.01 42 10 B 24.13 26.24 127 10 C 26.04 31.19 61 10 B 19.78 30.58 175 10 C 11.23 16.95 134 10 A 15.90 20.99 848 10 C 7.28 12.73 848 10 C 7.28 12.73 584 10 C 7.28 9.52 584 10 C 11.44 14.24 801 10 A 14.79 30.86 209 10 A 8.55 15.14 214 10 A 13.54 11.80	42 24 12
79 10 C 14.67 18.01 42 10 B 24.13 26.24 1 127 10 C 26.04 31.19 3 61 10 B 19.78 30.58 3 175 10 C 11.23 16.95 9 118 10 A 15.90 20.99 9 848 10 C 7.28 12.73 9 848 10 C 7.28 12.73 9 584 10 C 11.44 14.24 9 801 10 A 14.79 30.86 9 801 10 A 8.55 15.14 1 514 10 A 13.54 11.80 1	43 23 3
42 10 B 24.13 26.24 127 10 C 26.04 31.19 3 61 10 B 19.78 30.58 1 175 10 C 11.23 16.95 1 118 10 B 44.82 47.25 9 134 10 A 15.90 20.99 1 848 10 C 7.28 12.73 9 582 10 B 6.53 9.52 9 801 10 C 11.44 14.24 1 801 10 A 14.79 30.86 1 209 10 A 8.55 15.14 1 514 10 A 13.54 11.80 1	44 11 14 18
127 10 C 26.04 31.19 3 61 10 B 19.78 30.58 1 175 10 C 11.23 16.95 1 118 10 B 44.82 47.25 1 134 10 A 15.90 20.99 1 848 10 C 7.28 12.73 1 282 10 B 6.53 9.52 1 584 10 C 11.44 14.24 1 801 10 A 14.79 30.86 1 209 10 A 8.55 15.14 1 514 10 A 13.54 11.80 1	45 6 38 16
61 10 B 19.78 30.58 175 10 C 11.23 16.95 1 118 10 B 44.82 47.25 1 134 10 A 15.90 20.99 1 848 10 C 7.28 12.73 1 282 10 B 6.53 9.52 1 584 10 C 11.44 14.24 1 801 10 A 14.79 30.86 1 209 10 A 8.55 15.14 1 514 10 A 13.54 11.80 1	46 2 48 1
175 10 C 11.23 16.95 118 10 B 44.82 47.25 47.25 134 10 A 15.90 20.99 1 848 10 C 7.28 12.73 1 282 10 B 6.53 9.52 1 584 10 C 11.44 14.24 1 801 10 A 14.79 30.86 1 209 10 A 8.55 15.14 1 514 10 A 13.54 11.80 1	47 8 56 27
118 10 A 15.90 20.99 1 134 10 A 15.90 20.99 1 848 10 C 7.28 12.73 1 282 10 B 6.53 9.52 9.52 584 10 C 11.44 14.24 1 801 10 A 14.79 30.86 1 209 10 A 8.55 15.14 1 514 10 A 13.54 11.80 1	48 13 52 36
134 10 A 15.90 20.99 848 10 C 7.28 12.73 282 10 B 6.53 9.52 584 10 C 11.44 14.24 1 801 10 A 14.79 30.86 1 209 10 A 8.55 15.14 1 514 10 A 13.54 11.80 1	49 68 30
848 10 C 7.28 12.73 282 10 B 6.53 9.52 584 10 C 11.44 14.24 1 801 10 A 14.79 30.86 1 209 10 A 8.55 15.14 1 514 10 A 13.54 11.80 1	50 47 47 13
282 10 B 6.53 9.52 584 10 C 11.44 14.24 801 10 A 14.79 30.86 209 10 A 8.55 15.14 514 10 A 13.54 11.80	1 49 10
584 10 C 11.44 14.24 801 10 A 14.79 30.86 209 10 A 8.55 15.14 514 10 A 13.54 11.80	2 35 17 7
801 10 A 14.79 30.86 209 10 A 8.55 15.14 514 10 A 13.54 11.80	3 55 45 13
209 10 A 8.55 15.14 514 10 A 13.54 11.80	1 55 20 19
514 10 A 13.54 11.80	5 15 30 26
	6 25 30 3

Appendix 1: Cost allocation to customers in Solomon instances in a collaborative scenario – continued from previous page.

Instance Mode	Nodo	V coordinato	V goodingto	Domend	Earliest	Latest	Service	Comion	Collaboration	Stand-alone	Other carriers'
TIIStalle	anoni		1 COOLUMBAGE	Demain	service time	service time	time	Carrier	Cost	Cost	lowest Cost
R201.50	7	20	50	ಬ	331	410	10	В	13.01	13.43	15.27
R201.50	∞	10	43	6	404	481	10	B	17.85	21.05	21.62
R201.50	6	55	09	16	400	497	10	Α	19.95	23.38	28.72
R201.50	10	30	09	16	577	632	10	B	18.12	26.52	17.40
R201.50	11	20	65	12	206	325	10	C	16.68	30.88	17.89
R201.50	12	50	35	19	228	345	10	C	10.37	7.95	10.16
R201.50	13	30	25	23	069	827	10	Α	4.61	9.56	8.04
R201.50	14	15	10	20	32	243	10	В	10.58	34.05	17.84
R201.50	15	30	ιΩ	∞	175	300	10	B	16.35	19.66	18.21
R201.50	16	10	20	19	272	373	10	Α	13.95	15.61	28.22
R201.50	17	v	30	2	733	870	10	B	26.37	33.21	31.78
R201.50	18	20	40	12	377	434	10	C	10.88	17.32	9.32
R201.50	19	15	09	17	269	378	10	Α	11.66	33.54	16.61
R201.50	20	45	65	6	581	999	10	A	18.24	17.33	21.04
R201.50	21	45	20	11	214	331	10	B	12.21	14.36	12.74
R201.50	22	45	10	18	409	494	10	C	11.26	38.80	16.01
R201.50	23	55	2	29	206	325	10	A	20.81	49.46	27.92
R201.50	24	65	35	က	704	847	10	C	17.26	35.93	21.82
R201.50	25	65	20	9	817	926	10	B	24.06	39.97	29.58
										Continu	Continued on next page

Appendix 1: Cost allocation to customers in Solomon instances in a collaborative scenario – continued from previous page.

ne Other carriers'	Cost lowest Cost	71 10.82	2.90 1.96	2.31 2.52	66 19.55	16 15.37	13 9.43	78 26.08	53 17.36	41 26.06	62 40.32	08 32.64	65 13.41	91 46.89	70 28.37	9.45 12.04	64 17.15	06 11.47	56 31.73	01 10.55	Continued on next news
Stand-alone	ŭ	11.71	2.	2.	24.66	15.16	11.13	29.78	28.53	34.41	60.62	30.08	13.65	41.91	34.70	9.	24.64	20.06	30.56	34.01	tuo,
Collaboration	Cost	8.54	1.61	1.85	21.61	18.70	10.62	24.26	18.03	19.33	33.22	22.27	10.92	25.44	28.68	8.92	15.85	11.32	28.52	10.38	
Germon	Callier	В	Α	C	C	Α	B	Α	B	A	B	C	C	Α	B	Α	B	Α	C	C	
Service	time	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	
Latest	service time	299	255	255	313	354	275	222	200	614	813	208	693	405	224	437	511	172	705	340	
Earliest	service time	588	104	114	190	259	152	099	45	529	989	41	909	302	33	360	396	25	620	233	
Domend	Demaila	17	16	16	6	21	27	23	11	14	∞	ರ	∞	16	31	6	ರ	ಬ	7	18	
$V_{ocordinato}$	i coordinate	30	40	37	42	09	52	69	52	55	65	09	20	ಬ	12	25	7	12	33	14	
V condinate V coordinate	A coolumate	45	35	41	64	40	31	35	53	65	63	2	20	rc	09	40	42	24	23	111	
		26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	
Instance Mode	IIIStanice	R201.50	R201.50	R201.50	R201.50	R201.50	R201.50	R201.50	R201.50	R201.50	R201.50	R201.50	R201.50	R201.50	R201.50	R201.50	R201.50	R201.50	R201.50	R201.50	

Appendix 1: Cost allocation to customers in Solomon instances in a collaborative scenario – continued from previous page.

Other carriers'	lowest Cost	24.74	31.47	22.39	24.42	39.93	10.87	6.33	12.12	8.83	8.49	7.85	10.67	6.46	8.40	15.61	69.6	8.48	33.52	18.74	Continued on next page
Stand-alone	Cost	18.81	45.48	19.60	19.24	44.45	13.16	15.61	11.45	7.49	7.75	6.44	11.62	13.97	12.45	12.38	9.19	16.85	22.92	16.77	Continue
Collaboration	Cost	16.26	22.51	13.14	17.82	36.27	8.88	4.59	6.55	5.22	3.38	3.85	4.40	4.48	5.18	5.80	7.06	6.85	15.07	8.87	
Carrior	Carrier	C	A	C	В	B	C	A	C	A	C	A	В	В	C	A	C	В	C	В	
Service	time	10	10	10	10	10	10	06	06	06	06	06	06	06	06	06	06	06	06	06	
Latest	service time	189	628	250	906	540	642	296	870	146	782	29	702	225	324	605	410	505	721	92	
Earliest	service time	29	515	85	773	501	547	912	825	65	727	15	621	170	255	534	357	448	652	30	
Domend	Demaila	16	П	27	36	30	13	10	30	10	10	10	20	20	20	10	10	10	20	30	
$^{ m V}_{coordinato}$		38	48	26	52	89	47	89	20	99	89	65	69	99	89	20	99	69	85	75	
X coordinate		9	23	∞	13	9	47	45	45	42	42	42	40	40	38	38	35	35	25	22	
		45	46	47	48	49	20	\vdash	2	က	4	2	9	7	∞	6	10	П	12	13	
Instance Node	DOMESTIC	R201.50	R201.50	R201.50	R201.50	R201.50	R201.50	C101.50	C101.50	C101.50	C101.50	C101.50	C101.50	C101.50	C101.50	C101.50	C101.50	C101.50	C101.50	C101.50	

Appendix 1: Cost allocation to customers in Solomon instances in a collaborative scenario – continued from previous page.

Other carriers'	lowest Cost	16.33	17.34	25.74	16.71	18.25	20.96	2.72	2.59	4.01	7.53	7.87	9.28	5.48	13.62	9.42	15.90	13.63	22.35	23.60	Continued on next page
Stand-alone O	Cost	42.00	24.50	27.18	30.56	27.20	30.91	5.41	2.64	4.38	4.28	9.01	8.01	15.44	6.41	17.60	9.74	16.51	17.75	14.58	Continued
Collaboration	Cost	13.81	10.53	13.62	9.62	11.92	13.47	1.84	1.03	2.12	3.44	4.88	4.67	3.33	5.89	5.31	9.80	8.37	11.65	8.56	
Carrior	Callie	В	Α	C	C	В	A	C	В	C	В	A	A	A	В	C	В	В	C	C	
Service	time	06	06	06	90	90	06	06	06	90	90	90	06	06	90	90	90	06	06	06	
Latest	service time	620	429	528	148	254	345	73	396	883	222	144	224	701	316	593	405	504	237	100	
Earliest	service time	292	384	475	66	179	278	10	914	812	732	65	169	622	261	546	358	449	200	31	
Domand	Demaila	10	40	40	20	20	10	10	20	20	10	10	40	10	10	20	10	10	20	30	
		85	80	85	75	75	80	20	52	52	55	50	52	55	52	55	20	55	35	40	
Instance Node X econdinate V econdinate	A coordinate	22	20	20	18	15	15	30	30	28	28	25	25	25	23	23	20	20	10	10	
Nodo	none	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	
Instance	TIIStalle	C101.50																			

Appendix 1: Cost allocation to customers in Solomon instances in a collaborative scenario – continued from previous page.

lone Other carriers'	Cost lowest Cost	15.15 24.65	30.14 13.24	30.84 13.87	24.49 21.51	23.82 16.66	52.75 19.22	24.20 25.31	16.39 10.23	9.14 9.12	10.27 7.68	7.16 6.60	12.65 8.24	16.14 13.46	17.98 10.12	8.05 6.91	18.94 10.37	10.33 6.12	12.04 10.14	18.27 21.04	Continued on next page
Stand-alone																					υ
Collaboration	Cost	9.01	7.52	10.87	8.82	9.75	12.92	13.36	7.89	6.73	6.14	3.75	6.16	7.18	6.45	3.77	6.73	3.65	5.25	11.08	
Carrior	Carrier	O	C	A	A	C	B	A	A	В	A	В	В	A	C	В	O	A	В	C	·
Service	time	06	06	06	06	90	06	06	06	06	90	90	90	06	06	90	06	06	90	06	
Latest	service time	158	816	344	716	434	522	624	321	235	149	80	412	009	509	1127	693	1066	880	471	
Earliest	service time	87	751	283	665	383	479	292	264	166	89	16	359	541	448	1054	632	1001	815	311	
Domend	Demand	40	20	10	10	20	30	20	10	10	20	10	10	10	30	10	10	10	10	10	
V coordinate	r coordinate	40	45	35	45	40	40	45	30	32	32	35	30	30	32	35	30	35	32	75	
X coordinate		8	∞	v	ıO	2	0	0	35	35	33	33	32	30	30	30	28	28	26	52	
		33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	20	1	
Instance Node	TIISCATICE	C101.50	C101.50	C101.50	C101.50	C101.50	C101.50	C101.50	C101.50	C101.50	C101.50	C101.50	C201.50								

Appendix 1: Cost allocation to customers in Solomon instances in a collaborative scenario – continued from previous page.

Other carriers'	lowest Cost	13.14	20.52	17.66	6.20	8.58	16.13	3.51	7.16	6.11	7.00	14.39	10.57	17.52	11.37	19.76	9.79	16.17	20.24	1.56	n next page
Stand-alone Otl	Cost	11.39	30.58	22.45	11.67	7.16	23.39	6.94	19.61	99.9	12.16	25.87	8.11	15.96	19.25	15.48	18.55	8.71	12.13	2.20	Continued on next page
Collaboration	Cost	5.92	16.02	11.64	4.44	3.11	12.07	1.47	3.59	3.23	5.21	12.38	5.69	9.01	6.48	9.59	7.63	5.54	8.06	0.85	
Comion	Callie	O	C	A	A	В	A	A	A	O	В	C	В	В	C	В	C	В	В	A	
Service	time	06	06	06	06	06	06	06	06	06	06	06	06	06	06	06	06	06	06	06	
Latest	service time	373	1327	1421	185	657	1233	3047	2761	2951	2858	2279	2565	2186	2376	2094	2471	1902	1997	170	
Earliest	service time	213	1167	1261	25	497	1073	2887	2601	2791	2698	2119	2405	2026	2216	1934	2311	1742	1837	10	
Domend	Demaila	30	10	10	10	20	20	20	10	10	10	20	30	10	40	40	20	20	10	10	
		02	69	99	65	42	02	09	20	99	69	85	75	85	80	85	75	75	80	20	
V coordinate V coordinate	A coordinate	45	62	09	42	16	58	34	28	35	35	25	22	22	20	20	18	15	15	30	
		2	အ	4	2	9	2	∞	6	10	11	12	13	14	15	16	17	18	19	20	
Ingtonoo Modo	HISTAILCE	C201.50	C201.50	C201.50	C201.50	C201.50	C201.50	C201.50	C201.50	C201.50	C201.50	C201.50	C201.50	C201.50							

Appendix 1: Cost allocation to customers in Solomon instances in a collaborative scenario – continued from previous page.

Instance Node		ordinate	X coordinate V coordinate	Domand	Earliest	Latest	Service	Carrier	Collaboration	Stand-alone	Other carriers'
		Ooi aiiiaw		Ciliana	service time	service time	time	Carrica	Cost	Cost	lowest Cost
C201.50	21	30	26	20	2983	3143	06	В	5.30	5.35	6.28
C201.50	22	28	52	20	22	182	06	A	0.67	3.04	2.57
C201.50	23	14	99	10	1643	1803	06	A	5.40	20.97	7.02
C201.50	24	25	20	10	116	276	06	C	1.38	4.86	2.74
C201.50	25	22	99	40	2504	2664	06	В	8.69	9.74	9.26
C201.50	26	∞	62	10	1545	1705	06	В	5.83	8.35	16.04
C201.50	27	23	52	10	209	369	06	A	1.48	4.01	3.79
C201.50	28	4	55	20	1447	1607	06	A	6.65	19.79	10.03
C201.50	29	20	20	10	398	558	06	В	1.80	6.56	4.08
C201.50	30	20	55	10	303	463	06	C	6.59	12.23	7.20
C201.50	31	10	35	20	781	941	90	C	8.88	16.54	15.46
C201.50	32	10	40	30	593	753	06	В	3.99	9.82	11.38
C201.50	33	∞	40	40	685	845	90	В	5.32	10.96	12.75
C201.50	34	∞	45	20	1346	1506	06	A	7.09	14.45	9.74
C201.50	35	ಬ	35	10	876	1036	06	C	8.22	19.50	15.30
C201.50	36	ಬ	45	10	1253	1413	06	A	5.86	18.35	10.14
C201.50	37	2	40	20	971	1131	06	C	6.05	19.15	13.08
C201.50	38	0	40	30	1063	1223	06	В	8.78	21.64	20.96
C201.50	39	0	45	20	1158	1318	06	C	8.39	30.21	14.29
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Appendix 1: Cost allocation to customers in Solomon instances in a collaborative scenario – continued from previous page.

ion stand-alone Uther carriers Cost lowest Cost	COSt IOWEST	42.45 20.52	.14 13.98 6.70	.13 8.09 8.68		.85 11.75 6.24	11.75 26.20 2	11.75 26.20 8.88	11.75 26.20 8.88 20.06	11.75 26.20 8.88 20.06 6.81	11.75 26.20 8.88 20.06 6.81	11.75 26.20 8.88 20.06 6.81 6.31	11.75 26.20 8.88 20.06 6.81 6.31 44.72	11.75 26.20 8.88 20.06 6.81 6.31 44.72 9.82 30.34	11.75 26.20 8.88 20.06 6.81 6.31 44.72 9.82 30.34 27.92	11.75 26.20 8.88 20.06 6.81 6.31 44.72 9.82 30.34 27.92	11.75 26.20 8.88 20.06 6.81 6.31 44.72 9.82 30.34 27.92 21.68	11.75 26.20 8.88 20.06 6.81 6.31 44.72 9.82 30.34 27.92 21.68 23.56 24.05	11.75 26.20 8.88 20.06 6.81 6.31 44.72 9.82 30.34 27.92 21.68 23.56 24.05	11.75 26.20 8.88 20.06 6.81 6.31 44.72 9.82 30.34 27.92 21.68 23.56 24.05 22.63
Collaboration Cost		12.59	5.14	5.13	3.85		11.00	11.00	11.00 4.27 6.01	11.00 4.27 6.01 4.28	11.00 4.27 6.01 4.28 0.89	11.00 4.27 6.01 4.28 0.89 25.06	11.00 4.27 6.01 4.28 0.89 25.06 7.52	11.00 4.27 6.01 4.28 0.89 25.06 7.52	11.00 4.27 6.01 4.28 0.89 25.06 7.52 13.82	11.00 4.27 6.01 4.28 0.89 25.06 7.52 12.26 13.82	11.00 4.27 6.01 4.28 0.89 25.06 7.52 12.26 13.82 17.37 9.32	11.00 4.27 6.01 4.28 0.89 25.06 7.52 12.26 13.82 17.37 9.32	11.00 4.27 6.01 4.28 0.89 25.06 7.52 12.26 13.82 17.37 9.32	11.00 4.27 6.01 4.28 0.89 25.06 7.52 12.26 13.82 17.37 9.32 22.42 14.90 18.16
Carrier	t	В	В	A	В		А	A A	C A C	A A D A	C A C A A	CCPCPP	A C C A C A A	A A C C A A	A A C C A C A A	CABCGACAA	P C P P C C P C P P	C	B C A C A A A A A A A A A A A A A A A A	C B C B B B C C B B
Service	amn	06	06	06	06		06	06	06 06	06 06	06 06 06	06 06 06	06 06 06 06	90 90 90 90 10	90 90 90 90 10	90 90 90 90 10 10	90 90 90 90 10 10	90 90 90 90 10 10	90 90 90 90 10 10 10	90 90 90 90 10 10 10 10
Latest service time	service unite	1979	2918	2826	2733		2073	2073 2265	2073 2265 2169	2073 2265 2169 2640	2073 2265 2169 2640 3016	2073 2265 2169 2640 3016	2073 2265 2169 2640 3016 1127 2452	2073 2265 2169 2640 3016 1127 2452	2073 2265 2169 2640 3016 1127 2452 175 80	2073 2265 2169 2640 3016 1127 2452 175 80	2073 2265 2169 2640 3016 1127 2452 175 80 139	2073 2265 2169 2640 3016 1127 2452 175 80 139 171	2073 2265 2169 2640 3016 1127 2452 175 80 139 171 71	2073 2265 2169 2640 3016 1127 2452 175 80 139 171 71
Earliest service time	service crime	1819	2758	2666	2573	1913		2105	2105	2105 2009 2480	2105 2009 2480 2856	2105 2009 2480 2856 967	2105 2009 2480 2856 967 2292	2105 2009 2480 2856 967 2292 145	2105 2009 2480 2856 967 2292 145	2105 2009 2480 2856 967 2292 145 50	2105 2009 2480 2856 967 2292 145 50 109	2105 2009 2480 2856 967 2292 145 50 109 141	2105 2009 2480 2856 967 2292 145 50 109 1411 411	2105 2009 2480 2856 967 22292 145 50 109 141 41
Demand	1	10	10	20	10	10		10	10	10 30 10	10 30 10	10 30 10 10	10 30 10 10 10	10 30 10 10 10 20	10 30 10 10 10 20 30	10 30 10 10 10 20 30	10 30 10 10 10 20 20 30 40	10 30 10 10 10 20 30 40	10 30 10 10 10 20 30 40 40	10 30 10 10 10 20 30 40 40 20 20
Y coordinate	1	18	32	32	35	20		30	30	30 25 35	30 25 35 40	30 35 40 20 20	30 25 35 40 32	30 32 32 33 33 83 83	30 25 40 20 32 32 75	30 32 32 33 34 35 36 37 37 38 37 37 38 37 38 37 38 38 38 38 39 39 39 39 39 39 39 39 39 39 39 39 39	30 32 32 33 34 35 35 36 36 37 38 38 38 38	30 32 32 33 34 35 35 36 37 38 38 38 38 38 38 38 38 38 38 38 38 38	30 30 30 30 30 30 30 30 30 30 30 30 30 3	30 30 32 32 33 34 35 35 36 37 37 37 37 37 37 37 37 37 37 37 37 37
Instance Node X coordinate		36	35	33	33	32		30	30	30 34 30	30 30 36	30 34 30 36 48	30 34 30 36 48 26	30 34 30 36 48 25	30 34 36 36 36 27 27 27	30 34 36 36 48 25 22 22	30 34 36 36 37 38 38 39 30 30 30 30 30 30 30 30 30 30 30 30 30	30 34 36 36 48 27 22 20 20	30 34 36 36 37 38 38 38 38 39 30 30 30 30 30 30 30 30 30 30 30 30 30	30 34 36 36 48 22 22 20 20 18
Node		40	41	42	43	44		45	45	45 46 47	45 46 47 48	45 46 47 48 49	45 46 47 48 49 50	45 46 47 48 49 50	45 46 47 48 49 50 2	45 46 47 48 49 50 2 3	45 46 47 48 49 60 10 48 49	45 46 48 49 49 49 49 49 40 50 40 50 40 40 40 40 40 40 40 40 40 40 40 40 40	45 46 47 48 49 50 1 1 3 3 6	45 46 47 48 49 50 1 1 2 3 4 4 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7
Instance I		C201.50	C201.50	C201.50	C201.50	C201.50		C201.50	C201.50 C201.50	C201.50 C201.50 C201.50	C201.50 C201.50 C201.50 C201.50	C201.50 C201.50 C201.50 C201.50	C201.50 C201.50 C201.50 C201.50 C201.50	C201.50 C201.50 C201.50 C201.50 C201.50 RC101.50	C201.50 C201.50 C201.50 C201.50 C201.50 RC101.50	C201.50 C201.50 C201.50 C201.50 C201.50 RC101.50 RC101.50	C201.50 C201.50 C201.50 C201.50 C201.50 RC101.50 RC101.50 RC101.50	C201.50 C201.50 C201.50 C201.50 C201.50 C201.50 RC101.50 RC101.50 RC101.50 RC101.50	C201.50 C201.50 C201.50 C201.50 C201.50 C201.50 RC101.50 RC101.50 RC101.50 RC101.50 RC101.50	C201.50 C201.50 C201.50 C201.50 C201.50 RC101.50 RC101.50 RC101.50 RC101.50 RC101.50 RC101.50 RC101.50

Appendix 1: Cost allocation to customers in Solomon instances in a collaborative scenario – continued from previous page.

Appendix 1: Cost allocation to customers in Solomon instances in a collaborative scenario – continued from previous page.

Nod	Instance Node X coordinate	rdinata	V coordinate	Demand	Earliest	Latest	Service	Carrier	Collaboration	Stand-alone	Other carriers'
		ımıave	1 COOLUMBAGE	Demain	service time	service time	time	Callie	Cost	Cost	lowest Cost
28	8	92	30	10	62	92	10	A	27.24	28.96	25.16
29	6	06	35	10	29	26	10	В	24.14	44.10	26.95
30	0	88	30	10	74	104	10	C	20.18	54.35	24.56
31	1	88	35	20	61	91	10	A	21.82	27.49	23.32
32	2	87	30	10	131	161	10	B	17.69	33.40	25.55
33	3	85	25	10	51	81	10	A	25.03	28.94	26.12
34	4	85	35	30	111	141	10	B	13.22	35.48	20.24
35	2	29	85	20	139	169	10	C	20.65	23.08	28.23
36	9	65	85	40	43	73	10	A	23.46	68.11	27.03
37	2	65	82	10	124	154	10	C	15.72	15.61	19.17
38	×	62	80	30	75	105	10	C	15.20	22.71	17.17
39	6	09	80	10	37	29	10	B	12.77	17.43	14.49
40	0	09	85	30	85	115	10	B	18.07	33.99	17.92
4	1	58	22	20	92	122	10	В	16.08	20.45	19.02
42	2	55	80	10	33	63	10	B	11.70	14.35	10.98
43	3	55	85	20	128	158	10	C	19.46	19.55	25.56
44	4	55	82	10	64	94	10	C	17.06	19.36	20.21
45	5	20	82	10	37	29	10	C	17.14	19.34	13.12
46	9	18	80	10	113	143	10	C	14.09	16.71	26.30

Appendix 1: Cost allocation to customers in Solomon instances in a collaborative scenario – continued from previous page.

			V	Damand	Latings	חממתמסו	DOI A TOO	Carrior	Collaboration	Stand-alone	Other carriers
instance mode		A coolumnate	r coordinate	Demain	service time	service time	time	Callel	Cost	Cost	lowest Cost
RC101.50	47	2	45	10	45	75	10	A	13.90	21.02	23.89
RC101.50	48	42	5	10	151	181	10	Α	23.87	45.41	21.01
RC101.50	49	42	12	10	104	134	10	В	10.51	13.28	17.62
RC101.50	50	72	35	30	116	146	10	A	26.30	46.03	15.58
RC201.50	\vdash	25	85	20	673	793	10	B	17.76	22.99	21.04
RC201.50	2	22	75	30	152	272	10	B	92.9	11.73	15.15
RC201.50	3	22	85	10	471	591	10	C	15.58	25.58	17.93
RC201.50	4	20	80	40	644	764	10	B	11.78	15.18	16.03
RC201.50	2	20	85	20	73	193	10	B	17.67	26.12	22.58
RC201.50	9	18	75	20	388	208	10	B	9.57	14.42	16.38
RC201.50	7	15	75	20	300	420	10	B	8.29	18.91	15.44
RC201.50	∞	15	80	10	367	487	10	C	14.19	29.01	20.02
RC201.50	6	10	35	20	371	491	10	C	14.47	18.28	17.38
RC201.50	10	10	40	30	519	639	10	A	13.24	28.32	15.14
RC201.50	11	∞	40	40	195	315	10	A	7.38	16.18	14.52
RC201.50	12	∞	45	20	223	343	10	A	10.43	16.09	13.44
RC201.50	13	ಬ	35	10	653	773	10	C	17.28	22.45	23.97
RC201.50	14	ಬ	45	10	35	155	10	A	6.73	20.74	17.39
RC201.50	15	23	40	20	174	294	10	C	10.68	17.20	23.85

Appendix 1: Cost allocation to customers in Solomon instances in a collaborative scenario – continued from previous page.

Instance Mode	Todo	Y coordinate	V coordinate	Domand	Earliest	Latest	Service	Carrior	Collaboration	Stand-alone	Other carriers'
TIESCOTICE T	ano.			Demand	service time	service time	time	Carrier	Cost	Cost	lowest Cost
RC201.50	16	0	40	20	255	375	10	O	9.70	22.28	20.51
RC201.50	17	0	45	20	703	823	10	В	23.12	50.01	26.01
RC201.50	18	44	ಬ	20	335	455	10	A	15.13	28.75	28.94
RC201.50	19	42	10	40	254	374	10	A	10.58	20.84	17.58
RC201.50	20	42	15	10	537	299	10	В	8.23	19.03	16.43
RC201.50	21	40	ಬ	10	215	335	10	В	13.72	34.27	19.45
RC201.50	22	40	15	40	375	495	10	A	11.38	20.33	18.44
RC201.50	23	38	ಬ	30	201	321	10	C	13.51	57.91	22.02
RC201.50	24	38	15	10	681	801	10	A	89.6	16.80	16.90
RC201.50	25	35	ಬ	20	784	904	10	A	21.42	32.57	30.41
RC201.50	26	95	30	30	529	649	10	В	23.02	61.39	30.31
RC201.50	27	95	35	20	146	266	10	A	18.50	55.99	28.34
RC201.50	28	92	30	10	149	269	10	C	13.57	36.32	25.49
RC201.50	29	06	35	10	194	314	10	C	10.67	32.24	26.31
RC201.50	30	88	30	10	246	366	10	В	8.72	32.17	25.19
RC201.50	31	88	35	20	165	285	10	В	9.84	31.19	18.33
RC201.50	32	87	30	10	621	741	10	C	30.92	42.68	32.01
RC201.50	33	85	25	10	80	200	10	C	16.03	28.82	28.43
RC201.50	34	85	35	30	487	209	10	A	12.20	58.84	25.63
										Continu	Continued on next page

Appendix 1: Cost allocation to customers in Solomon instances in a collaborative scenario – continued from previous page.

Service time time Cost Cost 163 10 A 18.02 43.48 163 10 A 19.43 32.74 677 10 C 11.86 30.51 398 10 C 10.48 20.63 449 10 C 9.32 16.26 449 10 C 7.30 16.26 449 10 C 7.30 15.75 694 10 A 16.26 33.30 157 10 C 7.30 15.75 694 10 A 16.26 33.30 157 10 A 10.52 20.55 158 10 C 15.76 48.92 609 10 A 10.85 48.92 852 10 A 10.84 21.07 852 10 A 10.84 21.07 867 10	Instance Node X coordinate Y		Y coordinate	Demand	Earliest	Latest	Service	Carrier	Collaboration	Stand-alone	Other carriers'
777 10 B 18.02 43.48 163 10 A 19.43 32.74 677 10 C 11.86 30.51 398 10 C 10.48 20.63 449 10 C 9.32 16.26 449 10 A 16.49 30.62 496 10 B 11.07 39.98 153 10 C 7.30 15.75 694 10 A 16.26 33.30 157 10 A 10.52 20.55 157 10 C 15.76 24.98 609 10 A 10.85 48.92 560 10 A 10.85 48.92 560 10 A 10.84 21.07 627 10 B 9.32 23.29 628 10 C 20.51 30.31 87 10 C 20.51 30.31 87 10 C 8.67				- 1	service time	service time	time		Cost	Cost	lowest Cost
163 10 A 19.43 32.74 677 10 C 11.86 30.51 398 10 C 10.48 20.63 449 10 C 9.32 16.26 449 10 A 16.49 30.62 496 10 B 11.07 39.98 153 10 C 7.30 15.75 694 10 A 10.52 20.55 157 10 C 15.76 24.98 609 10 A 10.84 21.07 852 10 A 10.84 21.07 852 10 B 17.98 30.78 607 10 B 17.98 30.78 560 10 B 9.32 23.29 627 10 C 20.51 9.51 87 10 C 20.51 9.51 87 10 C 20.51 9.51 87 10 C 20.51	35 67 85 20		20		229	777	10	В	18.02	43.48	24.98
677 10 C 11.86 30.51 398 10 C 10.48 20.63 184 10 C 9.32 16.26 1 449 10 A 16.49 30.62 1 496 10 B 11.07 39.98 1 153 10 C 7.30 15.75 1 694 10 A 16.26 33.30 2 157 10 A 10.52 24.98 1 609 10 A 10.85 48.92 1 525 10 A 10.84 21.07 2 852 10 A 10.84 21.07 2 627 10 B 9.32 23.29 1 627 10 C 20.51 9.51 2 87 10 A 5.21 9.51 3 87 10 C 8.67 13.84 1 88 10 C 9.51 9.51<	36 65 85 40	85 40	40	_	43	163	10	A	19.43	32.74	26.66
398 10 C 10.48 20.63 184 10 C 9.32 16.26 1 449 10 A 16.49 30.62 1 496 10 B 11.07 39.98 1 153 10 C 7.30 15.75 1 694 10 A 16.26 33.30 2 157 10 A 10.52 20.55 1 609 10 A 10.85 48.92 1 609 10 A 10.84 21.07 1 852 10 A 10.84 21.07 2 852 10 B 17.98 30.78 2 627 10 C 20.51 30.31 2 627 10 C 20.51 30.31 2 87 10 C 8.67 13.81 1 143 10 A 16.56 15.94 1	37 65 82 10	82 10	10	_	557	229	10	C	11.86	30.51	20.43
184 10 C 9.32 16.26 449 10 A 16.49 30.62 1 496 10 B 11.07 39.98 1 153 10 C 7.30 15.75 1 694 10 A 16.26 33.30 2 337 10 A 10.52 20.55 1 609 10 A 10.84 24.98 1 609 10 A 10.84 21.07 1 852 10 A 10.84 21.07 2 852 10 B 17.98 30.78 2 627 10 C 20.51 30.31 2 198 10 C 20.51 30.31 2 87 10 C 8.67 13.81 143 10 A 16.56 15.94 1	38 62 80 3	80 3	က	0	278	398	10	C	10.48	20.63	20.19
449 10 A 16.49 30.62 496 10 B 11.07 39.98 1 153 10 C 7.30 15.75 1 694 10 A 16.26 33.30 2 337 10 A 10.52 20.55 1 609 10 A 10.85 48.92 1 609 10 A 10.84 21.07 1 852 10 B 17.98 30.78 2 627 10 B 9.32 23.29 1 627 10 C 20.51 30.31 2 198 10 C 8.67 13.81 87 10 A 16.56 15.94 1 143 10 A 16.56 15.94 1	39 60 80 1	80 1	Ţ	0	64	184	10	C	9.32	16.26	15.30
496 10 B 11.07 39.98 153 10 C 7.30 15.75 1 694 10 A 16.26 33.30 2 337 10 A 10.52 20.55 1 157 10 C 15.76 24.98 1 609 10 A 10.84 21.07 1 852 10 A 10.84 21.07 2 560 10 B 17.98 30.78 2 627 10 C 20.51 30.31 2 198 10 C 20.51 30.31 2 87 10 C 8.67 13.81 1 143 10 A 16.56 15.94 1	40 60 85 30	85 30	30	_	329	449	10	A	16.49	30.62	15.09
153 10 C 7.30 15.75 694 10 A 16.26 33.30 2 337 10 A 10.52 20.55 1 157 10 C 15.76 24.98 1 609 10 A 10.85 48.92 1 225 10 A 10.84 21.07 1 852 10 B 17.98 30.78 2 627 10 B 9.32 23.29 1 198 10 C 20.51 9.51 2 87 10 C 8.67 13.81 1 143 10 A 16.56 15.94 1	41 58 75 20		20	_	376	496	10	В	11.07	39.98	14.86
694 10 A 16.26 33.30 2 337 10 A 10.52 20.55 1 157 10 C 15.76 24.98 1 609 10 A 10.84 21.07 1 852 10 B 17.98 30.78 2 560 10 B 9.32 23.29 1 627 10 C 20.51 30.31 2 198 10 A 5.21 9.51 87 10 C 8.67 13.81 143 10 A 16.56 15.94	42 55 80 10	80 10	1(33	153	10	C	7.30	15.75	12.34
337 10 A 10.52 20.55 157 10 C 15.76 24.98 1 609 10 A 10.85 48.92 1 225 10 A 10.84 21.07 1 852 10 B 17.98 30.78 2 560 10 B 9.32 23.29 1 627 10 C 20.51 30.31 2 198 10 A 5.21 9.51 2 87 10 C 8.67 13.81 1 143 10 A 16.56 15.94 1	43 55 85 20		20		574	694	10	A	16.26	33.30	26.50
157 10 C 15.76 24.98 1 609 10 A 10.85 48.92 1 225 10 A 10.84 21.07 1 852 10 B 17.98 30.78 2 560 10 B 9.32 23.29 1 627 10 C 20.51 30.31 2 198 10 A 5.21 9.51 87 10 C 8.67 13.81 143 10 A 16.56 15.94	44 55 82 10	82 10	10	_	217	337	10	A	10.52	20.55	15.14
609 10 A 10.85 48.92 1 225 10 A 10.84 21.07 1 852 10 B 17.98 30.78 2 560 10 B 9.32 23.29 1 627 10 C 20.51 30.31 2 198 10 A 5.21 9.51 2 87 10 C 8.67 13.81 1 143 10 A 16.56 15.94 1	45 20 82 10	82 10	10		37	157	10	C	15.76	24.98	17.85
225 10 A 10.84 21.07 1 852 10 B 17.98 30.78 2 560 10 B 9.32 23.29 1 627 10 C 20.51 30.31 2 198 10 A 5.21 9.51 2 87 10 C 8.67 13.81 1 143 10 A 16.56 15.94 1	46 18 80 10	80 10	10		489	609	10	A	10.85	48.92	17.65
852 10 B 17.98 30.78 2 560 10 B 9.32 23.29 1 627 10 C 20.51 30.31 2 198 10 A 5.21 9.51 2 87 10 C 8.67 13.81 1 143 10 A 16.56 15.94 1	47 2 45 10	45 10	10		105	225	10	A	10.84	21.07	16.90
560 10 B 9.32 23.29 1 627 10 C 20.51 30.31 2 198 10 A 5.21 9.51 2 87 10 C 8.67 13.81 1 143 10 A 16.56 15.94 1	48 42 5 10	5 10	10		732	852	10	В	17.98	30.78	24.13
627 10 C 20.51 30.31 2 198 10 A 5.21 9.51 87 10 C 8.67 13.81 143 10 A 16.56 15.94	49 42 12 10	12 10	10	_	440	260	10	В	9.32	23.29	13.18
198 10 A 5.21 9.51 87 10 C 8.67 13.81 143 10 A 16.56 15.94 1	50 72 35 30	35 30	30		202	627	10	C	20.51	30.31	21.14
87 10 C 8.67 13.81 143 10 A 16.56 15.94	1 41 49 10	1	10	_	133	198	10	A	5.21	9.51	06.9
143 10 A 16.56 15.94	2 35 17 7		2		22	87	10	C	8.67	13.81	9.82
	3 55 45 13	1	Ï	33	86	143	10	A	16.56	15.94	14.47

Appendix 1: Cost allocation to customers in Solomon instances in a collaborative scenario – continued from previous page.

Instance Mode	do	V coordinate V coordinate	V coordinate	Domend	Earliest	Latest	Service	Corrior	Collaboration	Stand-alone	Other carriers'
בַּע	200	A coordinate	r coordinate	Demand	service time	service time	time	Carrier	Cost	Cost	lowest Cost
R109.50	4	55	20	19	123	184	10	C	12.26	26.36	16.78
m R109.50	ರ	15	30	26	20	93	10	Α	9.13	13.01	10.18
$\mathrm{R}109.50$	9	25	30	က	92	131	10	В	12.67	9.21	86.6
m R109.50	7	20	50	ಬ	61	110	10	B	14.90	14.65	14.04
R109.50	∞	10	43	6	75	124	10	C	15.35	18.89	21.08
R109.50	6	55	09	16	74	129	10	Α	17.59	25.25	15.86
R109.50	10	30	09	16	107	150	10	C	19.12	20.19	16.99
R109.50	11	20	65	12	42	101	10	B	18.43	29.24	23.13
R109.50	12	20	35	19	38	26	10	C	7.49	11.23	10.28
R109.50	13	30	25	23	131	196	10	B	3.88	3.60	7.11
R109.50	14	15	10	20	32	114	10	B	12.06	15.50	26.00
R109.50	15	30	5	∞	35	96	10	A	19.10	26.99	18.23
R109.50	16	10	20	19	52	107	10	C	15.10	30.02	16.01
R109.50	17	S	30	2	124	189	10	C	23.91	23.12	29.84
R109.50	18	20	40	12	69	114	10	B	13.88	12.54	10.34
R109.50	19	15	09	17	52	109	10	A	12.71	20.51	19.28
R109.50	20	45	65	6	105	156	10	C	17.02	20.58	22.76
R109.50	21	45	20	11	37	96	10	В	9.10	14.95	10.69
R109.50	22	45	10	18	92	127	10	C	14.00	31.94	14.84

Appendix 1: Cost allocation to customers in Solomon instances in a collaborative scenario – continued from previous page.

Other carriers' lowest Cost	23.24	25.96	32.91	29.2	2.17	4.11	20.78	13.95	9.54	25.89	16.18	27.75	32.29	35.64	11.04	43.37	22.72	2.06	17.45	Continued on next page
Stand-alone Cost	36.15	25.46	26.58	8.74	2.84	2.56	41.44	28.48	12.02	24.37	13.38	43.65	36.01	27.78	21.86	38.94	27.16	10.18	20.99	Contin
Collaboration Cost	24.04	21.08	21.50	7.78	1.48	1.88	20.07	17.70	6.47	20.06	11.34	21.94	32.72	20.12	9.55	31.10	20.51	10.62	16.07	
Carrier	В	A	A	A	В	C	В	В	C	C	C	C	A	A	C	В	A	A	В	
Service time	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	
Latest service time	102	190	186	161	75	92	86	102	85	175	92	147	178	112	164	115	110	114	131	
Earliest service time	43	124	121	112	∞	11	37	49	24	116	24	96	116	41	113	09	33	65	72	
Demand	29	ಣ	9	17	16	16	6	21	27	23	11	14	∞	2	∞	16	31	6	ಬ	
Instance Node X coordinate Y coordinate Demand	2	35	20	30	40	37	42	09	52	69	52	55	65	09	20	ಬ	12	25	7	
X coordinate	55	65	65	45	35	41	64	40	31	35	53	65	63	2	20	5	09	40	42	
Node	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	
Instance	R109.50	R109.50	R109.50	R109.50	R109.50	R109.50	R109.50	R109.50	R109.50	R109.50	$\mathrm{R}109.50$	R109.50	R109.50	R109.50	R109.50	$\mathrm{R}109.50$	R109.50	R109.50	R109.50	

Appendix 1: Cost allocation to customers in Solomon instances in a collaborative scenario – continued from previous page.

alone Other carriers' Cost lowest Cost	18.98 11.58	23.42 36.95	17.08 23.27	21.55 16.21	26.04 22.98	31.30 13.98	.01 13.53	39.26 44.53	13.33 12.16	9.24 7.37	15.81 10.41								
Stand-a							21.01												
Collaboration Cost	11.91	26.29	12.12	18.83	19.70	16.01	14.01	30.45	11.36	8.09	0.40	9.19	9.79	9.79 10.08 12.37	9.79 10.08 12.37 7.86	9.79 10.08 12.37 7.86 4.90	9.79 10.08 12.37 7.86 4.90 8.38	9.79 10.08 12.37 7.86 4.90 8.38 8.38	9.79 10.08 12.37 7.86 4.90 8.38 8.38 8.41
Carrier	A	В	В	A	C	B	C	A	B	O	ζ	ر) O	D Q	A A C	B A A C	A B A A C C	A A B A A C	A P B B B C C
Service time	10	10	10	10	10	10	10	10	10	10	1	Π	10	10 10	10 10 10	10 10 10 10	10 10 10 10 10	10 10 10 10 10 10	10 10 10 10 10 10
Latest service time	91	162	102	66	151	105	192	132	155	919	351	100	613	613	613 965 370	613 965 370 663	613 965 370 663 449	613 965 370 663 449	613 965 370 663 449 597
Earliest service time	25	111	45	29	92	34	128	93	102	989	1	<i>1</i> -7	498	498	498 498 470 20	498 470 20 266	498 498 470 20 266 292	498 470 20 266 292 288	498 470 20 266 292 288 254
Demand	5	2	18	16	\vdash	27	36	30	13	10	1).	7.	7 13 19	7 13 19 26	7 13 19 26 3	7 13 19 26 3	7 13 19 26 3 5	7 13 19 26 3 3 5 9
Y coordinate	12	က	14	38	48	56	52	89	47	49	1	II	17 45	17 45 20	17 45 20 30	17 45 20 20 30 30	17 45 20 20 30 30 50	17 45 20 30 30 30 50 43	17 45 20 30 30 30 50 43
X coordinate Y coordinate	24	23	11	9	23	∞	13	9	47	41		35	32 22	න න න	35 55 55 15	35 55 55 15 25	35 55 55 15 27 20	35 55 55 15 20 10	35 55 15 25 20 10
	42	43	44	45	46	47	48	49	20	\vdash		2	ი ი	0 to 4	0 to 4 to	0 6 4 b 0	0 6 4 5 9 7	2 6 4 5 9 6 8	0 6 4 6 6 6 8 6
Instance Node	R109.50	R109.50	R109.50	$\mathrm{R}109.50$	$\mathrm{R}109.50$	R109.50	R109.50	$\mathrm{R}109.50$	$\mathrm{R}109.50$	$\mathrm{R}209.50$	D900 E0	KZ09.50	K209.50 $R209.50$	R209.50 R209.50 R209.50	R209.50 R209.50 R209.50 R209.50	R209.50 R209.50 R209.50 R209.50	R209.50 R209.50 R209.50 R209.50 R209.50	R209.50 R209.50 R209.50 R209.50 R209.50 R209.50	R209.50 R209.50 R209.50 R209.50 R209.50 R209.50

Appendix 1: Cost allocation to customers in Solomon instances in a collaborative scenario – continued from previous page.

alone Other carriers'	Cost lowest Cost	19.11 19.86	8.86	10.91 6.19	16.45 14.36	30.94 14.03	16.65 12.42	24.65 15.56	7.09 9.38	21.42 14.12	21.32 15.92	11.61 12.36	14.58 11.58	28.31 26.81	31.91 22.27	35.94 21.01	8.00 8.54	1.67 1.81	7.61 4.58	33.25 21.09	
ion Stand-alone	Cost	11.58	7.21	7.12	8.75	11.61	9.46	14.85	10.33	10.85	11.45	8.67	7.79	19.54	23.19	16.50	6.77	1.57	2.98	21.56	
Collaboration			10	7	ω	11	0,	14	10	10	11	&	7	110	23	16	9		22	21	
Corrior	Callie	В	C	В	В	C	В	C	В	В	A	В	A	A	C	В	В	A	A	В	
Service	$_{ m time}$	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	
Latest	service time	510	403	826	454	529	423	959	462	432	602	389	623	513	918	926	202	612	325	374	Ī
Earliest	service time	33	170	426	32	30	222	409	349	215	538	156	280	36	633	400	548	5	44	129	
Domond	Demand	12	19	23	20	∞	19	2	12	17	6	11	18	29	3	9	17	16	16	6	
V occudinato	i coolumate	65	35	25	10	ಬ	20	30	40	09	65	20	10	ಬ	35	20	30	40	37	42	Ī
V 900rdinato		20	20	30	15	30	10	5	20	15	45	45	45	55	65	65	45	35	41	64	Ì
		11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	
Instance Mode	IIIstalice	R209.50	$\mathbb{R}209.50$	R209.50	R209.50	R209.50	R209.50	$\mathbf{R}209.50$	R209.50	R209.50	$\mathbf{R}209.50$	$\mathbf{R}209.50$	$\mathbf{R}209.50$	$\mathbf{R}209.50$	$\mathrm{R}209.50$	$\mathbf{R}209.50$	$\mathbf{R}209.50$	R209.50	$\mathbf{R}209.50$	R209.50	

Appendix 1: Cost allocation to customers in Solomon instances in a collaborative scenario – continued from previous page.

ne Other carriers'	st lowest Cost	93 14.70	89.8 69	28 24.51	03 10.80	23.28	01 24.43	93 20.30	41 11.89	90 30.82	63 18.89	70 6.42	13.84	8.82	75 26.65	71 11.33	46 12.71	96 30.53	63 25.23	49 25.64	Continued on next page
Stand-alone	Cost	18.93	10.69	39.28	15.03	25.21	38.01	30.93	21.41	30.90	31.63	4.70	17.12	12.68	30.75	20.71	13.46	19.96	17.63	20.49	Cont
Collaboration	Cost	15.64	8.58	19.54	6.63	15.33	20.98	12.12	9.57	22.67	12.43	4.94	9.37	4.81	23.91	8.18	6.12	16.52	12.76	21.39	
Germon	Callie	C	C	B	B	Α	C	Α	C	B	C	B	B	Α	B	A	Α	C	Α	C	
Service	time	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	
Latest	service time	498	336	835	646	929	948	710	736	260	797	554	682	616	747	501	699	685	362	962	
Earliest	service time	115	91	602	24	487	439	41	563	147	33	243	225	25	578	72	29	458	34	694	
Γ_{cmond}	Demaila	21	27	23	11	14	∞	ಬ	∞	16	31	6	ಬ	ಬ	7	18	16	\vdash	27	36	
V_{oco}	1 coordinate	09	52	69	52	55	65	09	20	v	12	25	7	12	3	14	38	48	56	52	
V occudinato	A coordinate	40	31	35	53	65	63	2	20	ıΩ	09	40	42	24	23	11	9	2	∞	13	
		30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	
Instance Mode	TIIStalled	R209.50	R209.50	R209.50	R209.50	R209.50	R209.50	R209.50	R209.50	R209.50	$\mathrm{R}209.50$	R209.50	R209.50	R209.50	R209.50	R209.50	$\mathrm{R}209.50$	R209.50	R209.50	R209.50	

Appendix 1: Cost allocation to customers in Solomon instances in a collaborative scenario – continued from previous page.

Instance Node	de X coordinate		V coordinate	Demand	Earliest	Latest	Service	Carrier	Collaboration	Stand-alone	Other carriers'
2			r coordinate	Demaila	service time	service time	time	Carrier	Cost	Cost	lowest Cost
7	49	9	89	30	444	597	10	C	21.68	41.06	34.71
ΔJ	50	47	47	13	499	069	10	Α	6.43	7.26	7.86
	1	45	89	10	830	1049	06	A	5.28	12.91	13.18
	2	45	70	30	226	939	06	C	7.54	11.71	14.89
	3	42	99	10	16	336	06	A	5.01	7.65	9.62
C108.50	4	42	89	10	643	998	06	C	4.02	8.08	10.08
C108.50	2	42	65	10	15	226	06	Α	4.21	7.63	8.78
C108.50	9	40	69	20	499	824	06	В	4.05	12.22	7.07
C108.50	2	40	99	20	87	308	06	В	3.86	9.92	69.2
C108.50	~	38	89	20	150	429	06	C	4.89	12.90	5.46
C108.50	6	38	70	10	429	710	06	A	3.57	11.48	8.58
C108.50 1	0	35	99	10	279	488	06	C	7.04	9.94	7.50
C108.50 1	11	35	69	10	363	590	06	B	7.45	19.18	7.13
C108.50 1	[2	25	85	20	547	826	06	C	13.53	25.59	23.97
C108.50 1	13	22	75	30	30	280	06	B	9.21	17.87	17.22
C108.50 1	14	22	85	10	489	869	06	B	12.48	39.09	24.17
C108.50 1	15	20	80	40	318	495	06	A	10.24	24.71	20.37
C108.50 1	16	20	85	40	394	609	06	C	13.29	27.87	18.17
7	17	18	75	20	33	226	06	C	11.04	30.55	21.53

Appendix 1: Cost allocation to customers in Solomon instances in a collaborative scenario – continued from previous page.

<u> </u>						(Arrier			
<u></u>			service time	service time	time		Cost	Cost	lowest Cost
OT	75	20	89	365	06	В	12.41	25.05	21.06
15	80	10	176	447	06	A	12.37	27.58	23.91
30	20	10	10	265	06	C	1.86	2.34	2.93
30	52	20	836	1043	06	В	1.43	2.86	2.93
28	52	20	704	991	06	C	2.61	4.23	3.94
28	55	10	664	845	06	В	3.57	4.27	5.01
25	20	10	15	333	06	A	3.39	69.9	5.19
25	52	40	88	305	06	A	3.63	7.38	5.88
25	55	10	505	821	06	A	2.91	8.41	4.33
23	52	10	179	398	06	В	4.72	92.9	5.46
23	55	20	476	663	06	C	5.03	12.69	7.42
20	20	10	288	475	06	В	9.71	8.92	9.87
20	55	10	368	585	06	В	8.50	9.98	10.97
10	35	20	144	293	06	C	13.46	15.17	15.82
10	40	30	31	309	06	C	9.20	10.23	13.99
∞	40	40	33	313	06	C	9.74	11.46	14.07
∞	45	20	655	912	06	C	8.42	22.79	17.57
ಬ	35	10	191	436	06	A	10.77	30.51	19.77
ಬ	45	10	288	793	06	A	9.35	20.84	15.18

Appendix 1: Cost allocation to customers in Solomon instances in a collaborative scenario – continued from previous page.

one Other carriers'	Cost lowest Cost	19.84 19.24	46.78 21.64	24.01 21.57	11.74 11.46	9.80 8.22	8.51 8.27	7.32 7.60	14.09 13.04	13.66 15.77	20.48 12.12	10.03 7.15	16.27 11.67	10.86 6.69	14.45 12.11	18.87 27.78	11.94 19.63	26.59 17.95	25.39 20.24	14.76 13.18	Continued on next page
Stand-alone	0	15	4($\overline{2}$	11	0,	&	Ţ~	1/	15	2(1(1(1(17	18	11	2(25	14	Col
Collaboration	Cost	8.97	12.26	13.24	7.59	5.16	4.82	4.19	6.12	6.27	5.35	3.47	5.39	3.37	4.99	12.38	69.9	15.15	10.88	5.06	
Carrior	Callie	C	B	Α	A	B	Α	B	B	A	C	B	C	Α	B	C	C	C	Α	A	
Service	time	06	06	06	06	06	06	06	06	06	06	06	06	06	06	06	06	06	06	06	
Latest	service time	512	587	710	405	338	345	273	493	889	602	1127	286	1126	926	711	099	1567	1661	655	
Earliest	service time	305	414	481	180	63	19	16	278	453	355	837	539	298	719	71	20	927	1021	15	
Damend	Demaila	20	30	20	10	10	20	10	10	10	30	10	10	10	10	10	30	10	10	10	
$V_{coordinato}$		40	40	45	30	32	32	35	30	30	32	35	30	35	32	75	20	69	99	65	
$\Lambda \sim 0.000$		2	0	0	35	35	33	33	32	30	30	30	28	28	26	52	45	62	09	42	
		37	38	39	40	41	42	43	44	45	46	47	48	49	20	\vdash	2	က	4	5	
Instance Node	mstance	C108.50	C108.50	C108.50	C108.50	C108.50	C108.50	C108.50	C108.50	C108.50	C108.50	C108.50	C108.50	C108.50	C108.50	C208.50	C208.50	C208.50	C208.50	C208.50	

Appendix 1: Cost allocation to customers in Solomon instances in a collaborative scenario – continued from previous page.

Other carriers'	lowest Cost	5.20	23.50	0.72	4.95	6.47	9.24	16.83	4.93	16.31	7.84	11.02	8.66	10.90	14.08	-0.63	2.66	2.93	5.00	2.92
Stand-alone (Cost	82.9	25.17	7.80	22.18	6.23	12.53	23.03	8.69	15.59	18.26	16.08	16.56	10.05	11.78	2.73	4.49	3.29	19.90	5.65
Collaboration	Cost	3.34	9.84	2.14	4.11	3.92	5.58	11.17	5.50	9.01	62.9	10.13	5.73	6.30	8.89	1.36	4.98	1.00	5.66	1.87
Correion	Carrier	В	A	A	A	C	В	C	В	В	C	В	C	В	В	A	В	A	A	C
Service	time	06	06	06	06	06	06	06	06	06	06	06	06	06	06	06	06	06	06	06
Latest	service time	268	1473	3287	3001	3191	3098	2519	2805	2426	2616	2334	2711	2142	2237	650	3288	652	2043	655
Earliest	service time	257	833	2647	2361	2551	2458	1879	2165	1786	1976	1694	2071	1502	1597	10	2648	12	1403	15
Domond	решапа	20	20	20	10	10	10	20	30	10	40	40	20	20	10	10	20	20	10	10
		42	20	09	20	99	69	85	75	85	80	85	75	75	80	20	99	52	99	20
V coordinate V coordinate	A coordinate	16	58	34	28	35	35	25	22	22	20	20	18	15	15	30	30	28	14	25
		9	7	∞	6	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
Instance Mode	HISTAILCE	C208.50	C208.50	C208.50	C208.50	C208.50	C208.50	C208.50	C208.50	C208.50	C208.50	C208.50	C208.50	C208.50	C208.50	C208.50	C208.50	C208.50	C208.50	C208.50

Appendix 1: Cost allocation to customers in Solomon instances in a collaborative scenario – continued from previous page.

2904 90 B 8.75 1.002 1945 90 B 6.49 1.55 657 90 A 1.61 4.62 1847 90 A 6.51 17.94 798 90 B 2.35 5.96 703 90 C 6.89 9.63 1181 90 C 8.68 15.32 1085 90 B 4.49 10.24 1085 90 C 9.20 19.24 11746 90 A 6.68 12.37 1276 90 A 6.68 12.37 1463 90 A 5.84 15.75 1463 90 A 5.84 15.75 1558 90 A 5.84 15.75 1558 90 B 9.66 20.51 2219 90 B 6.02 14.63 306 B	Instance Node X coordinate Y	000	Y coordinate Demand	Earliest service time	Latest service time	Service	Carrier	Collaboration Cost	Stand-a	Other carriers'
2904 90 B 8.75 10.02 1945 90 A 1.61 4.62 657 90 A 1.61 4.62 1847 90 A 6.51 17.94 798 90 B 2.35 5.96 703 90 C 6.89 9.63 1181 90 C 8.68 15.32 1 1085 90 B 4.49 10.24 1 11746 90 C 8.68 12.37 1 1276 90 A 6.68 12.37 1 1463 90 C 9.20 19.24 1 1463 90 C 7.10 19.24 1 1558 90 B 9.66 20.51 2 2219 90 B 6.02 14.63 2 3066 90 A 5.39 8.09 2973 90 B 6.02 14.63 2 2973 90	4 4		- 1	service time	service time	time	ţ	Cost	Cost	lowest CC
1945 90 B 6.49 1.55 657 90 A 1.61 4.62 1847 90 A 6.51 17.94 798 90 B 2.35 5.96 703 90 C 6.89 9.63 1181 90 C 8.68 15.32 1 1085 90 B 4.49 10.24 1 11746 90 C 9.20 19.24 1 1463 90 C 9.20 19.24 1 1463 90 C 9.20 19.24 1 1463 90 C 7.10 19.31 1 1558 90 C 7.10 19.31 2 2219 90 B 13.09 44.63 2 3158 90 B 6.02 14.28 366 90 A 5.39 8.09 2973 90 B 6.23 14.28 3673 90 B	25 22 66 40	7	_	2264	2904	06	В	8.75	10.02	8.67
657 90 A 1.61 4.62 1847 90 A 6.51 17.94 798 90 B 2.35 5.96 1181 90 C 6.89 9.63 1181 90 C 8.68 15.32 1 1085 90 B 4.49 10.24 1 1746 90 C 9.20 19.24 1 1576 90 A 5.84 15.75 1 1463 90 C 9.20 19.24 1 1463 90 C 9.20 19.24 1 1578 90 C 7.10 19.31 1 2219 90 C 8.70 20.51 2 3158 90 B 6.02 14.28 2 3066 B 6.02 14.28 2 3273 90 B 6.02 8.09 8	26 8 62 10			1305	1945	06	В	6.49	1.55	4.80
1847 90 A 6.51 17.94 798 90 C 6.89 9.63 1181 90 C 6.89 9.63 1181 90 C 8.68 15.32 1 1085 90 B 4.49 10.24 1 1085 90 A 6.68 12.37 1 1276 90 A 6.68 12.37 1 1463 90 A 5.84 15.75 1 1463 90 C 7.10 19.31 1 1558 90 C 8.70 20.51 2 2219 90 B 13.09 44.63 2 3158 90 B 6.02 14.28 2 3066 90 A 5.39 8.09 2 2219 90 B 6.02 14.28 2 3158 90 A 5.39 8.09 8 3273 90 B 2.39 8.09	27 23 52 10	52 10		17	657	06	A	1.61	4.62	4.13
798 90 B 2.35 5.96 703 90 C 6.89 9.63 1181 90 C 8.68 15.32 1 1085 90 B 4.49 10.24 1 1746 90 A 6.68 12.37 1 1276 90 A 6.68 12.37 1 1653 90 A 5.84 15.75 1 1463 90 C 7.10 19.31 1 1463 90 C 8.70 20.51 2 2219 90 C 8.70 20.51 2 3158 90 B 6.02 14.63 2 3066 90 A 5.39 8.09 8 2973 90 B 5.39 8.09 8	28 4 55 20		0	1207	1847	06	A	6.51	17.94	8.66
703 90 C 6.89 9.63 1181 90 C 8.68 15.32 1 993 90 B 4.49 10.24 1 1085 90 A 6.68 12.37 1 1276 90 A 6.68 19.24 1 1463 90 C 7.10 19.24 1 1463 90 C 7.10 19.31 1 1558 90 C 8.70 20.51 2 2219 90 B 13.09 44.63 2 3158 90 B 6.02 14.28 3066 90 A 5.39 8.09 2973 90 B 3.69 11.29	29 20 50 10		$\overline{}$	158	798	06	В	2.35	5.96	5.23
1181 90 C 8.68 15.32 993 90 B 4.49 10.24 1085 90 A 6.68 12.37 1276 90 A 5.84 15.24 1 1463 90 A 5.84 15.75 1 1463 90 C 7.10 19.31 1 1558 90 C 8.70 20.51 2 2219 90 B 13.09 44.63 2 3158 90 B 6.02 14.28 2 3066 90 A 5.39 8.09 2 2973 90 B 3.69 11.29 11.29	30 20 55 10			63	703	06	C	6.89	9.63	6.97
993 90 B 4.49 10.24 1 1085 90 A 6.68 12.37 1 1746 90 C 9.20 19.24 1 1653 90 A 5.84 15.75 1 1371 90 C 7.10 19.31 1 1463 90 B 9.66 20.51 2 2219 90 C 8.70 21.74 2 3158 90 B 6.02 14.28 2 3066 90 A 5.39 8.09 8 2973 90 B 3.69 11.29 11.29	31 10 35 20			541	1181	06	C	8.68	15.32	12.44
1085 90 A 6.68 12.37 1746 90 A 6.68 12.37 1276 90 C 9.20 19.24 1 1371 90 A 5.84 15.75 1 1463 90 C 7.10 19.31 1 1558 90 C 8.70 21.74 2 2219 90 B 13.09 44.63 2 3158 90 B 6.02 14.28 2 3066 90 A 5.39 8.09 8 2973 90 B 3.69 11.29 11.29	32 10 40 30			353	993	06	В	4.49	10.24	11.83
1746 90 A 6.68 12.37 1276 90 C 9.20 19.24 1 1653 90 A 5.84 15.75 1 1371 90 C 7.10 19.31 1 1463 90 B 9.66 20.51 2 2219 90 C 8.70 21.74 2 3158 90 B 13.09 44.63 2 3066 90 A 5.39 8.09 2973 90 B 3.69 11.29	33 8 40 40	40 40		445	1085	06	В	5.34	10.39	11.98
1276 90 C 9.20 19.24 1 1653 90 A 5.84 15.75 1 1371 90 C 7.10 19.31 1 1463 90 B 9.66 20.51 2 2219 90 C 8.70 21.74 2 3158 90 B 6.02 14.28 2 3066 90 A 5.39 8.09 2973 90 B 3.69 11.29	34 8 45 20			1106	1746	06	A	89.9	12.37	8.02
1653 90 A 5.84 15.75 1371 90 C 7.10 19.31 1 1463 90 B 9.66 20.51 2 1558 90 C 8.70 21.74 2 2219 90 B 13.09 44.63 2 3158 90 A 5.39 8.09 8 2973 90 B 3.69 11.29 11.29	35 5 35 10	35 10		989	1276	06	C	9.20	19.24	12.62
1371 90 C 7.10 19.31 1 1463 90 B 9.66 20.51 2 2219 90 B 13.09 44.63 2 3158 90 B 6.02 14.28 2 3066 90 A 5.39 8.09 2973 90 B 3.69 11.29	36 5 45 10			1013	1653	06	A	5.84	15.75	9.81
1463 90 B 9.66 20.51 2 1558 90 C 8.70 21.74 2 2219 90 B 13.09 44.63 2 3158 90 B 6.02 14.28 2 3066 90 A 5.39 8.09 2973 90 B 3.69 11.29	37 2 40 20			731	1371	06	C	7.10	19.31	17.58
1558 90 C 8.70 21.74 2 2219 90 B 13.09 44.63 2 3158 90 B 6.02 14.28 2 3066 90 A 5.39 8.09 2973 90 B 3.69 11.29	38 0 40 30			823	1463	06	В	99.6	20.51	22.25
2219 90 B 13.09 44.63 2 3158 90 B 6.02 14.28 3066 90 A 5.39 8.09 2973 90 B 3.69 11.29	39 0 45 20			918	1558	06	C	8.70	21.74	21.75
3158 90 B 6.02 14.28 3066 90 A 5.39 8.09 2973 90 B 3.69 11.29	40 36 18 10			1579	2219	06	В	13.09	44.63	25.88
3066 90 A 5.39 8.09 2973 90 B 3.69 11.29	41 35 32 10			2518	3158	06	В	6.02	14.28	88.9
2973 90 B 3.69 11.29	42 33 32 20			2426	3066	06	A	5.39	8.09	6.07
	43 33 35 10		_	2333	2973	06	В	3.69	11.29	7.15

Appendix 1: Cost allocation to customers in Solomon instances in a collaborative scenario – continued from previous page.

Instance Node		Y coordinate	V coordinate	Domand	Earliest	Latest	Service	Carrior	Collaboration	Stand-alone	Other carriers'
וכם זאנ			r coordinate	Demand	service time	service time	$_{ m time}$	Callie	Cost	Cost	lowest Cost
C208.50	44	32	20	10	1673	2313	06	A	12.07	26.49	23.29
C208.50	45	30	30	10	1865	2505	06	A	5.64	8.99	8.31
C208.50	46	34	25	30	1769	2409	06	C	7.55	19.96	16.10
C208.50	47	30	35	10	2240	2880	06	A	5.45	7.64	7.51
C208.50	48	36	40	10	2616	3256	06	C	0.98	6.29	4.09
C208.50	49	48	20	10	727	1367	06	C	19.73	38.88	31.05
C208.50	50	26	32	10	2052	2692	06	A	9.14	8.68	5.87
RC108.50	\vdash	25	85	20	49	191	10	A	9.64	28.16	14.25
RC108.50	2	22	75	30	30	168	10	A	5.27	16.44	11.27
RC108.50	3	22	85	10	95	152	10	C	11.11	16.99	18.36
RC108.50	4	20	80	40	69	193	10	A	8.00	21.75	14.26
RC108.50	2	20	85	20	40	189	10	C	10.11	16.11	16.56
RC108.50	9	18	75	20	09	159	10	В	8.04	24.90	12.57
RC108.50	7	15	75	20	54	133	10	C	10.59	14.49	14.49
RC108.50	∞	15	80	10	29	144	10	В	12.65	34.38	15.71
RC108.50	6	10	35	20	57	154	10	A	11.97	15.11	14.62
RC108.50	10	10	40	30	106	161	10	A	11.48	16.75	22.47
RC108.50	11	∞	40	40	33	152	10	Α	8.61	11.61	11.57
RC108.50	12	∞	45	20	32	148	10	C	7.96	15.34	10.37

Appendix 1: Cost allocation to customers in Solomon instances in a collaborative scenario – continued from previous page.

Appendix 1: Cost allocation to customers in Solomon instances in a collaborative scenario – continued from previous page.

30 10 61 178 time 25 10 61 178 10 35 30 83 108 10 85 40 43 185 10 80 10 95 182 10 80 10 36 104 10 80 10 36 104 10 80 10 36 104 10 80 10 32 142 10 81 20 10 184 10 82 10 35 142 10 83 10 184 10 84 10 24 10 10 84 10 35 184 10 85 10 20 184 10 86 10 20 184 10 87 10 20 18 10 88<	meranice mode		V coordinate	Jamena				(arrior			
32 87 30 10 61 178 10 B 16.56 29.73 33 85 25 10 51 178 10 A 19.98 23.62 34 85 26 87 18 10 C 14.43 28.08 35 65 85 40 43 186 10 C 14.43 28.08 36 65 85 40 43 186 10 C 14.43 28.08 37 65 86 10 95 182 10 C 14.43 28.02 38 16 18 10 C 14.43 28.02 18.08 18.08 18.08 18.08 18.08 18.08 18.08 18.08 18.08 18.08 18.08 18.08 18.08 18.08 18.08 18.08 18.09 18.09 18.09 18.09 18.09 18.09 18.09 18.09 <		A coordinate	r coordinate	Demain	service time	service time	time	Callie	Cost	Cost	lowest Cost
34 85 25 10 51 178 10 4 1938 23.62 34 85 36 83 168 10 8 1615 28.08 35 86 20 57 185 10 6 14.43 22.72 36 65 8 40 43 186 10 6 14.43 22.72 37 65 8 40 18 10 6 14.43 22.72 38 10 8 11 10 6 11.48 18.08 18.08 40 60 8 10 10 6 11.48 18.08 18.08 18.08 18.08 18.08 18.08 18.08 18.08 18.08 18.08 18.08 18.08 18.08 18.08 18.09 18.09 18.09 18.09 18.09 18.09 18.09 18.09 18.09 18.09 18.09 18.09 18.09			30	10	61	178	10	В	16.56	29.73	16.84
44 85 36 83 168 168 16.15 28.08 35 67 85 20 57 185 10 6 14.43 22.72 36 65 85 40 43 186 10 6 14.43 22.73 37 65 82 10 95 12 12 1.43 18.05 38 62 80 10 95 14 10 1.43 18.05 18.05 39 60 80 10 36 14 10 18 18.05 18.05 18.05 41 60 80 10 80 10 18 17.35 17.04 42 55 80 10 10 10 10 10 18.35 17.04 44 55 10 10 10 10 10 10 10 10 10 10 10 10 <			25	10	51	178	10	Α	19.98	23.62	26.72
35 67 85 20 57 185 10 C 1443 22.72 36 65 40 43 186 10 A 11.69 58.65 37 65 82 10 95 182 10 1.48 18.08 38 62 80 30 38 141 10 C 11.48 18.08 40 62 80 30 36 193 10 8 17.34 18.25 41 58 10 6 9 11.38 18.35 18.35 43 55 80 10 49 11.38 17.34 17.04 44 55 80 10 18 10 18 17.04 17.04 44 55 80 10 18 10 18 17.04 17.04 45 18 10 10 10 10 10 10		85	35	30	83	168	10	В	16.15	28.08	17.99
36 65 40 43 186 10 A 11.69 58.65 37 62 82 10 95 182 10 6 11.48 18.08 38 10 12 12 14 10 6 11.48 18.05 40 60 80 10 36 14 10 6 9.34 18.35 41 60 80 10 6 11.38 7.03 17.03 42 58 70 40 10 6 17.03 17.04 44 55 80 10 40 6 13.14 15.04 44 55 80 10 18 6 13.14 15.04 45 10 13 10 10 10 13.14 15.04 44 15 10 12 10 10 13.14 15.04 45 18 10 <t< td=""><td></td><td></td><td>85</td><td>20</td><td>57</td><td>185</td><td>10</td><td>C</td><td>14.43</td><td>22.72</td><td>20.71</td></t<>			85	20	57	185	10	C	14.43	22.72	20.71
37 65 82 10 95 182 10 C 11.48 18.08 38 62 80 30 38 141 10 C 9.34 18.35 40 60 80 10 36 19 10 B 7.51 17.82 41 60 80 10 49 10 B 7.51 17.82 42 60 80 10 49 10 B 7.13 17.82 44 55 80 10 38 18 10 17.43 17.43 44 55 82 10 35 10 C 13.14 16.45 45 10 37 192 10 C 9.31 16.45 46 18 10 7 12 12 12.65 47 12 10 1 1 1 1 1 1 1 <t< td=""><td>_</td><td></td><td>85</td><td>40</td><td>43</td><td>186</td><td>10</td><td>Α</td><td>11.69</td><td>58.65</td><td>19.06</td></t<>	_		85	40	43	186	10	Α	11.69	58.65	19.06
38 62 80 30 38 141 10 C 9.34 18.35 39 60 80 10 36 193 10 8 7.51 17.82 40 60 85 30 61 138 10 13.8 27.03 17.82 41 58 75 20 49 164 10 8 7.13 15.62 44 55 85 10 10 10 10 10 17.13 17.04 44 55 80 10 10 10 10 17.14 16.34 17.04 45 10 10 10 10 10 10 17.45 10 17.04 17.04 17.04 45 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 <td< td=""><td></td><td>65</td><td>82</td><td>10</td><td>92</td><td>182</td><td>10</td><td>C</td><td>11.48</td><td>18.08</td><td>16.14</td></td<>		65	82	10	92	182	10	C	11.48	18.08	16.14
39 60 80 10 36 193 10 B 7.51 17.82 40 60 85 30 61 138 10 138 27.03 41 58 75 80 10 140 16 16 16 17.04 17.04 43 55 82 10 100 185 10 16 17.04 16.34 16.34 44 55 82 10 37 142 10 16 16 16.34 16.34 46 18 10 12 12 12 16.45 <			80	30	38	141	10	C	9.34	18.35	18.61
40 60 85 30 61 138 10 B 11.38 27.03 41 58 75 20 49 164 10 B 7.13 15.50 43 55 85 10 10 10 C 13.14 16.34 44 55 85 10 10 C 13.14 16.34 45 10 37 142 10 C 7.36 17.55 46 18 10 7 184 10 C 7.36 12.55 47 2 10 7 184 10 C 8.26 12.65 48 10 10 10 10 A 10.64 10.64 10.74 10.74 10.74 10.74 10.74 10.74 10.74 10.74 10.74 10.74 10.74 10.74 10.74 10.74 10.74 10.74 10.74 10.74 10.74	_	09	80	10	36	193	10	B	7.51	17.82	12.64
41 58 75 20 49 164 10 B 7.13 15.50 42 55 80 10 180 10 6.79 17.04 43 55 85 20 100 185 10 C 13.14 16.34 44 55 82 10 35 142 10 C 9.31 16.45 45 10 37 192 10 C 7.36 12.55 46 18 10 1		09	85	30	61	138	10	B	11.38	27.03	24.15
425580103318010B6.7917.0443558210101851013.1416.344455821035142101016.45451037192101012.5546181071184101082612.6547245103819110A10.0430.71484212105013810A10.0430.71494212308317810A13.5317.64	tC108.50 41	58	75	20	49	164	10	B	7.13	15.50	12.25
43 55 85 20 100 185 10 C 13.14 16.34 44 55 82 10 35 142 10 C 9.31 16.45 45 10 37 192 10 C 8.26 12.55 47 2 45 10 38 191 10 A 10.46 16.54 48 42 12 10 50 184 10 A 10.04 30.71 49 42 12 10 83 178 10 A 10.04 30.71 50 7 35 36 37 178 10 A 13.53 17.64	_	55	80	10	33	180	10	В	6.79	17.04	12.28
44 55 82 10 35 142 10 C 9.31 16.45 45 20 82 10 37 192 10 C 7.36 12.55 46 18 10 71 184 10 C 8.26 12.66 47 2 45 10 38 191 10 A 9.06 16.54 48 42 10 50 184 10 A 10.04 30.71 49 42 12 10 99 138 10 B 11.20 16.73 50 73 35 35 36 83 178 10 A 13.53 17.64		55	85	20	100	185	10	C	13.14	16.34	21.31
45 20 82 10 37 192 10 C 7.36 12.55 46 18 80 10 71 184 10 C 8.26 12.66 47 2 45 10 38 191 10 A 9.06 16.54 48 42 10 50 184 10 A 10.04 30.71 49 42 12 10 99 138 10 A 11.20 16.73 50 73 35 30 83 178 10 A 13.53 17.64	_	55	82	10	35	142	10	C	9.31	16.45	15.81
46 18 10 71 184 10 C 8.26 12.66 47 2 45 10 38 191 10 A 9.06 16.54 48 42 5 10 50 184 10 A 10.04 30.71 49 42 12 10 99 138 10 B 11.20 16.73 50 72 35 30 83 178 10 A 13.53 17.64		20	82	10	37	192	10	C	7.36	12.55	13.67
47 2 45 10 38 191 10 A 9.06 16.54 48 48 10 A 10.04 30.71 49 42 12 10 B 11.20 16.73 50 72 35 30 83 178 10 A 13.53 17.64		18	80	10	71	184	10	C	8.26	12.66	14.09
48 42 5 10 50 184 10 A 10.04 30.71 49 42 12 10 99 138 10 B 11.20 16.73 50 72 35 30 83 178 10 A 13.53 17.64		23	45	10	38	191	10	Α	90.6	16.54	15.26
49 42 12 10 99 138 10 B 11.20 16.73 50 72 35 30 83 178 10 A 13.53 17.64			ಬ	10	20	184	10	Α	10.04	30.71	19.16
50 72 35 30 83 178 10 A 13.53 17.64		42	12	10	66	138	10	В	11.20	16.73	18.37
		72	35	30	83	178	10	Α	13.53	17.64	14.24

Appendix 1: Cost allocation to customers in Solomon instances in a collaborative scenario – continued from previous page.

25 36 36 service time service time time 25 85 20 388 911 10 26 75 30 36 10 10 27 85 10 425 10 10 20 85 20 40 630 10 18 75 20 40 667 10 19 75 20 228 667 10 10 75 20 228 67 10 10 35 20 228 67 10 10 35 20 21 68 10 10 40 30 40 75 10 10 40 40 75 10 10 40 32 51 10 10 40 20 40 10 10 10 40 20 20 20 <th>Instance Node</th> <th>9</th> <th>X coordinate</th> <th>V coordinate</th> <th>Domand</th> <th>Earliest</th> <th>Latest</th> <th>Service</th> <th>Corrior</th> <th>Collaboration</th> <th>Stand-alone</th> <th>Other carriers'</th>	Instance Node	9	X coordinate	V coordinate	Domand	Earliest	Latest	Service	Corrior	Collaboration	Stand-alone	Other carriers'
1 25 85 20 388 911 10 B 10.22 183 2 22 75 30 36 546 10 B 9.91 14.94 4 22 85 10 363 76 10 B 9.91 14.94 4 20 86 40 425 913 10 C 7.79 14.61 5 20 86 40 425 913 10 B 11.62 14.61 6 18 20 40 62 10 B 11.62 14.61 7 15 20 228 667 10 B 53.7 10.75 8 15 20 161 528 10 C 63.7 10.75 10 16 40 20 21 648 10 C 63.7 10.71 11 8 40 40	TICE TAC	200	A coolumnate	r coordinate	Demaila	service time	service time	$_{ m time}$	Callie	Cost	Cost	lowest Cost
2 52 75 30 546 10 B 9.91 14.94 4 22 85 10 425 708 10 7.79 21.66 4 20 86 40 425 913 10 7.79 21.66 5 20 40 425 62 10 89 14.61 10	08.50		25	85	20	388	911	10	В	10.22	18.33	17.98
3 22 85 10 425 708 10 C 7.79 21.66 4 20 80 40 425 913 10 B 11.62 14.61 6 18 20 85 20 40 630 10 B 11.62 14.61 7 18 75 20 228 667 10 B 5.37 10.75 8 15 20 228 667 10 B 5.37 10.75 9 15 20 161 58 10 B 5.37 10.75 10 15 20 213 648 10 C 6.37 10.41 11 8 40 42 51 10 A 5.35 12.42 12 8 40 72 10 A 7.09 13.45 13 15 10 40 A 10	08.50	2	22	75	30	30	546	10	В	9.91	14.94	13.59
4 20 40 425 913 10 B 11.62 14.61 6 18 20 40 630 10 B 8.96 20.53 7 18 75 20 228 67 10 B 5.37 10.75 8 15 20 161 58 10 B 5.37 10.75 8 15 20 161 58 10 C 8.53 10.75 10 10 22 213 648 10 C 8.53 10.75 11 8 40 40 40 7.39 10.75 10.75 10.75 12 8 40	208.50	က	22	85	10	353	208	10	C	7.79	21.66	12.51
5 20 40 630 10 B 8.96 20.53 6 18 75 20 228 667 10 B 5.37 10.75 7 15 20 161 558 10 B 5.37 10.75 8 15 20 161 528 10 C 8.53 10.75 10 16 20 21 648 10 C 8.53 18.46 11 8 40 40 67 64 7 7 18.46 11 8 40 40 40 6 7 7 18.45 13 41 10 7 7 18.60 11.36 14 5 10 35 10 6 18.30 18.20 15 40 10 2 12 12 12 18.20 16 10 10 10	208.50	4	20	80	40	425	913	10	B	11.62	14.61	16.06
6 18 75 20 228 667 10 B 5.37 10.75 7 15 75 20 161 558 10 B 9.13 21.02 8 15 80 10 229 624 10 C 8.53 18.46 10 10 22 21 648 10 C 6.37 18.46 11 8 40 40 40 40 40 A 7.09 18.45 12 8 40 40 40 40 A 7.09 11.36 13 5 10 35 91 10 A 7.09 11.36 14 5 40 35 91 10 A 5.13 40.06 15 40 5 10 52 10 5.23 13.45 16 0 40 40 40 40.06 40.06	208.50	ಬ	20	85	20	40	630	10	B	8.96	20.53	17.18
7 15 75 161 558 10 B 9.13 21.02 8 15 80 10 229 624 10 C 8.53 18.46 10 10 35 20 213 648 10 C 6.37 16.01 11 8 40 30 404 753 10 A 6.35 12.74 11 8 40 40 33 511 10 A 7.09 13.45 13 5 10 46 519 10 A 7.09 11.36 14 5 10 35 91 10 A 5.13 40.06 15 4 10 4 528 10 C 13.93 40.06 16 4 4 52 10 4 5.13 51.35 17 4 5 5 5 5 5	208.50	9	18	75	20	228	299	10	B	5.37	10.75	9.39
8 15 80 10 229 624 10 C 8-53 18-46 10 10 40 213 648 10 C 6-37 16-61 10 40 30 404 753 10 A 9-35 15-74 11 8 40 40 33 511 10 A 7-09 13-45 12 8 45 20 46 519 10 A 7-09 11-36 14 5 10 35 91 10 A 7-09 11-36 15 4 10 A 7-09 11-36 11-36 11-36 16 5 40 7 12-36 11-36 11-36 17 40 5 10 A 12-36 12-36 18 44 5 10 A 12-36 12-36 19 45 10 A	208.50	7	15	75	20	161	558	10	B	9.13	21.02	16.45
9 10 35 20 213 648 10 C 6.37 16.61 10 40 30 404 753 10 A 9.35 12.74 11 8 40 40 33 511 10 A 7.09 13.45 12 8 45 20 46 519 10 A 7.09 11.96 13 5 10 35 91 10 A 7.09 11.96 14 5 45 10 35 91 10 A 9.05 11.96 15 4 10 4 5 10 A 9.71 12.18 16 4 5 10 5 10 6 9.87 12.18 17 4 5 10 4 12.36 12.28 18 4 1 1 4 12.28 12.28 1	208.50	∞	15	80	10	229	624	10	C	8.53	18.46	16.26
10 10 40 753 10 A 9.35 12.74 11 8 40 40 33 511 10 A 7.09 13.45 12 8 45 20 46 519 10 A 7.09 11.96 13 5 10 35 91 10 A 7.09 11.96 14 5 45 10 A 7.09 11.96 40.06 15 4 5 10 A 7.09 11.18 40.06 16 5 4 5 10 A 5.71 12.18 16 6 7 6 7 9.87 21.35 17 10 4 5 10 4 13.36 24.55 18 4 1 1 1 1 1 1 1 1 18 4 4 1 4	208.50	6	10	35	20	213	648	10	C	6.37	16.61	8.91
11 8 40 40 33 511 10 A 7.09 13.45 12 8 45 20 46 519 10 A 7.09 11.96 13 5 10 35 91 10 C 13.93 40.06 14 5 45 10 35 10 C 9.87 21.35 15 6 7 52 10 C 9.87 21.35 16 7 6 7 12.36 21.35 16 6 7 12.36 24.55 17 10 8 10 10 10 10 18 44 5 20 21 21 21.75 21.75 19 42 10 6 10 <td< td=""><td>208.50</td><td>10</td><td>10</td><td>40</td><td>30</td><td>404</td><td>753</td><td>10</td><td>A</td><td>9.35</td><td>12.74</td><td>16.11</td></td<>	208.50	10	10	40	30	404	753	10	A	9.35	12.74	16.11
12845204651910A7.0911.961351039591110C13.9340.0614540103569710A5.7112.181540203952810C9.8721.35170452039490910B18.3042.80184452021857110A11.3221.75194240408554210A9.4315.82	208.50	11	8	40	40	33	511	10	A	7.09	13.45	11.90
1354039591110C13.9340.0614545103569710A57.112.1815240203952810C9.8721.3516040209453510C12.3624.55170452039490910B18.3042.80184452021857110A11.3221.75194210408554210A9.4315.82	208.50	12	∞	45	20	46	519	10	A	7.09	11.96	13.45
14 5 45 10 35 697 10 A 5.71 12.18 15 2 40 20 39 528 10 C 9.87 21.35 16 0 40 20 94 535 10 C 12.36 24.55 17 0 45 20 394 909 10 B 18.30 42.80 18 44 5 20 218 571 10 A 11.32 21.75 19 42 10 A 9.43 15.82 15.82	208.50	13	ъ	35	10	395	911	10	C	13.93	40.06	21.76
15 2 40 20 39 528 10 C 9.87 21.35 16 0 40 20 94 535 10 C 12.36 24.55 17 0 45 20 394 909 10 B 18.30 42.80 18 44 5 20 218 571 10 A 11.32 21.75 19 42 10 A 9.43 15.82 15.82	208.50	14	50	45	10	35	269	10	A	5.71	12.18	12.29
16 0 40 20 94 535 10 C 12.36 24.55 17 0 45 20 394 909 10 B 18.30 42.80 18 44 5 20 218 571 10 A 11.32 21.75 19 42 40 40 85 542 10 A 9.43 15.82	208.50	15	2	40	20	39	528	10	C	9.87	21.35	15.93
17 0 45 20 394 909 10 B 18.30 42.80 18 44 5 20 218 571 10 A 11.32 21.75 19 42 10 A 9.43 15.82 15.82	208.50	16	0	40	20	94	535	10	C	12.36	24.55	19.62
18 44 5 20 218 571 10 A 11.32 21.75 19 42 10 40 85 542 10 A 9.43 15.82	208.50	17	0	45	20	394	606	10	B	18.30	42.80	15.07
19 42 10 40 85 542 10 A 9.43 15.82	208.50	18	44	ಬ	20	218	571	10	A	11.32	21.75	14.54
	208.50	19	42	10	40	85	542	10	A	9.43	15.82	22.31

Appendix 1: Cost allocation to customers in Solomon instances in a collaborative scenario – continued from previous page.

Instance Node	Todo	X coordinate	V coordinato	Domand	Earliest	Latest	Service	Corrior	Collaboration	Stand-alone	Other carriers'
TIBratice	anor		r coordinate	Demain	service time	service time	time	Callel	Cost	Cost	lowest Cost
RC208.50	20	42	15	10	391	802	10	В	8.99	20.51	23.62
RC208.50	21	40	v	10	45	517	10	В	13.12	31.22	13.72
RC208.50	22	40	15	40	229	640	10	A	5.26	12.08	20.07
RC208.50	23	38	ŭ	30	45	523	10	C	13.04	47.63	24.60
RC208.50	24	38	15	10	389	914	10	A	9.70	13.40	22.73
RC208.50	25	35	5	20	386	904	10	A	15.10	25.55	13.41
RC208.50	26	95	30	30	389	788	10	В	18.39	48.99	37.94
RC208.50	27	95	35	20	57	009	10	A	14.26	44.30	22.61
RC208.50	28	92	30	10	55	575	10	C	11.65	24.74	24.99
RC208.50	29	06	35	10	52	536	10	C	11.57	23.09	19.21
RC208.50	30	88	30	10	06	521	10	В	12.73	28.61	19.23
RC208.50	31	88	35	20	20	534	10	В	10.84	26.21	19.86
RC208.50	32	87	30	10	425	868	10	C	16.69	24.22	27.42
RC208.50	33	85	25	10	51	602	10	C	11.06	19.71	17.61
RC208.50	34	85	35	30	342	751	10	A	9.83	31.90	16.66
RC208.50	35	29	85	20	410	905	10	В	13.37	36.52	35.17
RC208.50	36	65	85	40	43	617	10	A	9.17	24.69	12.61
RC208.50	37	92	82	10	410	823	10	C	9.64	22.27	31.35
RC208.50	38	62	80	30	114	561	10	C	8.05	15.02	11.84
										Continu	Continued on next page

Appendix 1

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Appendix 1: Cost allocation to customers in Solomon instances in a collaborative scenario – continued from previous page.

Instance Node X coordinate V coordinate Demand	hordinate Demand	Demand		Earliest	Latest	Service	Carrier	Collaboration	Stand-alone	Other carriers'
			se	service time	service time	time	Carrio	Cost	Cost	lowest Cost
60 80 10	80 10	10		36	829	10	\mathcal{C}	5.16	13.20	10.88
60 85 30		30		191	586	10	A	7.35	19.32	12.33
58 75 20	75 20	20		201	029	10	В	4.19	15.44	9.33
55 80 10	80 10	10		33	268	10	C	7.60	13.01	10.12
55 85 20	85 20	20		429	838	10	A	11.19	35.60	30.01
55 82 10	82 10	10		49	504	10	A	11.14	21.64	14.98
20 82 10	82 10	10		37	597	10	C	99.9	17.76	12.07
18 80 10	80 10	10		315	782	10	A	6.04	29.88	13.20
47 2 45 10	45 10	10		38	909	10	A	7.50	16.63	18.40
42 5 10	5 10	10		396	904	10	В	12.24	23.89	26.35
42 12 10	12 10	10		341	658	10	В	4.16	15.78	20.56
72 35 30		30		351	782	10	C	14.88	16.56	13.36