E-Comm Public Safety Wide Area Radio Network

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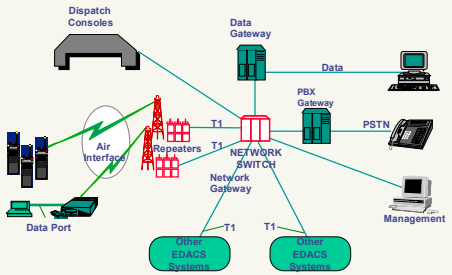
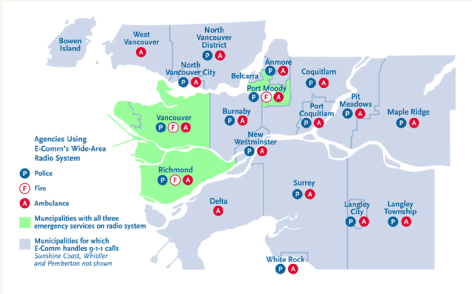
A. Objectives

- New user behaviour prediction model
- Lower new call blocking probability
- Lower handover call blocking probability
- Higher network resource utilization
- Prioritized call admission control

B. E-Comm Network



E-Comm network architecture

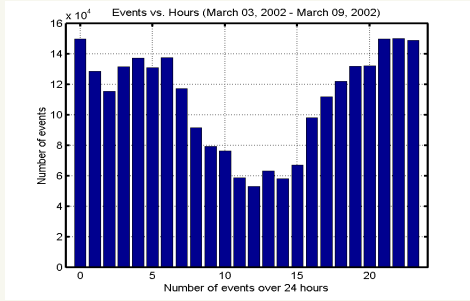


E-Comm network coverage

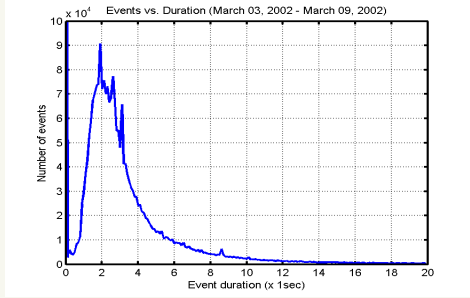
C. E-Comm Data

Event_UTC_At	Duration	Sms	Node_Id	System_Id	Slot_Id	Caller	Callee	Call_Type	Call_State	Voice_Call	Digital_Call	Multi_System_Call	Confirmed_Call	Preempt_Call	Primary_Call	Queue_Pri	Mcp	Callee_Bit	Reason_Code
			Network_Id		Channel_Id				Call_Direction		Interconnect_Call		Msg_Trunked_Call		Queue_Depth		Caller_Bit		
2002-03-08 00:00:00.000	2470	10	33	8	4	NULL	14911	918	0	0	0	1	1	0	0	0	0	1	NULL	NULL	1	0	0	0
2002-03-08 00:00:00.000	2470	10	33	11	7	NULL	14911	918	0	0	0	1	1	0	0	0	0	1	NULL	NULL	1	0	0	0
2002-03-08 00:00:00.000	2470	10	33	2	8	NULL	14911	918	0	0	0	1	1	0	0	0	0	1	NULL	NULL	1	0	0	0
2002-03-08 00:00:00.000	2470	10	33	8	5	NULL	14911	918	0	0	0	1	1	0	0	0	0	1	NULL	NULL	1	0	0	0
2002-03-08 00:00:00.000	5180	10	33	11	2	NULL	14918	949	0	0	0	1	1	0	0	0	0	1	NULL	NULL	1	0	0	0
2002-03-08 00:00:01.000	4580	10	33	11	6	NULL	9518	1430	0	0	0	1	1	0	0	0	0	1	NULL	NULL	1	0	0	0
2002-03-08 00:00:01.000	7260	10	33	8	5	NULL	13372	935	0	0	0	1	1	0	0	0	0	1	NULL	NULL	1	0	0	0
2002-03-08 00:00:01.000	7260	10	33	8	3	NULL	13372	935	0	0	0	1	1	0	0	0	0	1	NULL	NULL	1	0	0	0
2002-03-08 00:00:01.000	5180	10	33	11	9	NULL	14919	949	0	0	0	1	1	0	0	0	0	1	NULL	NULL	1	0	0	0
2002-03-08 00:00:01.000	5190	10	33	8	6	NULL	14915	949	0	0	0	1	1	0	0	0	0	1	NULL	NULL	1	0	0	0
2002-03-08 00:00:02.000	2470	10	33	8	4	NULL	14911	918	0	1	100	1	1	0	0	1	0	1	NULL	NULL	1	0	0	0
2002-03-08 00:00:02.000	2470	10	33	11	7	NULL	14911	918	0	1	100	1	1	0	0	1	0	1	NULL	NULL	1	0	0	0
2002-03-08 00:00:02.000	2470	10	33	2	8	NULL	14911	918	0	1	100	1	1	0	0	1	0	1	NULL	NULL	1	0	0	0
2002-03-08 00:00:02.000	2470	10	33	8	5	NULL	14911	918	0	1	100	1	1	0	0	1	0	1	NULL	NULL	1	0	0	0

Data sample



Daily activity



Distribution of event durations

D. Two Approaches

Analysis and Prediction

- Analyze network activity data
- Build the pattern of user behavior
- Construct prediction model

Simulation and Improvement

- Study the deployed network
- Build customized simulation tools
- Enhance the current CAC algorithm to accommodate large number of:
  - group calls
  - confirmed calls

E. Tools

- Customized simulation tools
- Linux 8.0 + PostgreSQL 7.2.3
- Matlab, AutoClass, S-PLUS
- Microsoft SQL Server 2000

F. References

- E-Comm: http://www.ecomm.bc.ca.
- M/A-Com: http://www.macom-wireless.com.
- PostgreSQL: http://www.postgresql.org.