Slutrapport till projektet

Optimal design och effektiv planering av telekommunikationssystem
CENIIT PROJECT 02.09

Inledning

Projektet har löpt under tidsperioden 2002-2007. Projektets fokus har varierat något mellan åren, men hela tiden varit inriktat mot *planering, analys och design av telekommunikationssystem.* Inledningsvis ingick även "klassiska" (fiberbaserade) system, men redan efter något år var fokuseringen helt mot trådlösa kommunikationssystem – främst *resursstyrning i mobil telekommunikation* och *resursstyrning i ad hoc nätverk.*

Motivet till forskningsområdet är den snabba tekniska utveckling som kontinuerligt leder till nya utmaningar och planeringssituationer inom området. Medlet för oss att möta denna utmaning har varit olika modellansatser som i symbios med avancerad optimeringsteori har paketerats i olika planeringsverktyg. De senare finns det ett stort behov av inom industrin – såväl bland operatörer som bland infrastrukturhållare.

Projektresultat

- **Etablering av forskargrupp**
  Verksamheten är idag etablerad. Projektet har bidragit till att bygga upp en forskningsgrupp, numera ett vetenskapligt område (Mobile Telekommunikation) på ITN, LiU Norrköping. Verksamheten har nått lyskraft såväl i ett nationellt som i ett internationellt perspektiv. Ett tydligt bevis på det är bidraget i *IEEE Wireless Communications Magazine*[2]. Av 66 inskickade bidrag till detta specialnummer accepterades enbart 6.

- **Forskarexamina**
  Under projektets löptid har fyra forskarexamina utfärdats inom programmet *Infrainformatik:*

  - Tekn licentiatexamen, Patrik Björklund (2000)[3]

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[1] Institutionen för teknik och naturvetenskap (ITN), Linköpings tekniska högskola, Campus Norrköping, 601 74 Norrköping. Tel: 011-363131, Mobil: 0708-423131, Fax: 011-363270, E-post: petva@itn.liu.se

[2] I. Siomina, P. Värbrand, and D. Yuan, Automated Optimization of Service Coverage and Base Station Antenna Configuration in UMTS Networks, *IEEE Wireless Communications Magazine*, vol. 13, pp. 16-25. 2006.

[3] Björklund, P. Two Resource Optimization Applications in Wireless Networks, Licentiate Thesis No. 943

- Tekn licentiatexamen, Iana Siomina (2005)[4]
- Tekn doktorsexamen, Patrik Björklund (2006)[5]
- Tekn doktorsexamen, Iana Siomina (2007)[6]

Inom samma område har även Di Yuan blivit utnämnd till docent (2005).

- **Externa forskningsanslag**
  Under projektets löptid har följande anslag beviljats:

  - Yuan (Vetenskapsrådet 2005-2007), totalt ca 690 kSEK
  - Yuan (Vetenskapsrådet 2006-2008), totalt ca 790 kSEK
  - Värbrand (Vetenskapsrådet 2006-2008), totalt ca 1,8 MSEK
  - Yuan (COST 293 – finansiering av forskarutbyten)

- **Industrikoppling**
  Kopplingen till industrin är något vi prioriterat och jobbat med mycket för att få till stånd. Samarbetspartners inom projektet har varit: Ericsson Research, Linköping, FOI (The Swedish Defense Research Agency), Linköping, TeliaSonera, Farsta, ComOpt AB, Helsingborg.

- **Övriga samarbetspartners**
  Forskargrupper: Politecnico di Milano, Italien, ZIB, Berlin, Tyskland, University of Bergen, Norway, och Universita' degli Studi di Lecce, Italy
  Forskarnätverk: COST 293 (Graphs and Algorithms in Communication Networks, GRAAL) samt adjungerade till COST 2100 (Pervasive Mobile & Ambient Wireless Communications).
  CENIIT projekt: Fault Tolerance in Real-time Distributed Systems (Simin Nadjm-Tehrani)

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[5] Björklund, P. Applications of Resource Optimization in Wireless Networks, Dissertation No. 1029
[6] Siomina, I. Radio Network Planning and Resource Optimization: Mathematical Models and Algorithms for UMTS, WLANs, and Ad Hoc Networks, Dissertation No. 1116

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