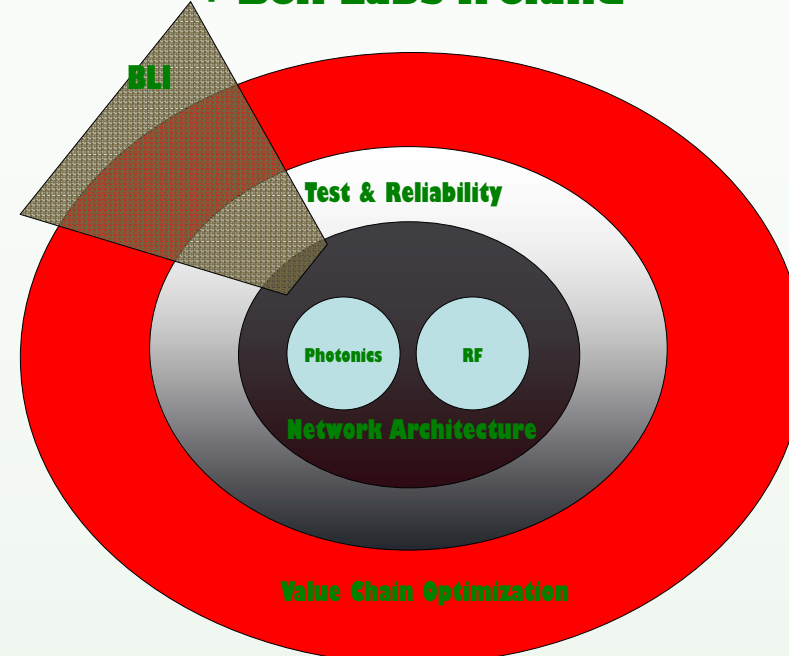


Value Chain Optimisation at the Cork Constraint Computation Centre in the Centre for Telecommunications Value-chain-driven Research

Five highly interrelated research strands
+ Bell Labs Ireland

VCO's place in CTVR

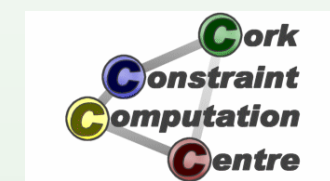
Emerging Network Architectures: the form of future networks: protocols, control, management, mobility, routing and architectures
Photonics: the key issues in realizing an all-optical network: transparency and intelligence
RF: realizing the next generation of fully reconfigurable radio transceivers and intelligent antenna systems
Testing & Reliability: reliability issues in hardware and software and developing general models for embedded self-test
Value Chain Optimisation: developing new techniques to acquire, model and optimise value-chains in the presence of hierarchy, distribution, uncertainty and change.



VCO's mission

Increase value in the telecommunications industry
by helping people or companies to make better decisions:
Can we cut our supply chain costs?
Can we design a better wireless network?
Which configuration has the highest reliability?
To which component is the cost most sensitive?
Where should we focus our product development?
Can we trade-off manufacturing cost for reliability?
In telecoms technology, and in supply chains
VCO is led by 4C at UCC, with partner the **National Institute of Technology Management** at UCD

Joe Bater, Ken Brown, David Burke, Alex Ferguson, Eugene C. Freuder, Onur Koyuncu, James Little, Barry O'Sullivan, Roberto Rossi, Armağan Tarım
i.lastname@4c.ucc.ie

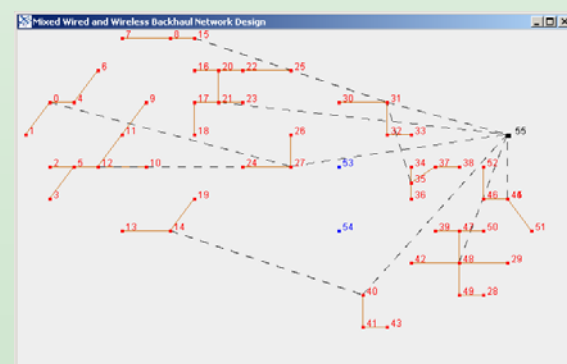
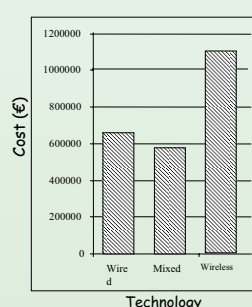


VCO in... telecoms technology

Backhaul Network Evaluation

Demand for increases in traffic capacity, speed and reliability
WiMAX offers a new method for communication between users and the core network
What are the cost implications?

Trinity College:

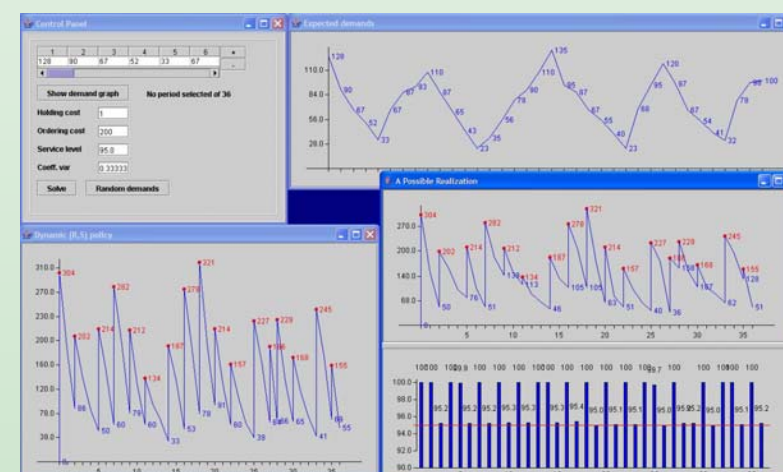


53 base stations on TCD campus
3G UMTS pico-cell coverage
Models for WiMAX radio propagation
Estimates of trenching and equipment costs
Traffic demands and performance constraints
Mixed technology reduces cost of high capacity networks that meet demand

VCO in... supply chains

Stochastic Inventory Lot-Size Optimisation

Develop optimisation models for determining optimal order policies under demand and lead-time uncertainties

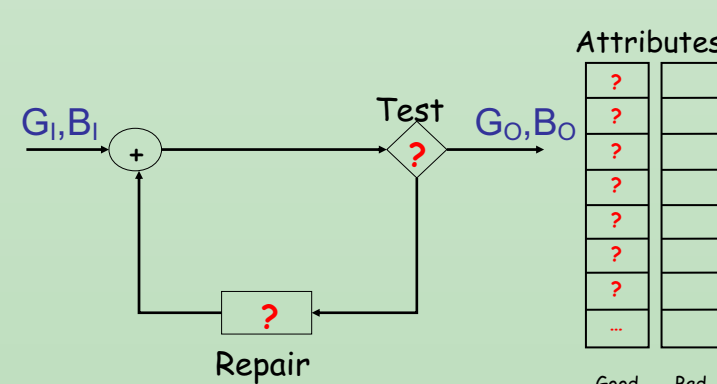


Demand and lead-time uncertainties necessitate carrying buffer-stocks
Insufficient buffer-stock leads to stock-outs and loss of customer satisfaction
Overstocks are just as damaging financially
What are the optimal buffer-stock levels when demand is non-stationary?
What are the optimal replenishment times? What are the optimal order quantities?

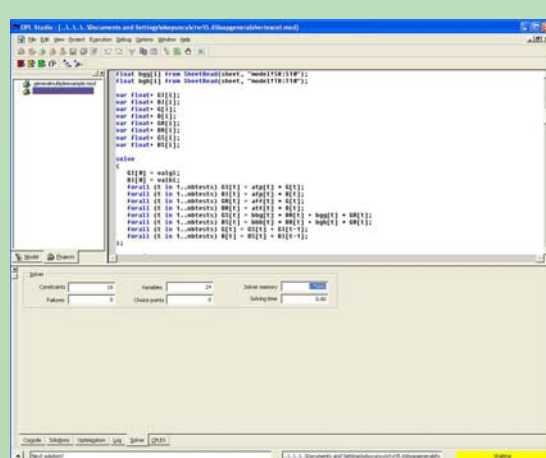
Optimisation for Test Solutions

Develop an economic modelling tool to understand the trade-offs between test-cost and product quality and thereby to optimise test along the entire supply chain

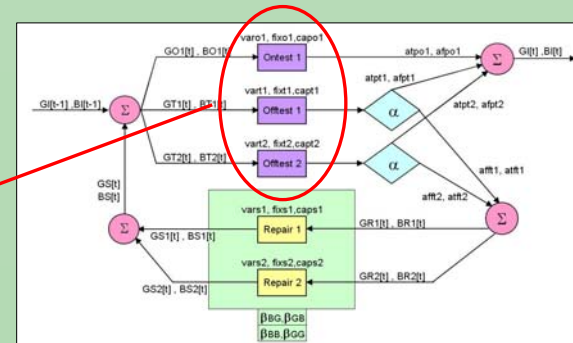
Attributes	
90	10
65	35
95	5
93	7
50	50
80	20
70	30
...	...
Good	Bad



- Testing is essential in supply chains, but time consuming and expensive
- Has significant impact on product quality, and customer satisfaction
- Excessive testing reduces marginal return
- What is the optimal test strategy and design to achieve a certain field return rate?

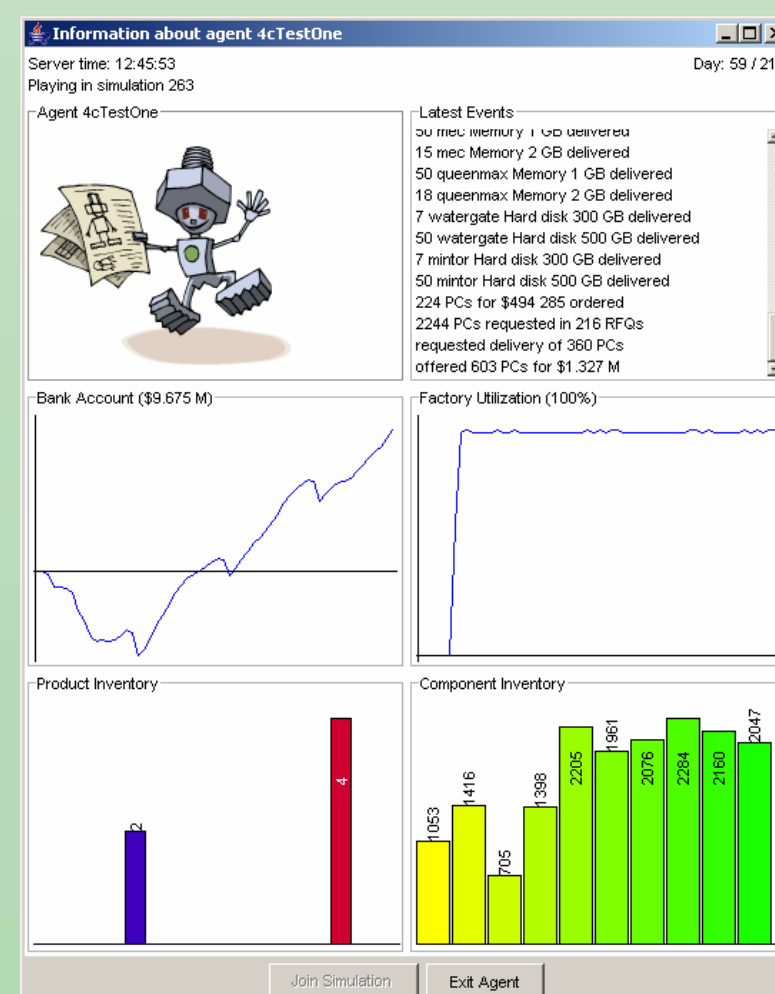


The number and type of test machines to be used in optimal design



Trading Agent Competition

Today's supply chains are essentially static, relying on long-term relationships among key trading partners. More flexible and dynamic practices offer the prospect of better matches between suppliers and customers as market conditions change.
TAC SCM is an open international competition, capturing many of the challenges involved in dynamic supply chains. The aim is to develop an agent that manages a supply chain for manufacturing PCs.



Six agents compete in real-time for supplies and customers orders.
Each competition lasts 220 simulated days, each of 15 seconds real time

- Each day the agent receives:**
- Customer requests and orders
 - Supplier quotes
 - Current product and component inventory levels
 - Reports summarising supplier and customer markets

- We combine:**
- Constraint-based optimisation
 - Reasoning with probabilities
 - Learning of market conditions
- To determine:**
- What customer requests to bid on?
 - What price to bid?
 - What component quotes to request, and orders to make from suppliers?
 - How to schedule production?
 - How to schedule deliveries?