ITU / BDT Regional Network Planning Workshop with Tool Case Studies for the Arab Region

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Business Planning Tools: STEM

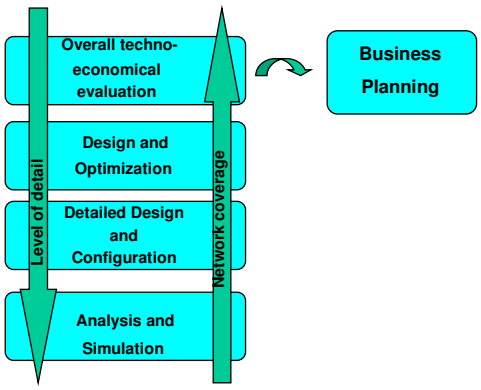
Robin Bailey
Head of Decision Systems Group
Analysys Ltd.

Oscar González Soto
ITU Consultant Expert
Strategic Planning and Assessment

Network Planning Tools Content

- Tool objectives
- Modeling capabilities
- Type of results
- Benefits and Customers

Network Planning Tools: STEM



Objective : STEM is a business decision making support tool that enables the analysis of business models and cost assignment for Telecommunication Networks and services over a period of time.

The Analysys STEM network investment modelling tool is a product of Analysys Consulting Ltd, Cambridge, UK
Contact: Robin Bailey – Head of Decision Systems Group
robin.bailey@analysys.com, see: www.analysys.com

Analysys STEM

Analysys

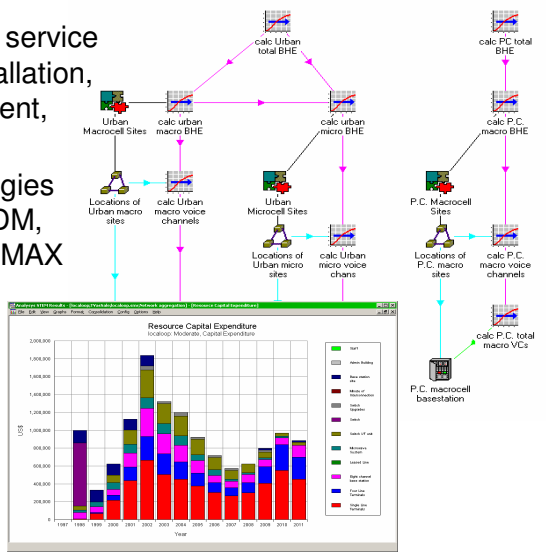
- Strategic Telecoms Evaluation Model*
- A consistent language and flexible framework for evaluating investments in telecoms business
- A high-level communication tool which uses icons to represent the key drivers in a business plan
- A time-based revenue, capex and opex calculator which supports network roll-out and investment decisions
- A tailored package of software, training, consultancy and support services

* developed over 20 years with the emerging telecoms economy

Business-case modelling by design

Analysys

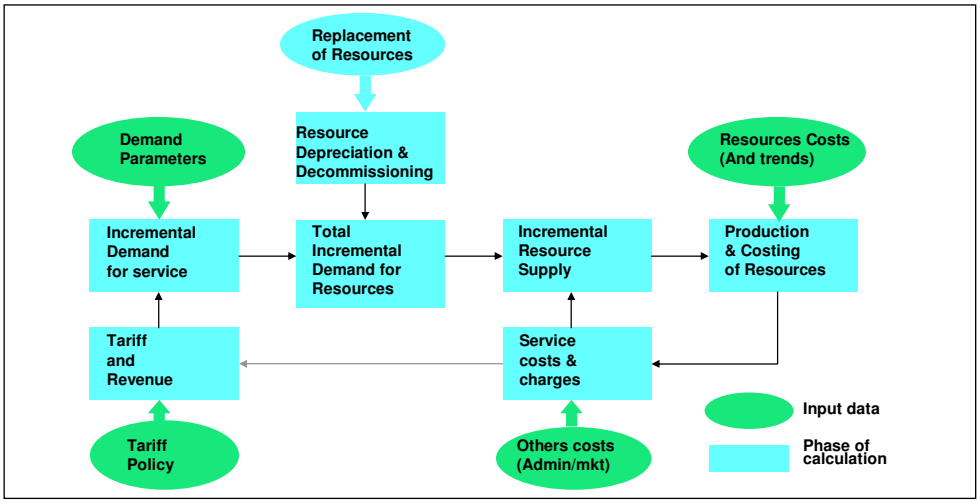
- Business planning based on service demand and equipment installation, categorised by market segment, service and geo-type
- Comparison of roll-out strategies across technologies, e.g. TDM, DSL, VoIP, GSM, UMTS, WiMAX
- Communication of vendor sales propositions
- Product analysis and breakdown of costs



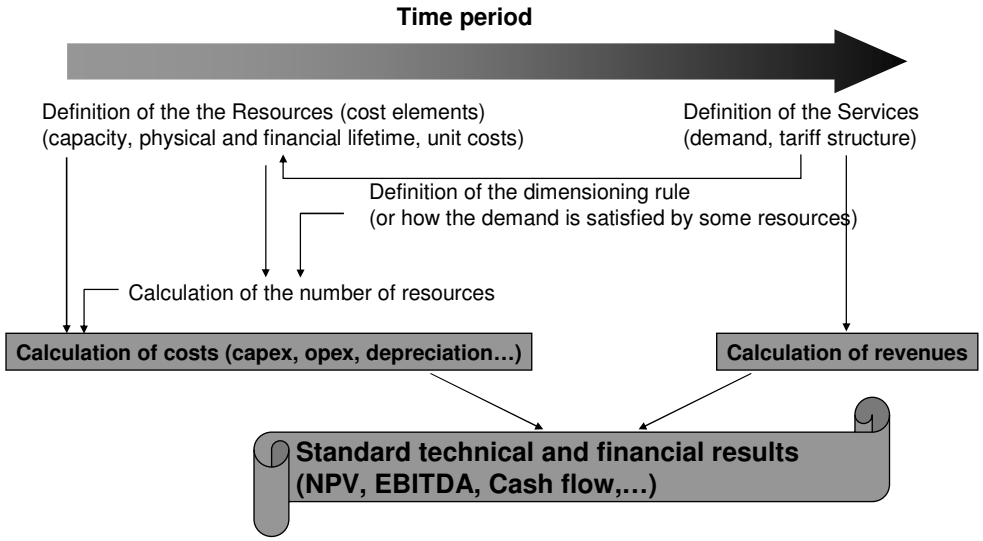
Business Planning Tools: STEM

Analysys

Activity Flow:



How the STEM engine works



Business Planning Tools: STEM

Resources

- physical lifetime
- traffic-carrying capacity
- depreciation period
- economies of scale
- capital expenditure
- operating expenditure

Services

- subscribers
- service rates
- annual and busy-hour traffic
- Erlang or BW demand
- resources required

STEM*

Time

- cost-related tariffs and demand elasticity
- age-based cost profiling
- non-linear resourcing

STEM allows both a macroscopic and microscopic approach to modelling

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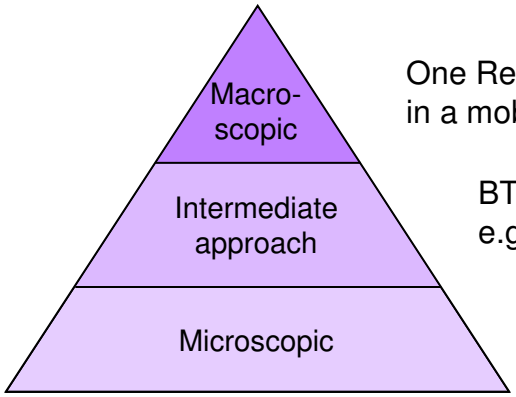


Examples:

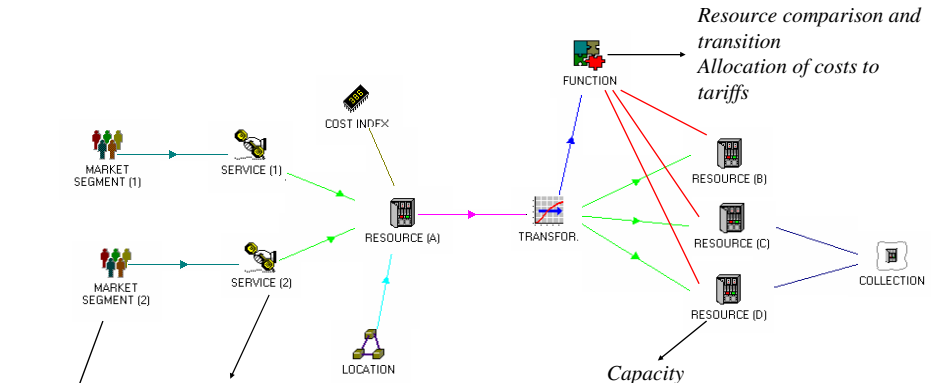
One Resource used to model all BTSs in a mobile network

BTSs grouped by area type, e.g. urban/suburban/rural/highways

BTSs modelled one by one

STEM focuses on telecoms objects

Analysys



Resource comparison and transition
Allocation of costs to tariffs

Subscribers

Traffic
Tariffs
Resource requirement
Cost dependent tariffs
Price elasticity of demand

Capacity
Lifetime (physical and financial)
Costs (capex, opex)
Age profile
Economies of scale

STEM is demand driven and allocates costs to demand

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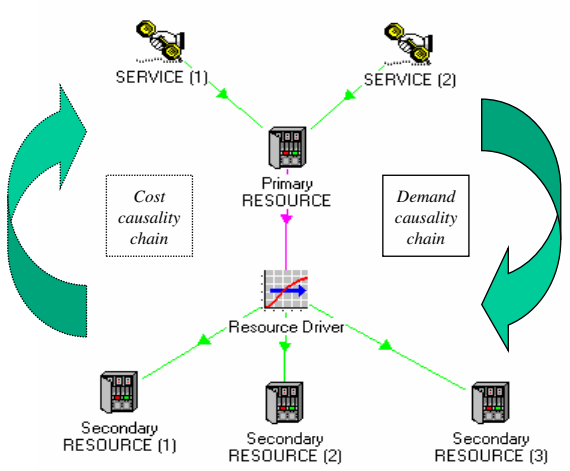

- Demand driven
- The STEM Editor emphasises the demand causality chain between services and resources
- The cost causality chain flows in the opposite direction

Market Segment

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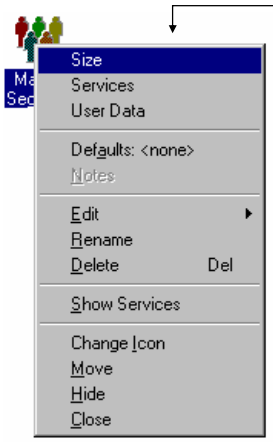

1. Choose the Size of the Market

2. Select the Service(s) to which this Market Segment is associated

3. You can define a set of inputs which can be referenced in formulae, and also in the definitions of derived results

Services

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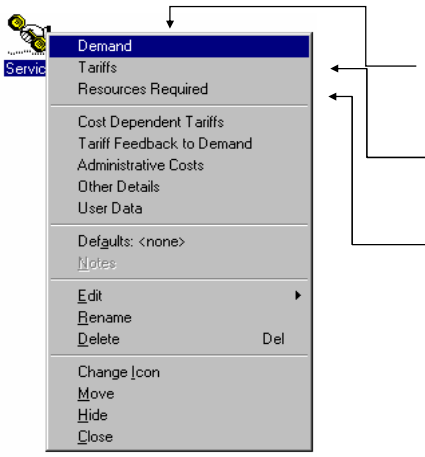
A Service is anything you can draw a revenue from, such as mobile telephony, X.25, house rentals…



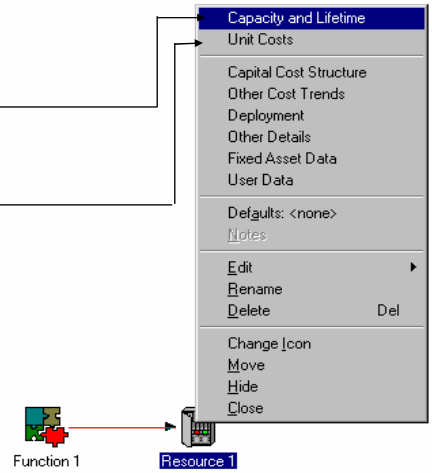
1. Define the Demand for this service (customer base, traffic unit, penetration rate…)
2. Define the Tariff of this service (connection, rental usage tariff)
3. Select the Resources the operator must install to provide that service

Resources

Analysys

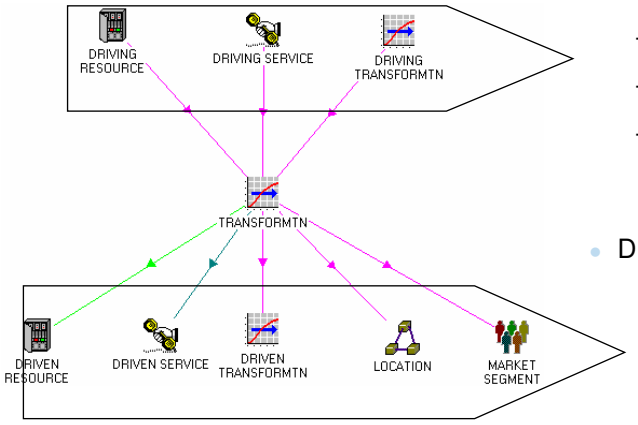
A Resource is anything that will cost you something, such as switches, leased lines, staff, a licence…

1. Define the capacity and the lifetime (physical, financial) of the Resource
2. Define the cost (capital cost, maintenance and operation costs…) of the Resource



Transformations can use a variety of inputs and can drive several elements

Analysys



- DRIVERS can be:
  - Resources
  - Services
  - Transformations
- DRIVEN elements can be:
  - Resources
  - Services
  - Transformations
  - Locations
  - Market Segments

Transformations allow Resources to be driven by other Resources rather than by Services

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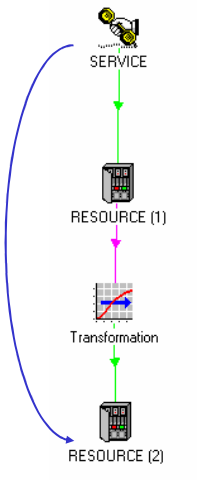
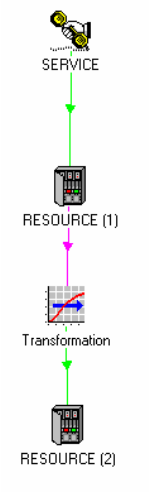


- This is particularly useful when:
  - there is a natural relationship between two Resources
    - e.g. towers are driven by base stations
  - Resources are distant from end customers and Services
    - e.g. in backbone networks
- However, all Resources in a STEM model are ultimately driven by Service demand

The rationale for Transformations is to act as secondary sources of demand

Analysys



e.g. number of installed units

e.g. time lag

Input

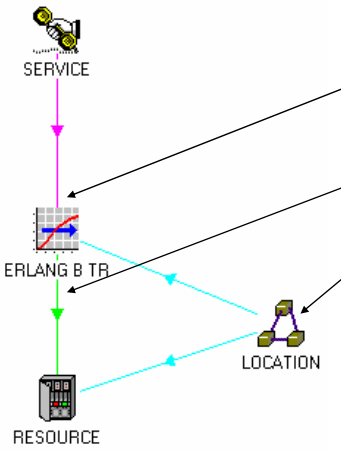
Transformation

Output

e.g. roll-out other resources

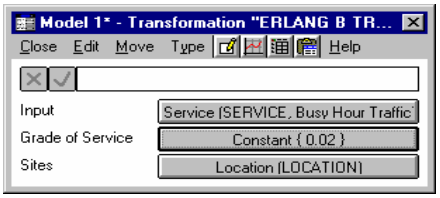
Erlang B Transformations can be used to convert Erlangs into channels

Analysys



The input to the Transformation is the Service *busy hour traffic*

The Erlang B formula returns the *number of channels* required to meet that level of traffic (given the *GoS*) and the *number of sites* (because the formula is non-linear)



STEM features: methodology

Analysys

- Assumptions for market segmentation, customers, connections, bandwidth, annual and busy-hour traffic drive the calculation of:
  - connection, rental and usage revenues
  - equipment installation, utilisation and replacement
  - capital expenditure, depreciation and operating costs
- Automatic aggregations for profitability and cashflow

STEM features: additional algorithms

Analysys

- Erlang B, customer churn, elasticity of demand and cost dependent tariffs
- Pre-run installation, deployment, planned units, technology shift and decommissioning
- Cost trends and age factors, economies of scale, overheads and value-chain analysis
- Financial parameters for working capital, tax and interest, gearing, borrowing, equity and dividends
- Flexible framework can be extended with user-definable formulae and transformations

STEM features: modelling platform

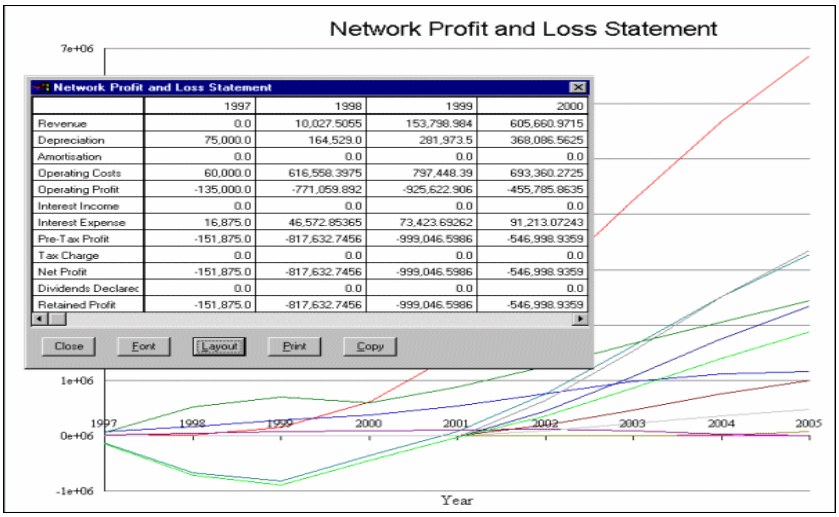
Analysys

- Object-oriented editing interface associates data directly with icons and links between elements
- Multiple views provide alternative insights into the model structure
- Seamless integration of annual, quarterly and monthly data
- Integrated multi-dimensional scenario engine
- End-to-end auditable
- Interfaces with Excel and ODBC databases
- Comprehensive documentation and online help

Business Planning Tools: STEM

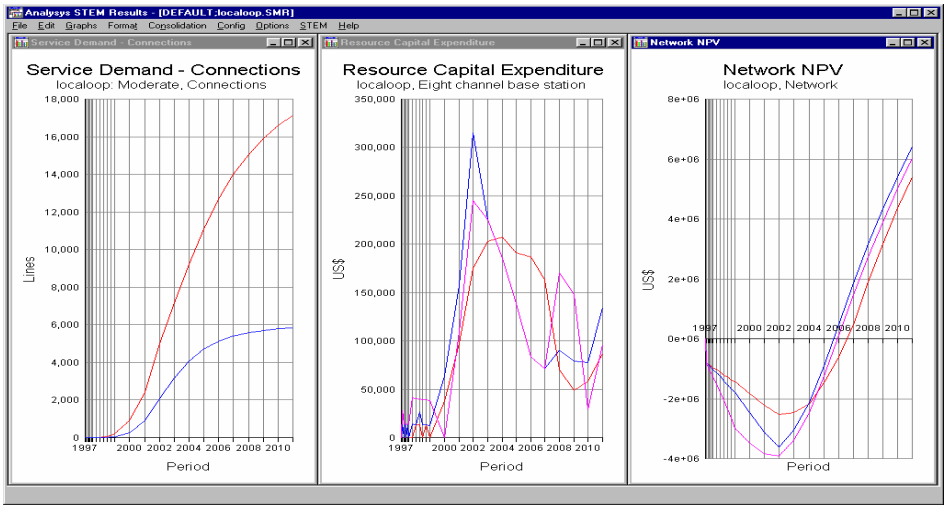
Example of results for business analysis

Analysys



Business Planning Tools: STEM
Example of results for business analysis

Analysys



* Under licence of Analysys

Business Planning Tools: STEM
Example of results for business analysis

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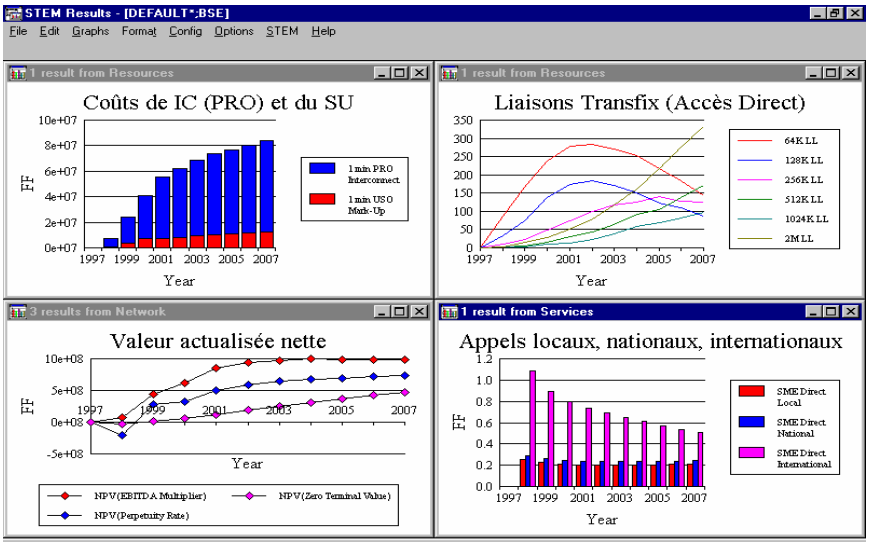

Business Planning Tools: STEM

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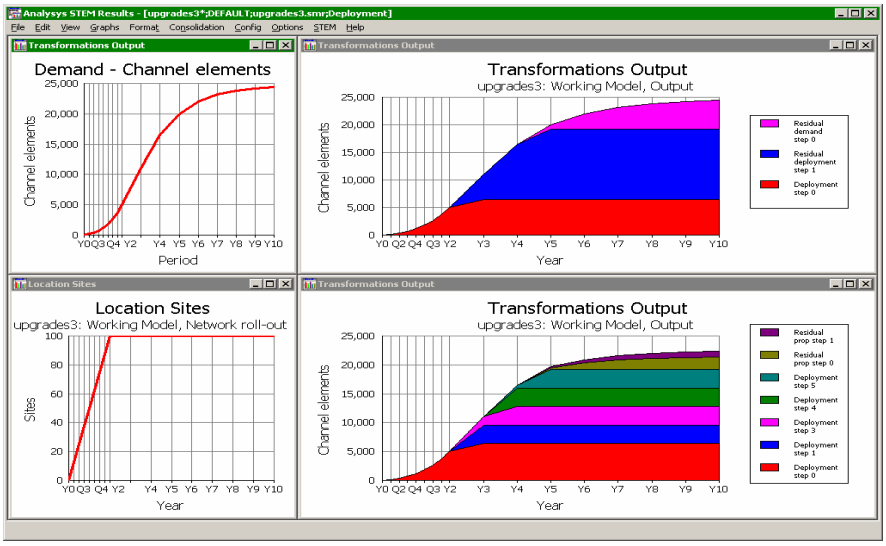

Business Planning Tools: STEM

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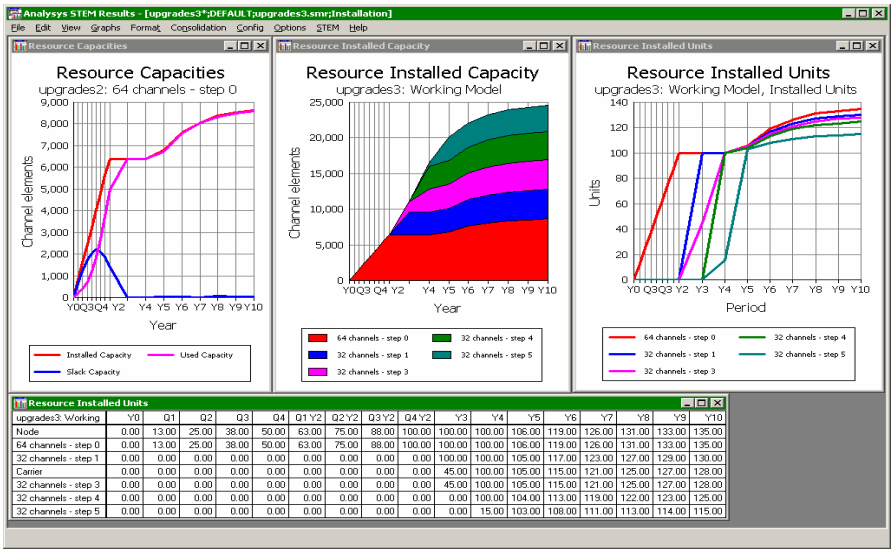

upgrades3: Working	Y0	Q1	Q2	Q3	Q4	Q1 Y2	Q2 Y2	Q3 Y2	Q4 Y2	Y3	Y4	Y5	Y6	Y7	Y8	Y9	Y10
Node	0.00	13.00	25.00	38.00	50.00	63.00	75.00	88.00	100.00	100.00	100.00	106.00	119.00	126.00	131.00	133.00	135.00
64 channels - step 0	0.00	13.00	25.00	38.00	50.00	63.00	75.00	88.00	100.00	100.00	100.00	106.00	119.00	126.00	131.00	133.00	135.00
32 channels - step 1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	100.00	105.00	117.00	123.00	127.00	129.00	130.00
Carrier	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	45.00	100.00	105.00	115.00	121.00	125.00	127.00	128.00
32 channels - step 3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	45.00	100.00	105.00	115.00	121.00	125.00	127.00	128.00
32 channels - step 4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	104.00	113.00	119.00	122.00	123.00	125.00
32 channels - step 5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	15.00	103.00	108.00	111.00	113.00	114.00	115.00

Benefits: Consistent financial framework

Analysys

- Service elements capture demand and tariff assumptions ⇨ REVENUE
- Resource elements represent unit costs and build constraints for hardware, software, licences, buildings and human resources ⇨ CAPEX, DEPRECIATION and OPEX
- Connection, traffic and location-based dimensioning rules are shown as graphical links ⇨ PROFITABILITY and BALANCE SHEET

Benefits: STEM integrates communication with calculation

Analysys

- Provides a brainstorming and presentational tool for rapidly developing network business models — THINK
- Automatically generates demand / cost-allocation formulae, geographical variants and scenarios — CREATE
- Calculates annual, quarterly and monthly service connections, traffic and revenues, equipment installation and replacement, capex and opex — RUN
- Delivers hundreds of built-in results through an integrated charting interface which can drill-down into individual elements, revenues and costs — REVIEW

Benefits: Professional modelling process

Analysys

- Iconic presentation and pre-defined algorithms encourage **focus** on issues rather than formulae
- General connection/traffic/location dimensioning rules are applicable to a broad range of technologies and ensure **consistent** structure and data gathering
- Purpose designed interface accelerates modelling process and increases **productivity**
- Concise representation of complexity makes models **robust** and **easier to maintain** (less errors)
- Industry-standard platform lends **credibility** to results

Benefits: STEM creates business value

Analysys

- **Flexibility** means quicker delivery of new cases, increased productivity, and greater focus on key issues, un-distracted by mundane spreadsheet maintenance
- **Robustness** saves hours of effort every time you alter the structure of the services or technology modelled, and helps avoid costly mistakes
- **Consistency** allows for the effortless exploration of new scenarios, enabling new insights which could be too time-consuming to explore in Excel

Operators and vendors using STEM

Analysys

- BT Global Services
- Cable and Wireless
- Cegetel
- China Telecom
- Korea Telecom
- Swisscom Mobile
- Telecom New Zealand
- Telkom Indonesia
- Telkom SA
- Telstra
- Alcatel
- Ericsson
- Fujitsu
- Huawei Technologies
- Iskratel
- Juniper
- Marconi
- Motorola
- Nokia
- Siemens

STEM User Group Meeting

Analysys

- 20–21 September 2006, Clare College, Cambridge, UK
- Interactive sessions on business planning for convergent services and product-profitability analysis
- Master classes for established users in parallel with fast-track training for newcomers
- Guest presentations from operator and vendor clients

Please register by email to stem.admin@analysys.com