Reaching the Goal

Presented by: John Arthur Ricketts, IBM
Date: June 7-8, 2010
Agenda

1. Professional, Scientific, and Technical Services
2. TOC Applications
3. Theory of Constraints for Services
Which system is simpler?

Conventional wisdom says B looks simpler, but TOC shows A is actually simpler.

System A

System B
Professional, Scientific, & Technical Services

2007 North American Industry Classification System (NAICS), Sector 54

This sector comprises establishments that specialize in performing professional, scientific, and technical activities for others.

These activities require a high degree of expertise and training.

- Accounting
- Advertising
- Architecture
- Bookkeeping
- Computing
- Consulting
- Engineering
- Law
- Research
- Photography
- Translation / Interpretation
- Veterinary

Source: www.census.gov
Resource Management
(Hire-to-plan vs. Hire-to-deal)

Methods based on conventional wisdom are prone to under- or over-supply resources.

When the capacity plan anticipates growth, but the services market turns down, the bench grows.

When capacity lags demand, the “bench” becomes depleted and there are “open seats.”
Resource Management
(Replenishment for Services: Hire-to-buffer)

People are not inventory, but the Aggregation Principle and Buffer Management do apply in $R_S$.

Inventory
- Total consumption
- Unreliability
- Time to resupply
- Unidirectional buffer

Resources
- Net consumption
- Unreliability
- Time to adjust
- Bidirectional buffer
Project Management
(Critical Chain for Services – Multi-project Critical Chain)

CC\textsubscript{I} optimizes the internal constraint. CC\textsubscript{E} uses R\textsubscript{S} to satisfy the external constraint.
Process Management
(DBR for Services)

DBRG uses fixed capacity to deliver goods.
DBRS uses variable capacity to deliver services.

Buffer Management

Capacity Management

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Finance and Accounting
(Cost Accounting for Services)

- Cost allocation → Standard cost → Billing rate
- Billing rate * Hours = Standard price
- Utilization drives client billing by profit centers
- Cost centers must recover costs from profit centers
- Inventory can be of little or no concern
- Priorities: 1) Expense, 2) Revenue, 3) Investment
- Local optimization → Global optimization
Finance and Accounting
(Throughput Accounting for Services)

Financial Measures

- **Throughput (T)** – **cash generated through deliverables and service levels**, which is sales prices minus truly variable costs (subcontractor fees, commissions, travel & living, etc.)

- **Investment (I)** – all money spent on **service production systems, facilities, skills, intellectual capital, and assets**; plus money spent responding to requests for information, preparing bids and proposals, and negotiating contracts

- **Operating Expense (OE)** – all money spent to **produce deliverables and service levels from investments**, which is primarily direct labor of practitioners, managers, and partners; but also includes selling, general, and administrative (SG&A) costs
Finance and Accounting
(Throughput Accounting for Services)

Performance Measures

- Net Profit of project or process \((NP) = T – OE\)
- Return on Investment \((ROI) = \frac{NP}{I}\)
- Productivity \(= \frac{T}{OE}\)

Resource Measures

- Throughput per Constraint Unit \((T/CU) = \frac{(\text{revenue} – \text{TVC})}{\text{constrained resources}}\)
- Throughput per hour \((T/h) = \frac{(\text{revenue} – \text{TVC})}{\text{productive hours}}\)
- Operating Expense per hour \((OE/h) = \frac{(\text{direct labor} + \text{SG&A})}{\text{available hours}}\)
- Utilization \((U) = \frac{\text{time a resource spends producing}}{\text{time available to produce}}\)
Finance and Accounting
(Throughput Accounting for Services)

Decision-support Measures

- Change in Net Profit ($\Delta NP$) = $\Delta T - \Delta OE$
- Payback (PB) = $\Delta NP / \Delta I$

Control Measures

- Project or Process Dollars per Day (PDD) = $NP / \text{days}$

  *PDD corresponds to TDD in the sense that both encourage on-time delivery, but “on-time” has a somewhat different meaning in services because both the start and finish are generally relevant to clients.*

- Resource Dollars per Day (RDD) = excess resources * OE/day

  *RDD is the rate at which excess resources erode NP by generating OE which cannot be recovered by T or redirected into I.*
### Finance and Accounting
(Throughput Accounting for Software)

#### Throughput Accounting for...

<table>
<thead>
<tr>
<th>Throughput Accounting for...</th>
<th>Software Engineering (TA&lt;sub&gt;E&lt;/sub&gt;)</th>
<th>Software Business (TA&lt;sub&gt;B&lt;/sub&gt;)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Internal</td>
<td>External</td>
</tr>
<tr>
<td>Throughput is...</td>
<td>Zero</td>
<td>Cash from code</td>
</tr>
<tr>
<td>Investment is mainly...</td>
<td>Ideas + tools</td>
<td>Ideas + tools</td>
</tr>
<tr>
<td>Operating Expense is...</td>
<td>Labor</td>
<td>Labor</td>
</tr>
</tbody>
</table>

Professional, Scientific, and Technical Services often produce computer software for semi-automation of services, but pure software companies are in the Information sector.
## Marketing & Sales

<table>
<thead>
<tr>
<th>Marketing &amp; Sales for Services</th>
<th>Conventional</th>
<th>TOC-based</th>
</tr>
</thead>
<tbody>
<tr>
<td>Client needs indicated by…</td>
<td>Pain points</td>
<td>Core problems</td>
</tr>
<tr>
<td>Typical value proposition is…</td>
<td>Decrease client’s OE</td>
<td>Increase client’s T</td>
</tr>
<tr>
<td>Pricing is based on…</td>
<td>Provider’s cost</td>
<td>Client’s value</td>
</tr>
<tr>
<td>Service prices tend toward…</td>
<td>Standard</td>
<td>Flexible</td>
</tr>
<tr>
<td>Sales management focus is…</td>
<td>Entire pipeline</td>
<td>Sales constraint</td>
</tr>
<tr>
<td>Opportunities are ranked by…</td>
<td>Profit margin</td>
<td>ΔNP</td>
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Marketing and Sales for Services follows the same TOC principles as manufacturing and distribution, but PSTS enterprises may provide TOC services to others.
Strategy & Change for Services follows the same TOC principles as manufacturing and distribution, but PSTS enterprises may suffer the “shoemaker’s children” syndrome.
Implementation & Technology
(Management Systems connected by Enterprise Service Bus)
TOC for Services

- Strategy & Change
- Marketing & Sales
- Implementation & Technology

- Replenishment
- Critical Chain
- Drum Buffer Rope
- Throughput Accounting
- Deliverables
- Service Levels
- Implementation & Technology
References


About the author

John Arthur Ricketts is an IBM distinguished engineer.

Formerly a consulting partner in IBM Global Services, Dr. Ricketts is currently a technical executive in IBM Corporate Headquarters.

His experience includes manufacturing operations, higher education, software engineering, telecommunications, information technology consulting, new ventures, professional development, and service delivery.

John’s doctorate is in Information Systems, Computer Science, and Behavioral Science.