



TOCICO 2010 Conference

Reaching the Goal

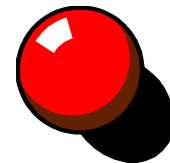
Presented by: John Arthur Ricketts, IBM

Date: June 7-8, 2010

Agenda

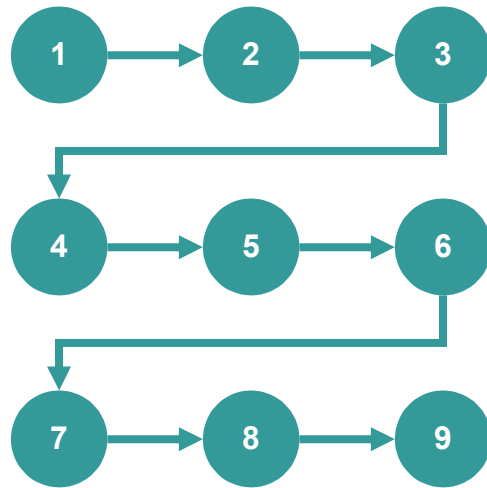
TOCICO 2010 Conference

1. Professional, Scientific, and Technical Services
2. TOC Applications
3. Theory of Constraints for Services

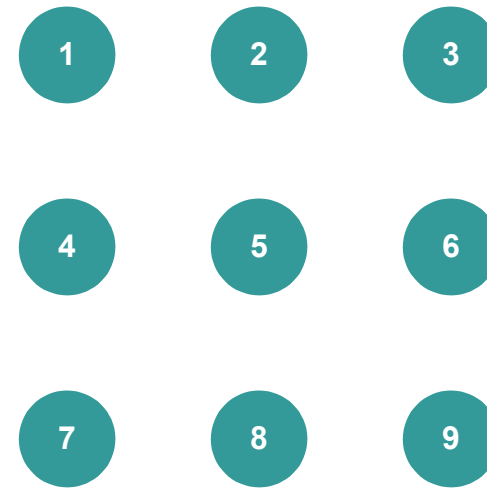


Which system is simpler?

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



System A



System B

Professional, Scientific, & Technical Services

TOCICO 2010 Conference

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

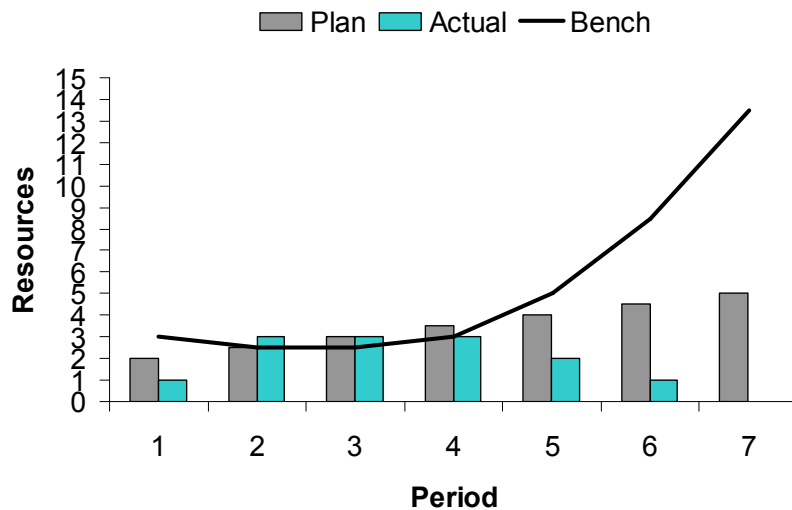
Source: www.census.gov



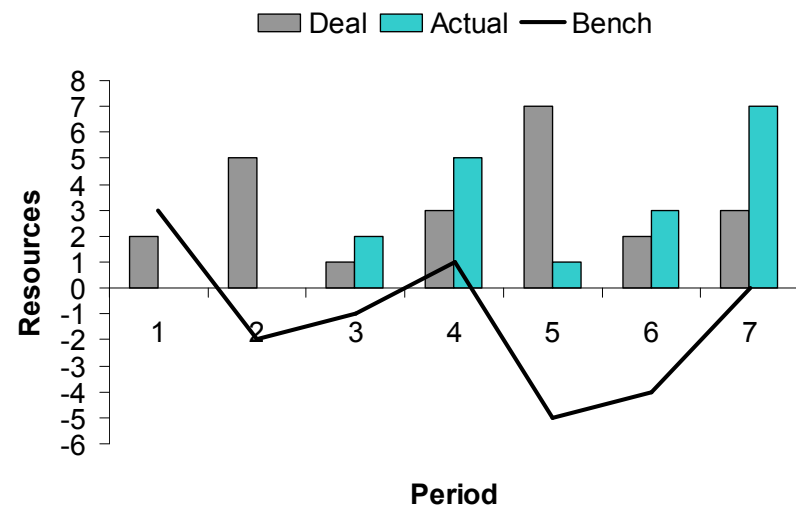
Resource Management

(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.”



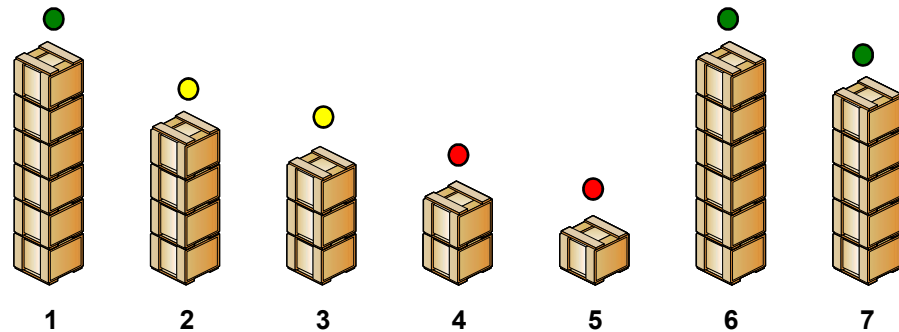
Resource Management

(Replenishment for Services: Hire-to-buffer)

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

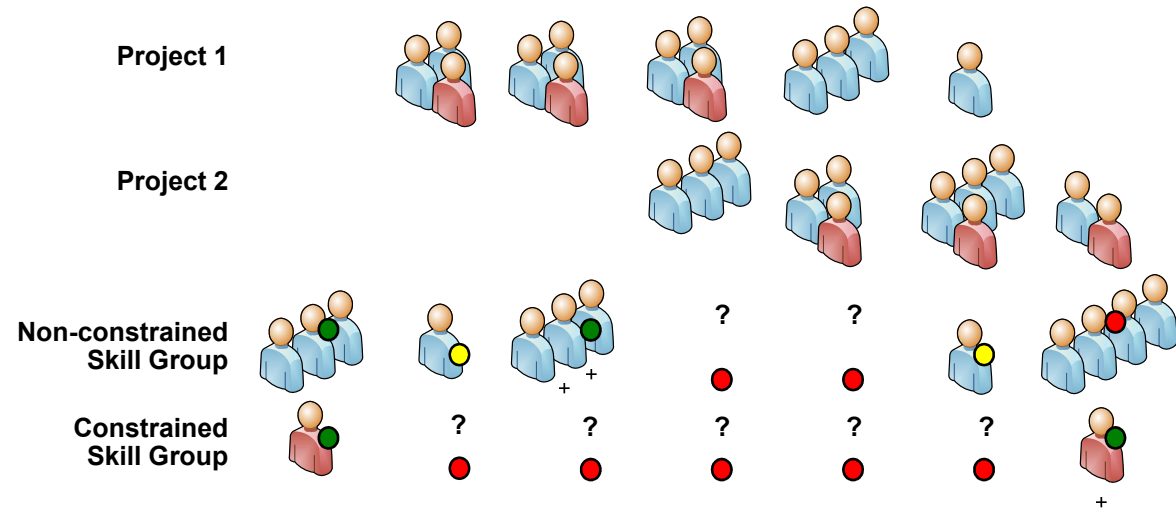
Inventory

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



Resources

- Net consumption
- Unreliability
- Time to adjust
- Bidirectional buffer



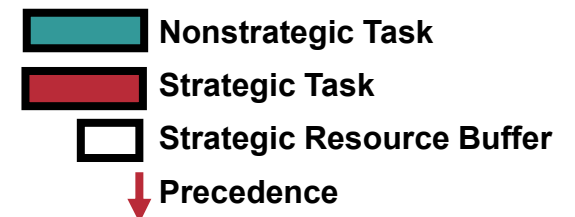
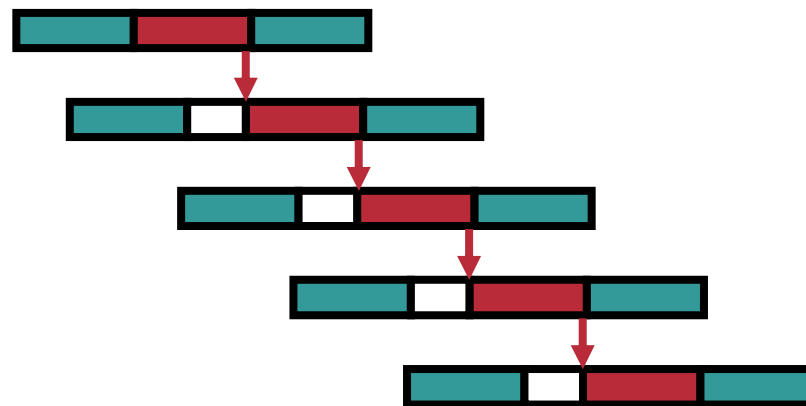
Project Management

(Critical Chain for Services – Multi-project Critical Chain)

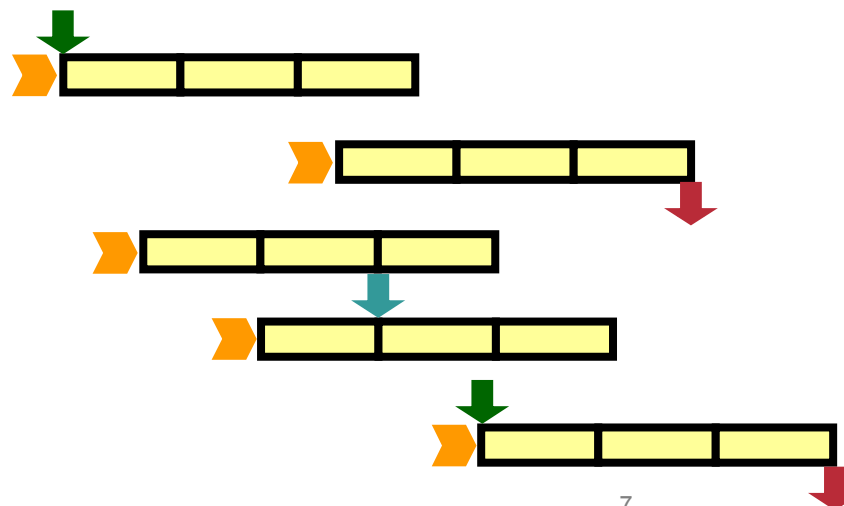
TOCICO 2010 Conference

CC_I optimizes the internal constraint.
 CC_E uses R_S to satisfy the external constraint.

Internal
Constraint



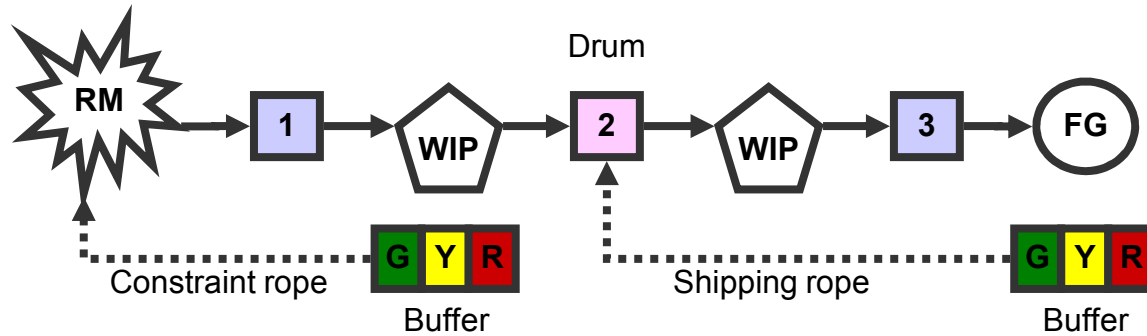
External
Constraint



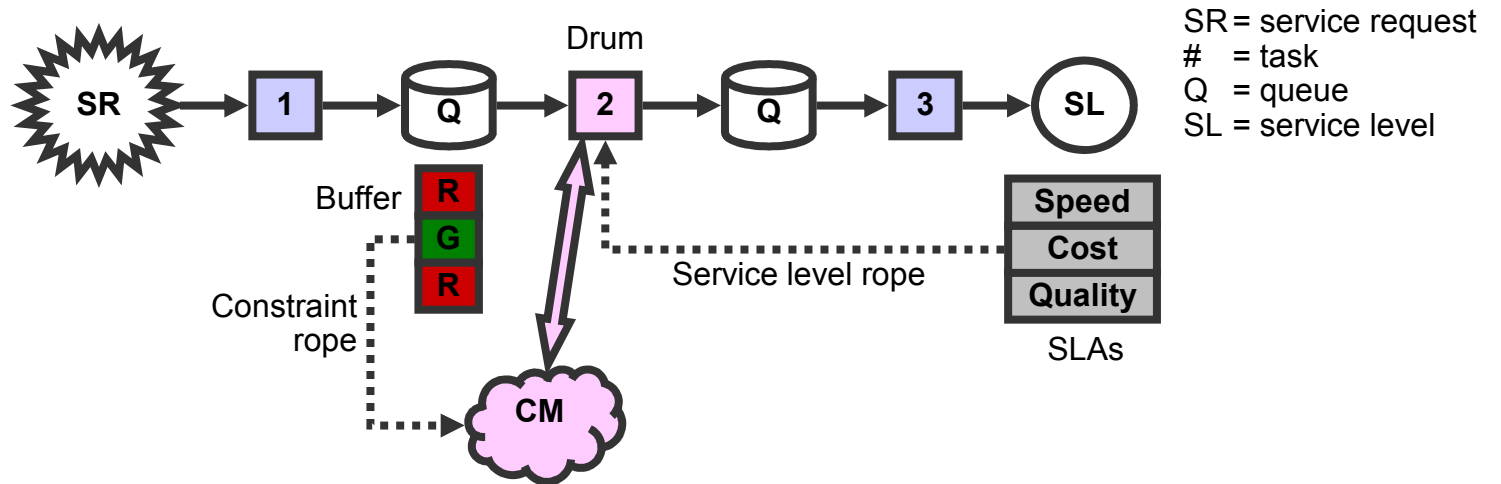
Process Management (DBR for Services)

DBR_G uses fixed capacity to deliver goods.
DBR_S uses variable capacity to deliver services.

Buffer Management



Capacity Management

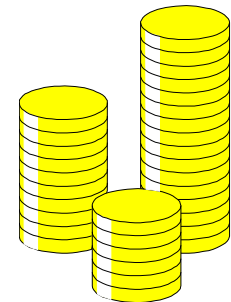


Finance and Accounting

(Cost Accounting for Services)

TOCICO 2010 Conference

- **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**



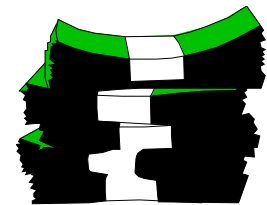
Finance and Accounting

(Throughput Accounting for Services)

TOCICO 2010 Conference

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)

TOCICO 2010 Conference

Performance Measures

- Net Profit of project or process (**NP**) = $T - OE$
- Return on Investment (**ROI**) = NP / I
- Productivity = T / OE

Resource Measures

- Throughput per Constraint Unit (**T/CU**) =
(revenue – TVC) / constrained resources
- Throughput per hour (T/h) =
(revenue – TVC) / productive hours
- Operating Expense per hour (OE/h) =
(direct labor + SG&A) / available hours
- Utilization (U) =
time a resource spends producing / time available to produce



Finance and Accounting

(Throughput Accounting for Services)

TOCICO 2010 Conference

Decision-support Measures

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

Control Measures

- Project or Process Dollars per Day (**PDD**) =
NP / 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)

TOCICO 2010 Conference

Throughput Accounting for...	Software Engineering (TA _E)		Software Business (TA _B)	
	Internal	External	Product	Service
Throughput is...	Zero	Cash from code	Cash from code	Cash from code + infrastructure
Investment is mainly...	Ideas + tools	Ideas + tools	Ideas + tools + inventory	Ideas + tools
Operating Expense is...	Labor	Labor	Labor + SG&A + training + support	Labor + SG&A + training + support + infrastructure

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

Marketing & Sales for Services	Conventional	TOC-based
Client needs indicated by...	Pain points	Core problems
Typical value proposition is...	Decrease client's OE	Increase client's T
Pricing is based on...	Provider's cost	Client's value
Service prices tend toward...	Standard	Flexible
Sales management focus is...	Entire pipeline	Sales constraint
Opportunities are ranked by...	Profit margin	ΔNP

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

Strategy & Change for Services	Conventional	TOC-based
Strategy is determined by...	Various methods	Cause and effect
Competing mainly on price is...	Acceptable	Not acceptable
Heart of strategy is...	Core competency	Compelling market offers
Strategic constraints are...	Not crucial to strategy	Deliberately chosen
Problems are...	Framed by change agent	Reached by consensus
Direction of solution is set by...	Compromise	Conflict resolution

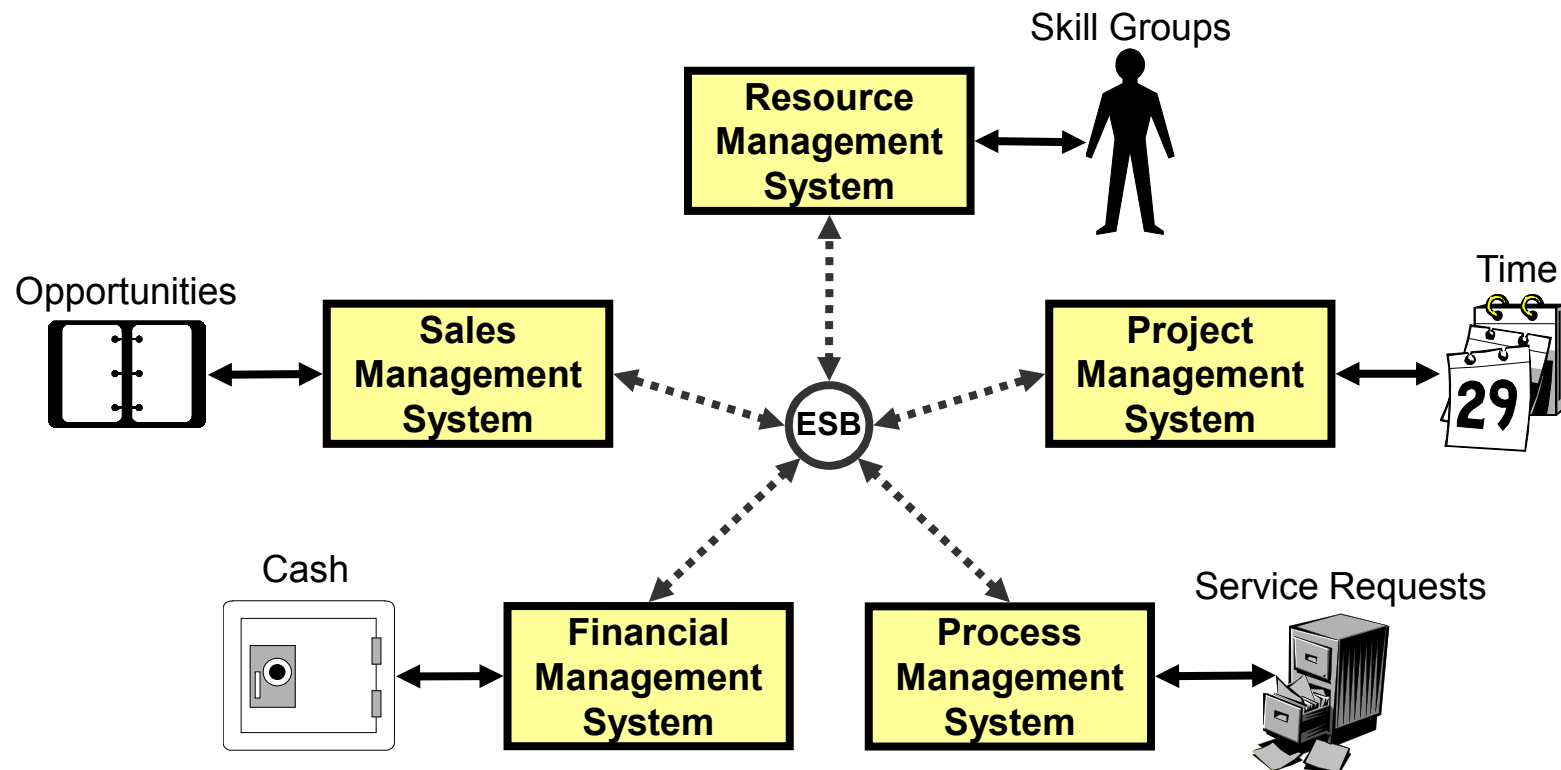
Strategy and Change for Services follows the same TOC principles as manufacturing and distribution, but PSTS enterprises may suffer the “shoemaker’s children” syndrome.



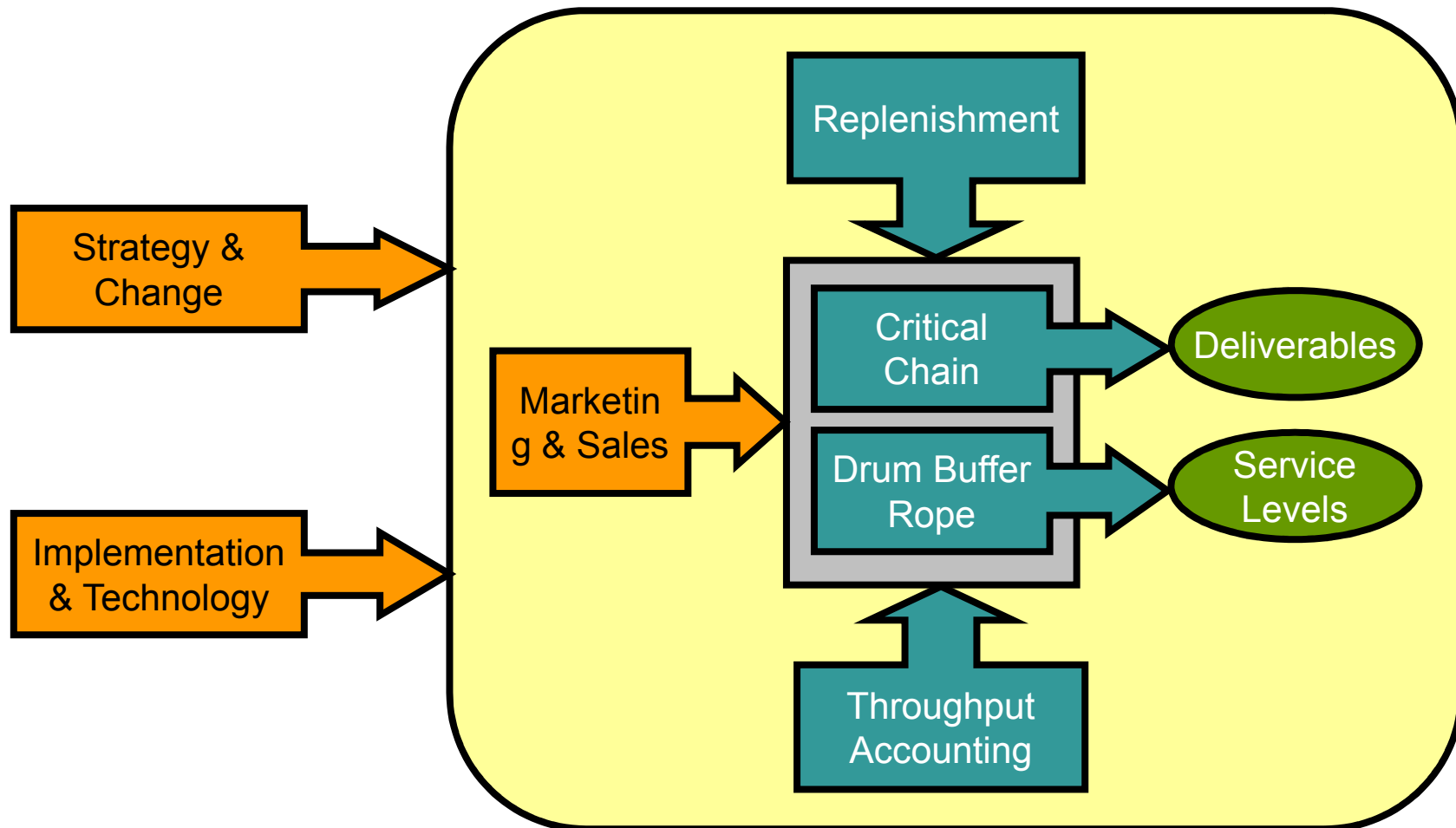
Implementation & Technology

(Management Systems connected by Enterprise Service Bus)

TOCICO 2010 Conference



TOC for Services



References

Ricketts, John A., *Reaching the Goal: How Managers Improve a Services Business Using Goldratt's Theory of Constraints*, IBM Press, 2008.

Ricketts, John A., "Theory of Constraints for Services: Past, Present, and Future," *The Science of Service Systems*, Haluk Demirkan, James C. Spohrer, and Vikas Krishna (editors), Chapter 40, Springer, New York, 2010.

Ricketts, John A., "Theory of Constraints in Professional, Scientific, and Technical Services," *Constraint Management Handbook*, Jim Cox and John Schleier (editors), Chapter 29, McGraw-Hill, New York, 2010.



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.

