Demand Capacity Planning

Rickard Holm, Volvo Car Corporation

Background Odette DCP Project

- Capacity Alignment is an issue in almost every business
  - ➔ capacities (production equipment, personnel, etc.) need to be aligned to fluctuation of market/customer demand
  - ➔ traditionally this process is done company internally without explicit involvement of external business partners
  - ➔ recent developments in the automotive industry (e.g. globalisation, platform strategies, longer machine running times) have increased the difficulties incorporated with the traditional approach Suppliers usually work in 3 or 4 shift operation 7 days per week
    =>capacity increase is much more difficult
- Scope of the Odette Recommendation is a **collaborative, integrated** approach for Demand Capacity Planning that helps to overcome the weak points of the traditional approach and is the foundation for marketing simulations

Background Odette DCP Project

- When Odette started the DCP project, several companies (e.g. Audi/VW, DC (MCG), Ford, GM, PSA, Renault) had either already introduced or at least planned to introduce DCP solutions
  - ➔ Example: GM Europe (system called CAMAS) started in 1999; in 2002: 1.800 suppliers and 50.000 part numbers
- Suppliers are interested to avoid heterogeneous individual solutions with every customers and need to see consolidated medium and long term demands for capacity management
- Customers are interested to minimise effort and time for roll-out of the DCP process to their supply base
- Conclusion: OEMs and Suppliers are interested to standardise the basic functionality and processes regarding DCP

Demand Capacity Planning (DCP) - Background
The Odette SCM Group

- Established in March 2001

- **Goal** of Odette SCM Group is to identify and tackle the reasons for slow implementation of SCM-concepts in automotive industry

  - ➔ bringing together the **know-how** and **experience**
  - ➔ create **recommendations (SCMo & DCP)**
  - ➔ enable **interoperability**

- This presentation refers to the recommendation for the SCM building block "**Demand Capacity Planning**" (DCP)

Participants DCP Project

OEMs

Audi	Roland Scheidler
BMW	Jan Kühner (replaced Manfred Wiltschek)
DaimlerChrysler	Andreas Basche
Ford	Thomas Lieb
GM	Angelika Gillmann*, Peter Scherer
PSA	Rob Exell
Renault	Didier Canals
Volvo	Rickard Holm
VW	Martina Hemken
Bosch	Oliver Merle**

* no direct participation in meetings in 2002

Suppliers

Faurecia	Michel Godin
Siemens VDO	Karlheinz Dietz
Treves	Hugues de Quercize
Galia	Jean-Pierre Le Bot

** Project Leader

Organizations

Odette Int	Patrick Lucchesi
SMMT	John Luscombe
VDA	Hans-Guenter Bodlien (till 11.2002)

Goal and target of Odette DCP concept

- Goal: **Improve** the traditional, rather unstructured, cumbersome capacity planning activities significantly
  - ➔ no 100% solution

- Target of DCP
  - ➔ **detect** potential capacity shortfalls and under-utilization of capacities **in time**, efficiently and reliably
  - ➔ Structured and **efficient resolution procedure** once a serious future capacity shortfall is identified

Important elements Odette DCP process

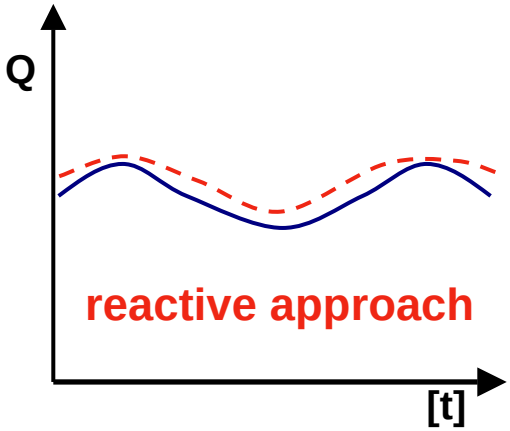
- ➔ reliable, consistent and agreed medium/long term **demand** planning
  - As demand information will never be 100% perfect. **uncertainty** should be considered in an appropriate way
- ➔ suitable representation of **capacity** information
- ➔ **open communication** of suppliers and customers (e.g. transparency of shared relevant data)
- ➔ uniform/agreed demand and capacity **definitions**
- ➔ agreed **collaborative business processes**

Benefits of Collaborative DCP:

- Reduction of all extra costs associated with capacity shortfalls
  - premium freight
  - overtime and premiums
  - frequent production plan rescheduling
- No loss of customer orders and thus contribution margin
- Reduction of all cost associated with idle capacities
- Less administrative work in the DCP process
- Transparency and consolidated view of customer's demand figures in shortage situation enables to take the right decisions/measures (right place, right time, right quantity,...)

DCP Result

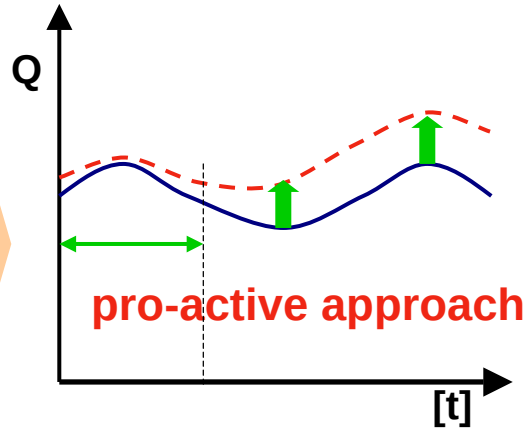
- Enable smooth and secure adjustment of capacities to the mid- and long-term oscillation/variation of demand



supplier adapts capacity to strictly follow the demand fluctuations

➔ **alignment**

➔ **limited collaboration**



supplier offers capacity increment to enable simulation of marketing scenarios

➔ **alignment & signal to customer**

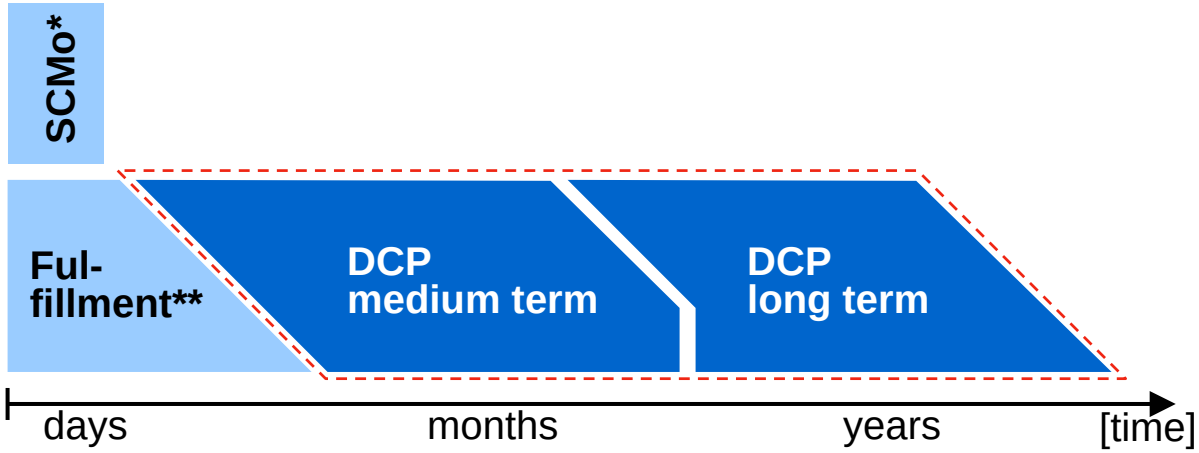
➔ **collaboration**

Legend:

— **demand**

- - **declared capacity**

Scope of Odette DCP



users	operations (logistics/ production)	production planning	sales / purchasing, project mgmt.
examples for measures	overtime, premium freight, banking	additional shifts, small invest-ments, large banking	major investments (tooling, machines, etc.)

*** Supply Chain Monitoring** **** e.g. call-offs, VMI, Kanban**

Current Situation / Motivation for DCP
Customer Point of View

- Experience: **severe capacity problems** in certain areas of the automotive industry in the late 90s
- Reasons:
  - ➔ **Too late recognition**/communication of demand increase
  - ➔ **No reaction** of some suppliers on forecasted demand increases
    - no (proactive) capacity increase
    - no timely communication of capacity shortfall to effected customer(s)
  - ➔ **Slow** decision taking and resolution process
  - ➔ In bottleneck situations customer plants act uncoordinated
  - ➔ Suppliers often have too optimistic capacity assumptions
- Result: A significant number of cars was not build/sold due to unresolved capacity shortfalls

Current Situation / Motivation for DCP
Supplier Point of View (Multiple Customer)

- Experience:
  - ➔ **Severe capacity problems** in certain areas of the automotive industry in the late 90s
  - ➔ Increasing difficulty and effort to build **realistic** medium and long term demand (sales/production) **forecasts**
  - ➔ Significant **time lags** in the alignment of capacities to demand fluctuation
- Reasons:
  - ➔ Stability & reliability of demand (sales / production) planning (= basis for capacity planning) is rather low
  - ➔ In general customers do not provide official demand forecasts with a time horizon of more than 12 months
  - ➔ **Slow** and unstructured decision taking and resolution process

Current Situation / Motivation for DCP
Supplier Point of View (Multiple Customer)

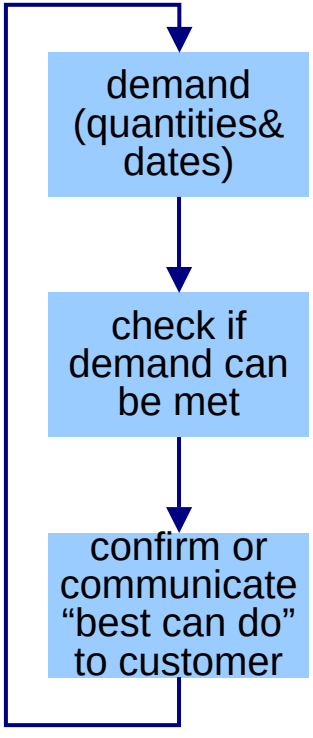
- Result:
  - ➔ Capacity **shortfalls** / **under-utilization** of capacities
  - ➔ High **risk** for suppliers to make significant investments
  - ➔ Preferred strategy is to wait until a sufficient level of **confidence** is reached regarding the future demand
  - ➔ Supplier demand capacity planning **not consistent** with customer planning

Current Situation / Motivation for DCP Conclusion

- There is a strong **need for improvement** in the field of DCP:
  - ➔ better prevention
  - ➔ smart, lean, IT-supported, structured process for capacity alignment
  - ➔ integrated, collaborative approach based on sharing of common and consistent data
- The big car makers are already engaged in DCP concepts
  - ➔ Goal is to **reduce number and consequences of capacity shortfalls** significantly and all related expenditures and loss of profit margin

Basic Concept for DCP
Two Models of Demand Capacity Planning

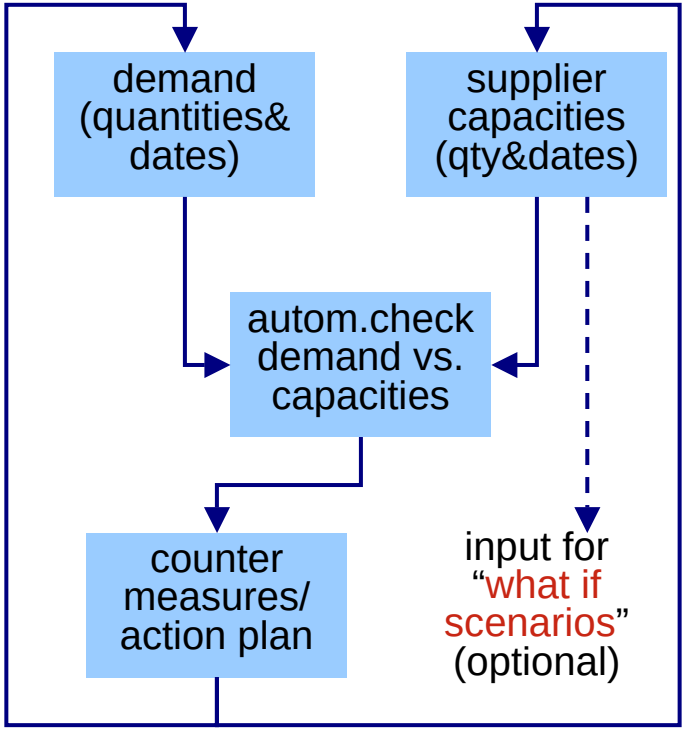
Traditional Process (sequential)



for **every** marketing scenario suppliers have to check & confirm / communicate "best can do"

established process

Integrated Process (parallel) ✓

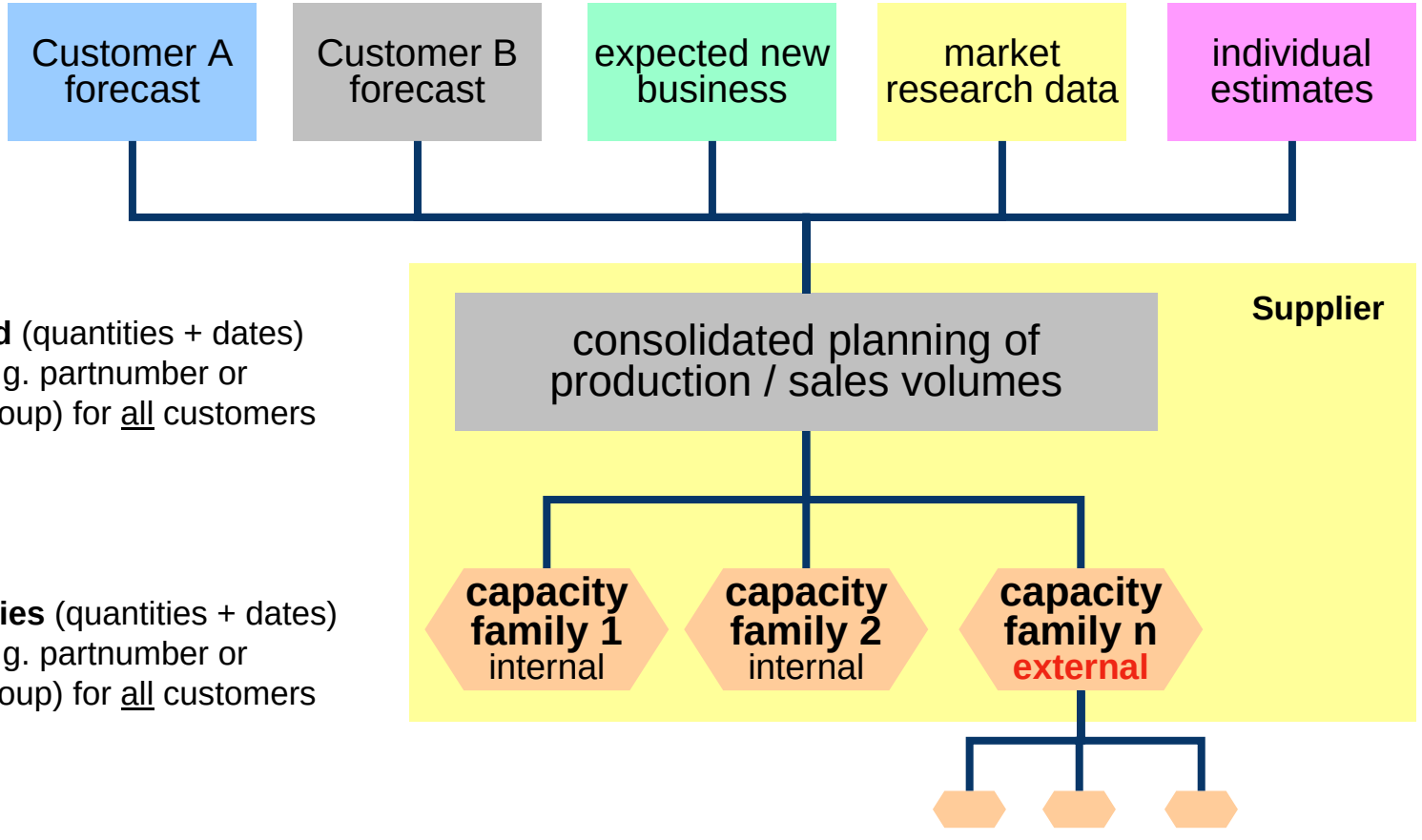


The integrated process **also** allows to roughly check **feasibility of marketing scenarios** (approximation) without further supplier involvement; identification of critical capacity constraints

future requirement of OEMs
➔ **Odette Focus**

Basic Concept for DCP
Need for Demand Consolidation

1. inputs



2. demand (quantities + dates) by item (e.g. partnumber or product group) for <u>all</u> customers

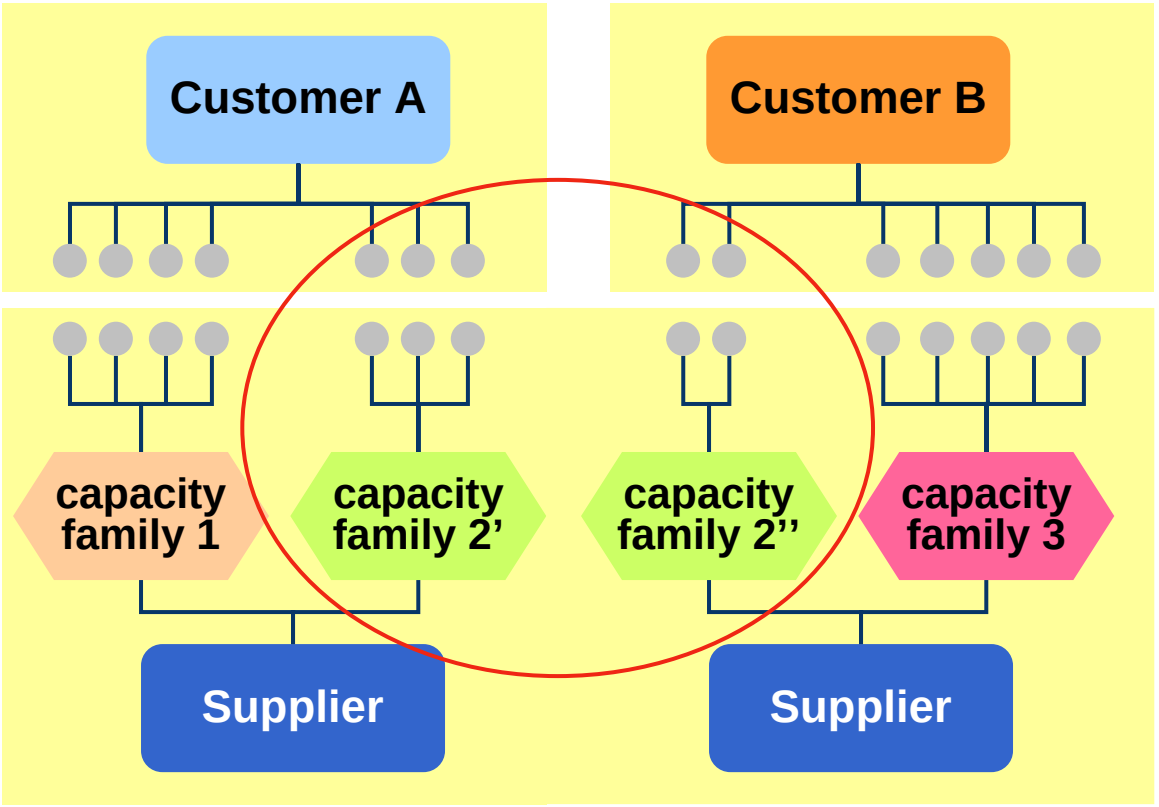
3. capacities (quantities + dates) by item (e.g. partnumber or product group) for <u>all</u> customers

Back-up

Multi-Customer DCP
Separate, Customer-driven Solutions ...

demand (quantities+dates) by item (e.g. partnumber / product group)

capacities (quantities+dates) by capacity family (group of items)



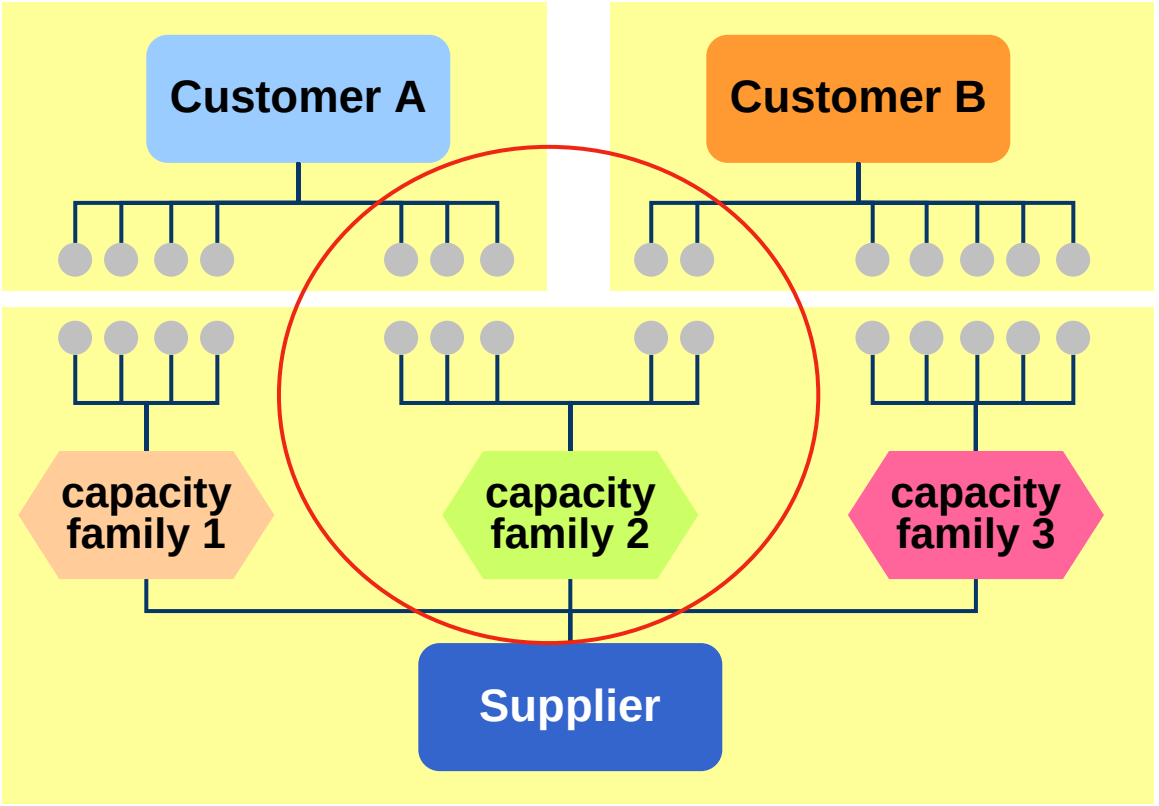
... do not provide the consolidated view, suppliers need for DCP

Back-up

Multi-Customer DCP
Interoperable DCP applications ...

demand (quantities+dates) by item (e.g. partnumber / product group)

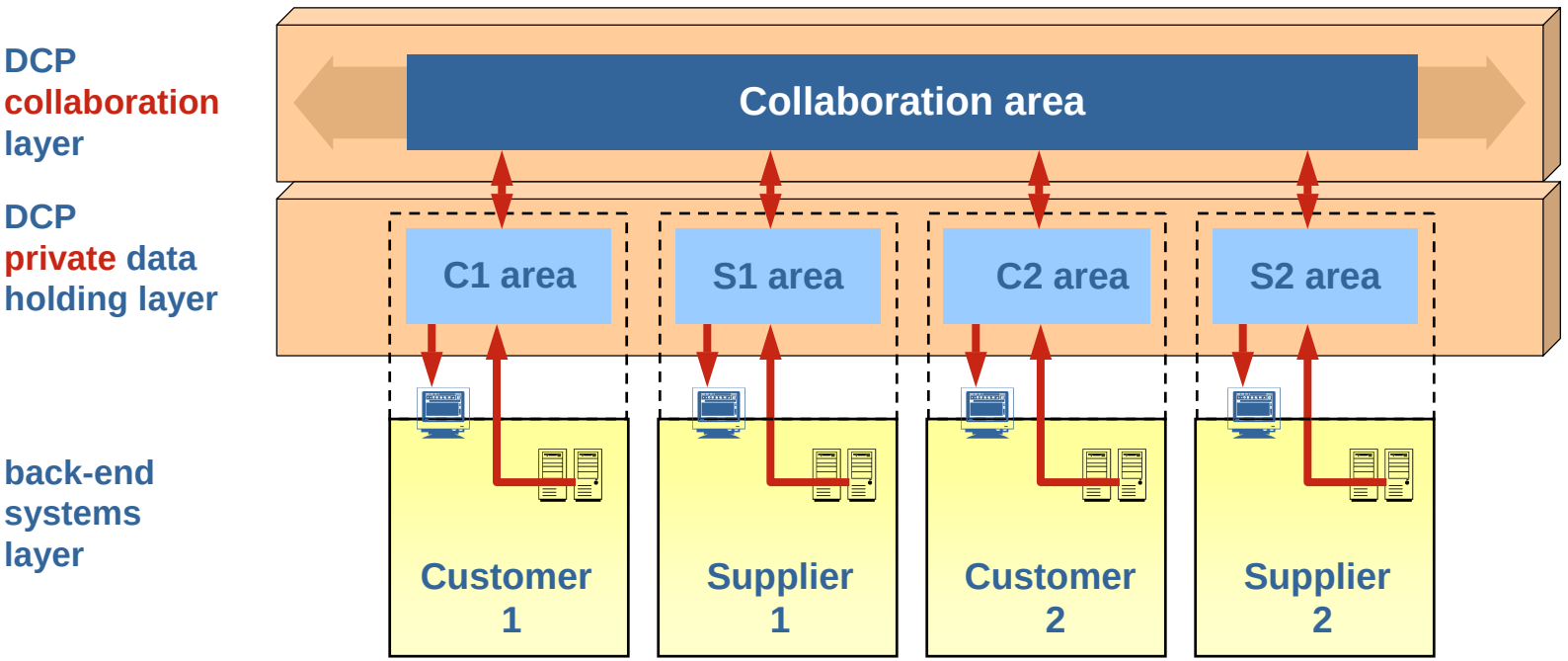
capacities (quantities+dates) by capacity family (group of items)



... would provide the consolidated view across all customers for the suppliers

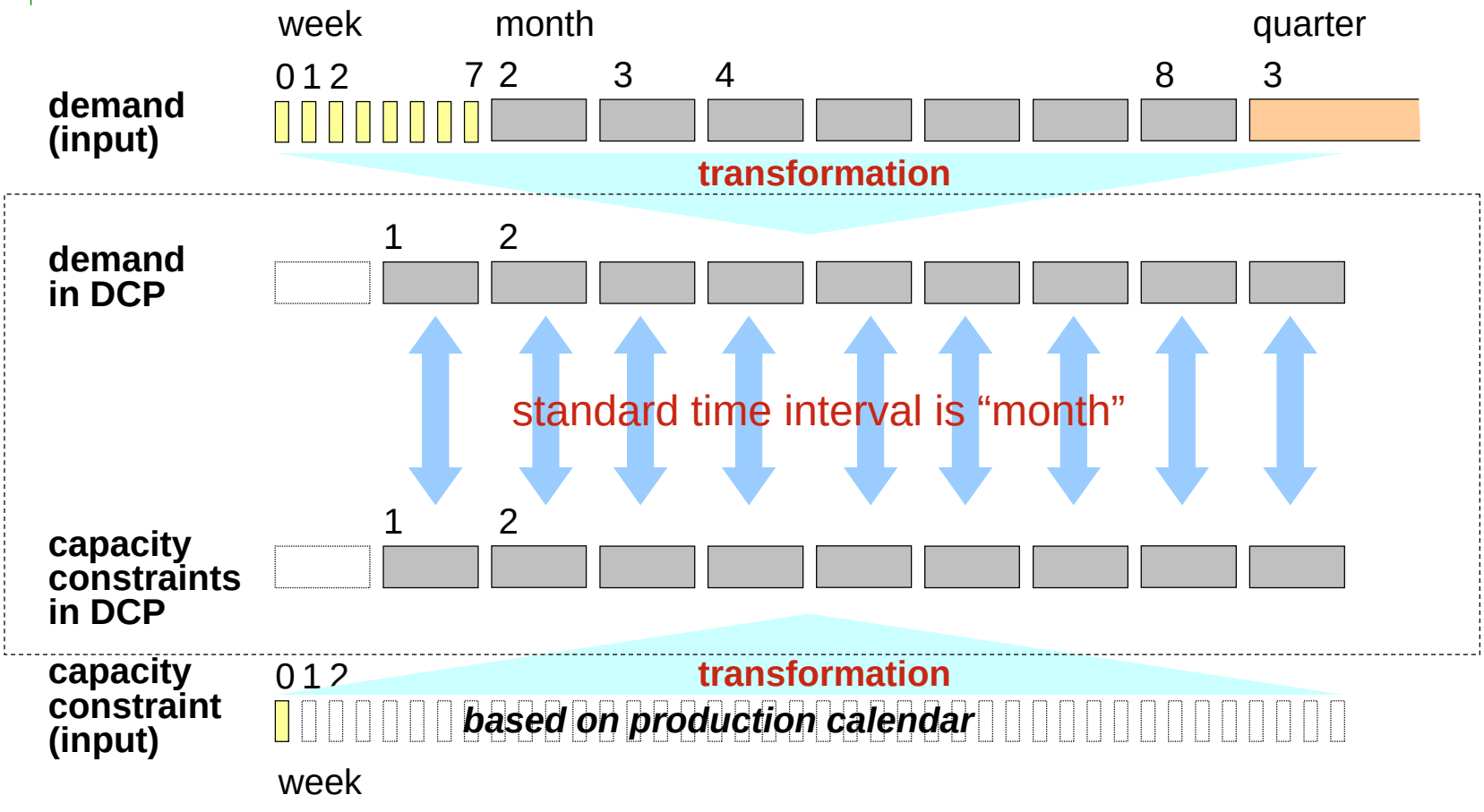
Basic Concept for DCP Layer Concept

- DCP does not replace ERP systems
- DCP is a complement (add on) to existing backend systems



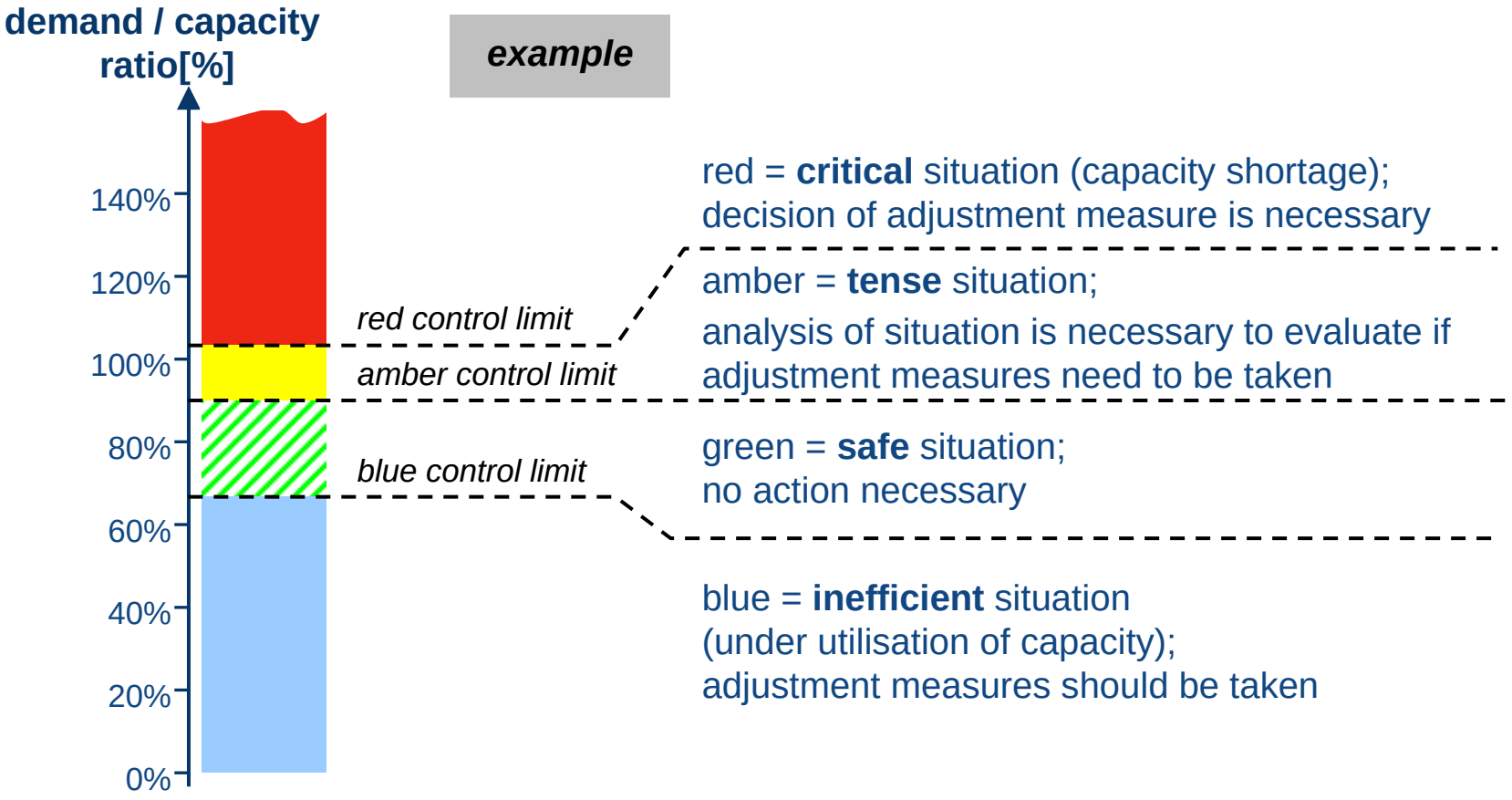
Legend: = back-end system, = DCP-Screen with customised view

General Considerations
Definition of Time Intervals - Example



Alert Definition for “Capacity Alert”

- Supplier and Customer agree on Alert Thresholds



Basic Concept for DCP - DCP Dash Board

Demand Capacity Overview - Situation before measure taking

Time period (e.g. months)

		M1	M2	M3	M4	M5	M6	M7	M8	M9
Original Customer Demand (input)		400	500	550	450	500	600	700	700	700
Available Capacity (input)		500	500	500	500	500	500	500	500	500
Available Capacity - Demand		100	0	-50	50	0	-100	-200	-200	-200
Contracted Capacity		600	600	600	600	600	600	600	600	600
Contracted Capacity - Demand		200	100	50	150	100	0	-100	-100	-100

Specific Adjustment Measures - defined by supplier without customer involvement

Approval Procedure				Proposed Solutions									
Date (latest)	Internal approval	Partner approval	Cost	Solution	(M0)	M1	M2	M3	M4	M5	M6	M7	M8	M8
M3	x	check	-	10% Overtime, NOT charged			50	50	50		50		50	50
M2	x		€	Banking		-50	-50		-100		50	100	50	50
				Banking Stock	50	100	150	150	250	250	200	100	50	0
				Incremental capacity 1 (supplier only)		-50	0	50	-50	0	100	100	100	100

supplier has closed the gap between available and contracted capacity

		M1	M2	M3	M4	M5	M6	M7	M8	M9
Original Customer Demand (input)		400	500	550	450	500	600	700	700	700
Available Capacity + Increment_1		450	500	550	450	500	600	600	600	600
Available Capacity - Demand		50	0	0	0	0	0	-100	-100	-100
Contracted Capacity		600	600	600	600	600	600	600	600	600
Contracted Capacity - Demand		200	100	50	150	100	0	-100	-100	-100

Specific Adjustment Measures - collaboratively defined

M6	x	approve	€	10% Overtime, charged										
M4	inform	x	-	Demand > contracted cap. to be confirmed								100	100	
M2	x	approve	€€€	Invest additional test station								100	100	100
				Demand Adjustment (collaboration)		0	0	0	0	0	0	-100	-100	0
				Incremental capacity 2 (collaboration)		0	0	0	0	0	0	100	100	100

collaboration to close the remaining gap

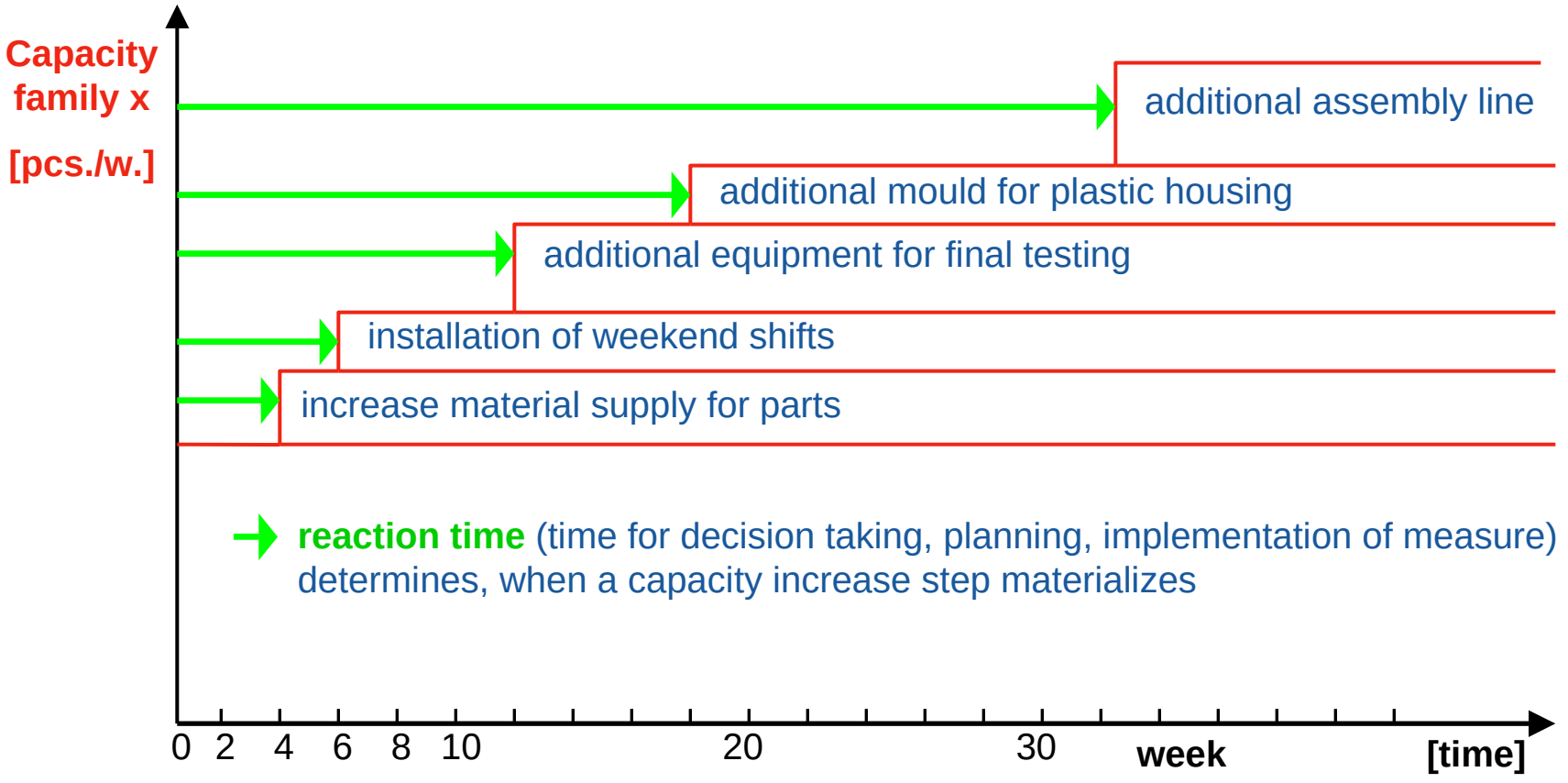
		M1	M2	M3	M4	M5	M6	M7	M8	M9
Adjusted Demand		400	500	550	450	500	600	600	600	700
Available Capacity + Increment_1+2		450	500	550	450	500	600	700	700	700
Available Capacity - Demand		50	0	0	0	0	0	100	100	0
Contracted Capacity		600	600	600	600	600	600	600	600	600
Contracted Capacity - Demand		200	100	50	150	100	0	0	0	-100

DCP Ways of capacity adjustments

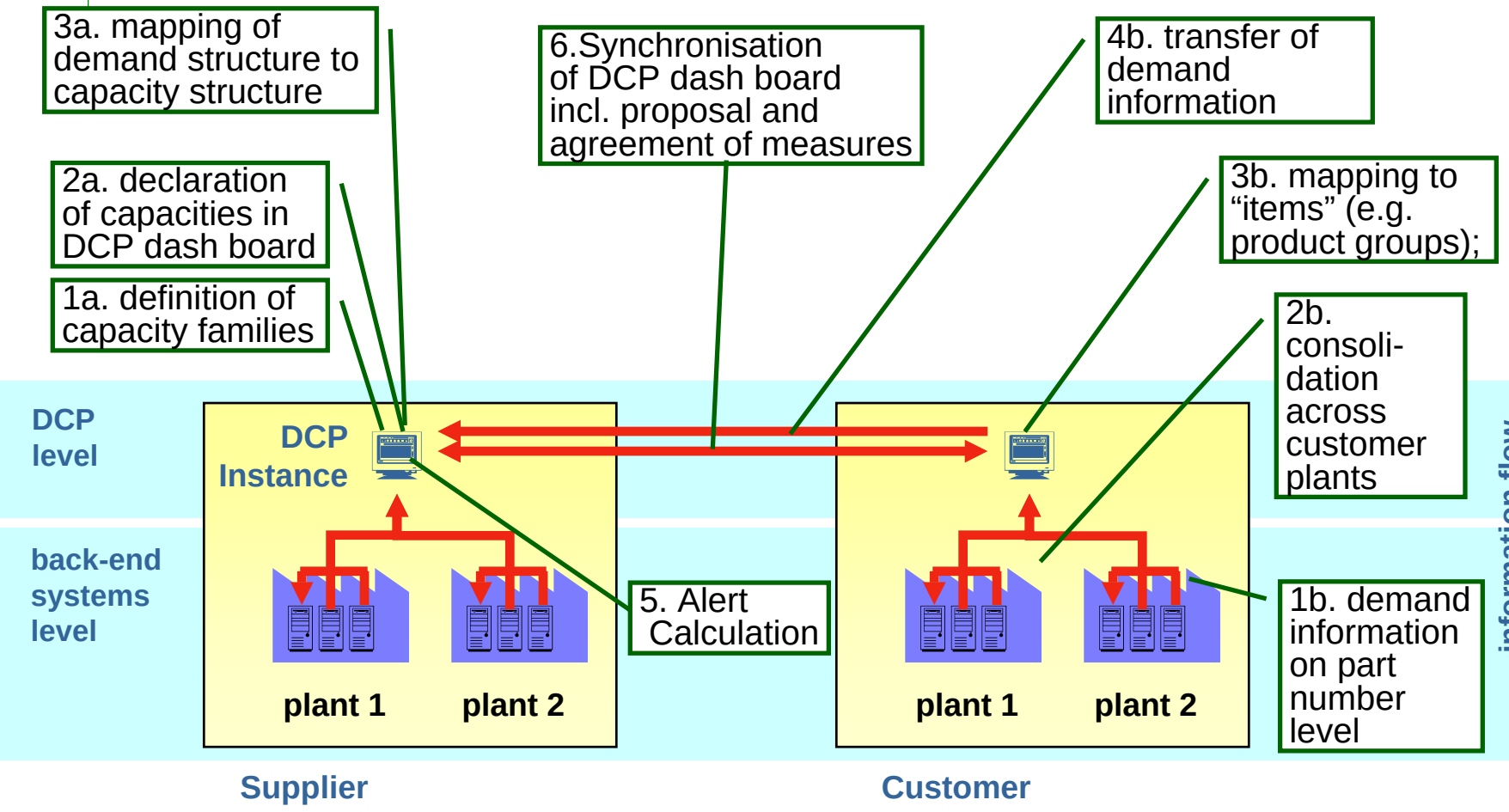
- Main interest of suppliers is to **adjust** their **capacities regularly** according to the fluctuations in demand
  - ➔ short term capacity adjustments
    - production personnel: overtime; work on short time; allocation of operators to other production lines; anticipation/delay of training, maintenance
    - reduced / extended operation times for machines, etc.
  - ➔ medium term adjustments
    - production personnel: hiring / dismissal of personnel; increase/decrease number of shifts; etc.
    - additional tooling, moulds and eventually other equipment
  - ➔ long term adjustments
    - investment / desinvestment of production facilities including buildings, machines, equipment, direct and indirect personnel, supplier capacities, etc.

animated version

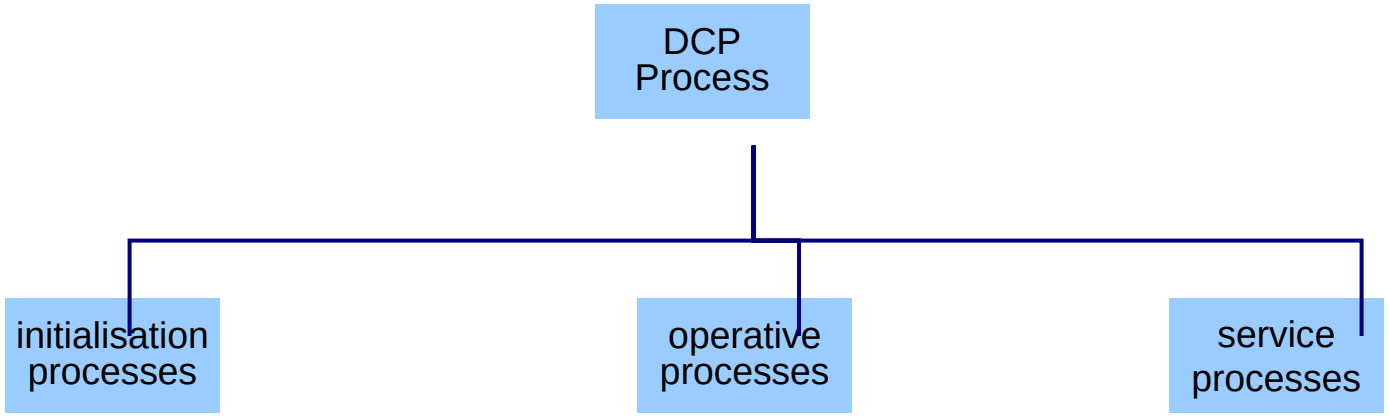
Basic Concept for DCP - Capacities are dynamic and must be regarded as a function of time



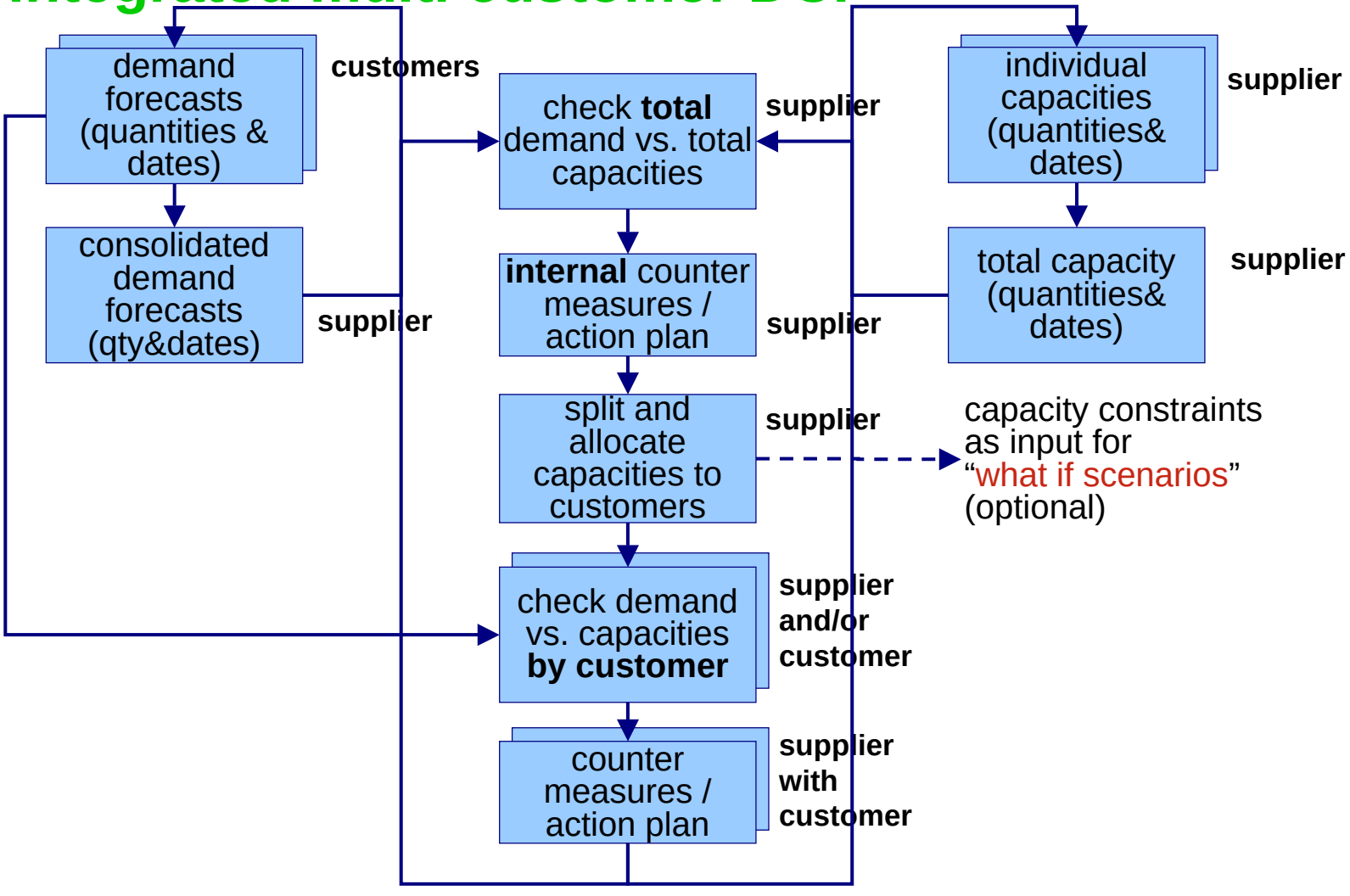
Basic Concept for initialization of DCP



DCP process descriptions



Integrated multi customer DCP



DCP-documents

To be find at: www.odette.org

Tack för uppmärksamheten!

Rickard Holm, Volvo Car Corporation