

Historien om DDC



fortalt af

Dines Bjørner, Inspirator og faglig drivkraft

Ole Oest, Ada projektleder + DDC-I direktør

Leif Rystrøm, DDC-direktør

og Chr. Gram

Why Dansk Datamatik Center ?



1960s: Simple programming courses \implies Big systems + lots of errors

NATO 1968:

SOFTWARE ENGINEERING

Report on a conference sponsored by the
NATO SCIENCE COMMITTEE
Garmisch, Germany, 7th to 11th October 1968

Peter Naur +
Brian Randell +
many others

IBM Vienna:

VDM = Vienna Development Method aiming at

”systematically developing a compiler from a language definition”

Dines Bjørner + H. Bekic + Cliff Jones + many others

1. DANSK DATAMATIK CENTER

Dansk Datamatik Center (DDC) blev stiftet den 5. september 1979 som et studieselskab for avanceret programmeludvikling i Danmark. DDC er juridisk set en forening.

2. FORMÅL

Dansk Datamatik Centers formål er

- at styrke anvendelsen og udnyttelsen af edb inden for både den private og den offentlige sektor, herunder især nye anvendelsesområder og -former
- at koordinere og deltage i udførelsen af beligt avancerede programmeludviklingsopgaver
- at udføre rådgivnings- og udredningsopgaver
- at formidle viden om avanceret programmeringsmetodik mellem de højere lære og offentlige virksomheder (såvel edb-inbureauer, konsulentfirmaer som egentlige edb-brugere)
- at formidle samarbejde med udenlandske videncentre
- at foranstalte efteruddannelse på højt fagligt niveau
- samt at støtte dansk dataindustri.

- styrke anvendelsen og udnyttelsen af edb
- avanc. programmeludvikling og systemkonstruktion
- støtte dansk dataindustri

Formålet er yderligere detaljeret i vedtægternes § 2.

3. LEDELSE / PERSONALE

Medlemsvirksomheder

Medlemmerne af DDC udgøres af følgende virksomheder:

- Crone & Koch edb k/s
- IS Datacentralen af 1959
- Jydsk Telefon A/S
- Kommunedata I-S
- A/S Regnecentralen af 1979
- Christian Rovsing A/S
- Sparekassernes Datacenter
- Teleteknisk Forskningslaboratorium
- ØK Data

- Crone & Koch
- Datacentralen af 1959 I-S
- Jydsk Telefon A/S
- Kommunedata I-S
- Regnecentralen af 1979 A/S
- Christian Rovsing A/S
- SDC, Sparekassernes Datacenter
- Teleteknisk Forskn.laboratorium
- ØK Data

Den faglige referencegruppe består af følgende personer:

Leif Saalbach Andersen (formand)	ØK Data
Dines Bjørner	Instituttet for Datateknik, DTH
Jørgen Høg	Christian Rovsing A/S
Fritz Krogh-Jespersen	Jydsk Telefon A/S
Peter Kornerup	Datalogisk Afdeling, Århus Universitet
Jørgen Zachariassen	A/S Regnecentralen af 79
Ken Schubell	Crone & Koch edb k/s
Torben Zahle	Datalogisk Institut, Københavns Universitet

Leif Saalbach Andersen	ØK Data
Dines Bjørner	
Jørgen Høg	Christian Rovsing
Fritz Krogh-Jespersen	Jydsk Tel.
Jørgen Zachariassen	Regnecentr.
Ken Schubell	Crone & Koch
Torben Zahle	

3.5 Personale

Bestyrelsen konstituerede på et bestyrelsesmøde den 25. oktober 1979 Dines Bjørner som daglig leder af DDC. Herudover har DDC i et begrænset omfang trukket på arbejdskraft fra anden side til løsning af konkrete opgaver.

4. LOKALER

Dansk Datamatik Center har lejet sig ind i kontorlokaler på DTH og har følgende adresse:

Dansk Datamatik Center
Elektrovej, bygning 341
2800 Lyngby.

5. VIRKSOMHED I PERIODEN 01.01. 1979 - 31.12 1979

Efter et møde hos ATV i december 1978, hvor der blev redegjort for behovet og motivet for at starte et dansk selskab for avanceret programmeludvikling, er der siden blevet nedsat en arbejdsgruppe, som har afholdt en række møder i februar, marts, april, maj, juni og august 1979, og man har på disse møder arbejdet videre med problemstillingen. Den 5. september 1979 var man kommet så vidt, at Dansk Datamatik Center kunne stiftes. Siden stiftelsen - og indtil årets udgang har der været afholdt 2 bestyrelsesmøder.

På bestyrelsesmødet den 25. oktober blev det besluttet at nedsætte en faglig referencegruppe samt at konstituere Dines Bjørner, DTH, som daglig leder af DDC indtil 1. april 1980.

På bestyrelsesmødet den 4. december blev centrets 2 første medarbejdere ansat (Steen Ulrik Palm og Gert Schmeltz Pedersen).

Leder:	Dines Bjørner
2 ansatte:	Steen Ulrik Palm Gert Schmeltz Pedersen

VDM: - Specification language VDM-SL (also called META-IV)

- Methods + rules for deriving + manipulating specifications

```
AccNum = token; CustNum = token;
Balance = int; Overdraft = nat;
AccData :: owner : CustNum
          balance : Balance
state Bank of
  accountMap : map AccNum to AccData
  overdraftMap : map CustNum to Overdraft
```

Data types

```
inv mk_Bank(accountMap,overdraftMap) ==
  for all a in set rng accountMap &
    a.owner in set dom overdraftMap
    and a.balance >= -overdraftMap(a.owner)
```

Invariant

```
pre cust in set dom overdraftMap
post r not in set dom accountMap~ and
  accountMap = accountMap~ ++ {r | -> mk_AccData(cust,0)}
```

Pre- and Post-
Conditions.

Short story of DDC:

1968: NATO-conference on problems with SW. New term: Software Engineering

1970s: Still many big datatypes delayed, with errors and shortcomings

1979: Discussions with ATV, Academy of Technical Sciences (~ IVA in Sweden).

DDC created: ATV society with 10 members: Private + public IT companies (no banks)

Ambition: Learn companies better SW development practice.

1980-85: **DDC** Growth: from 2 to 40 people

from 1 mio.DKK to 18 mio.DKK

Main Projects: **Compiler development** for Ada and CHILL.

1985: **DDC International** (now DDC-I Inc.): Develop + market + sale Ada systems.

1985-89: Many SW development projects together with member companies.

Courses, seminars, publications

VDM developed into **RAISE** = Rigorous Approach to Industrial Software Engineering.

1989: DDC closed. Some projects + staff transferred to CRI Inc.

Norway 1967-90:

SIMULA Obj-orient.

DELTA Modeling Lang.

BETA Modeling Lang.

Sweden 1984-99:

SISU System Development

Langefors, Bubenko, ...

ADA Project:

1980: US DoD wanted a *cure-it-all* language: Ada

French/German consortium ready to get EU-money.

1981: DDC + Olivetti + Chr.Rovsing: EU-contract [Portable Ada for minicomputers.](#)

1980-81: First [Formal Definiton](#) (VDM) of Ada + Run-time system.

1984: [Ada completed](#) + US-DoD validated

First Customers:

Nokia, 2 * Honeywell, Beijing Inst. of System Engin., NEC (Ja

1985: Subsidiary [DDC-International Inc.](#): Ada, *later* C, C++, Safe
(Now in Phoenix, USA.)

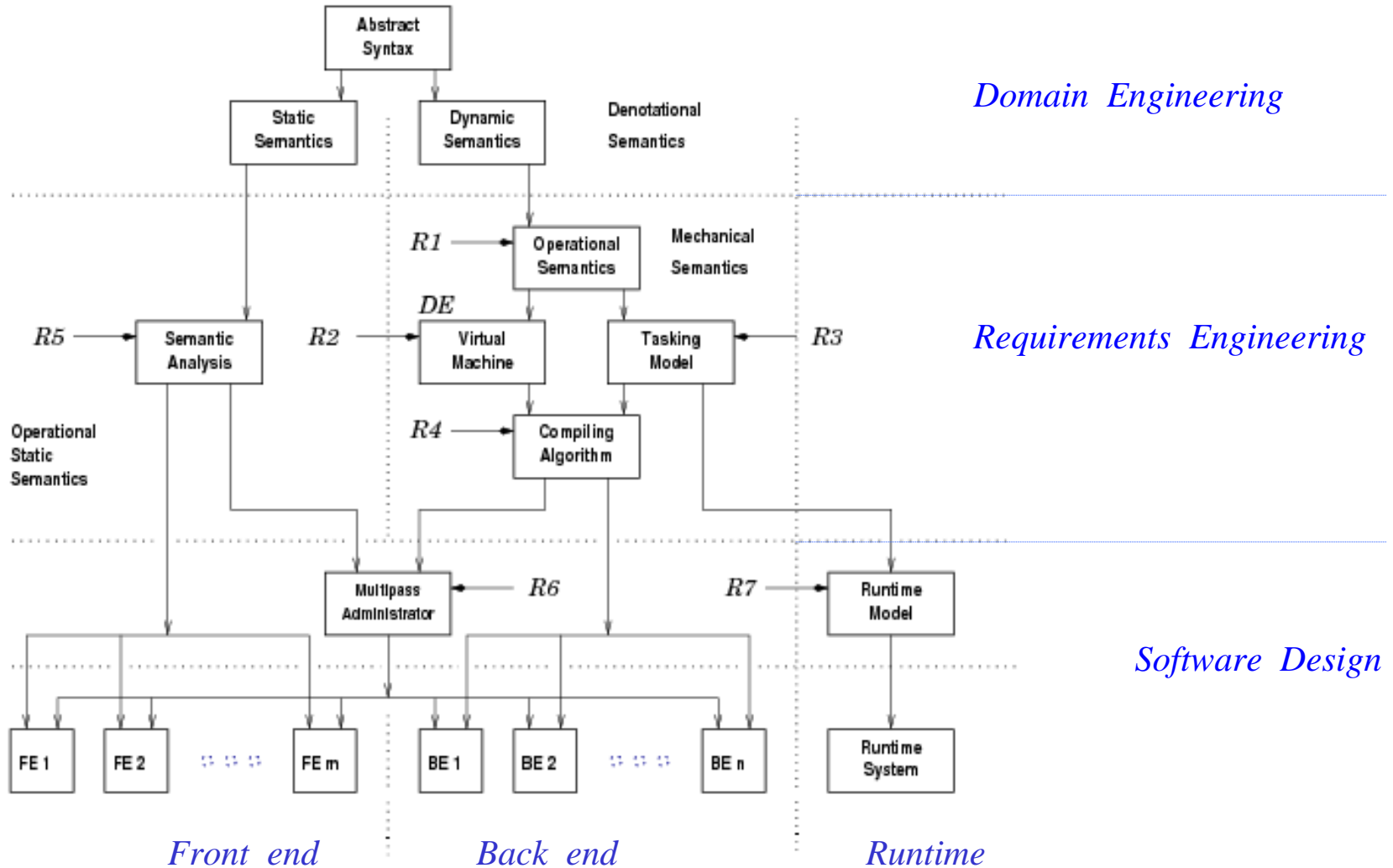
1984-87: EU-contract: [Formal Definition of Ada.](#) 4 volumes
DDC + Italy.

Alas! - No real interest in Denmark.



ADA Project:

VDM Specification of Ada compiler



Ada compiler **First** to be US-DoD **validated** in Europe

On schedule, <20% budget excess.

CHILL = CCITT High Level Language
Formal description + Compiler

⇒ Public property ⇒ No lasting income.

Revision of VDM ⇒ Rigorous
Approach to
Industrial
Software
Engineering

RAISE = Language + Methods + Tools for
{ Requirements Analysis
Specification
Design + Development
of general software

EU Development contract ⇒ No lasting income.

Software Construction: Comparison of Methods: Yourdon, SA, SD,... , SYSDOC
225 pages

Office Automation Projects: Cooperation with Member Companies on:
Taxonomy + Terminology
Generic Office Automation System.
150 pages

Fra 1987:

Kvartalsmagasin CUBUS

med emner som:

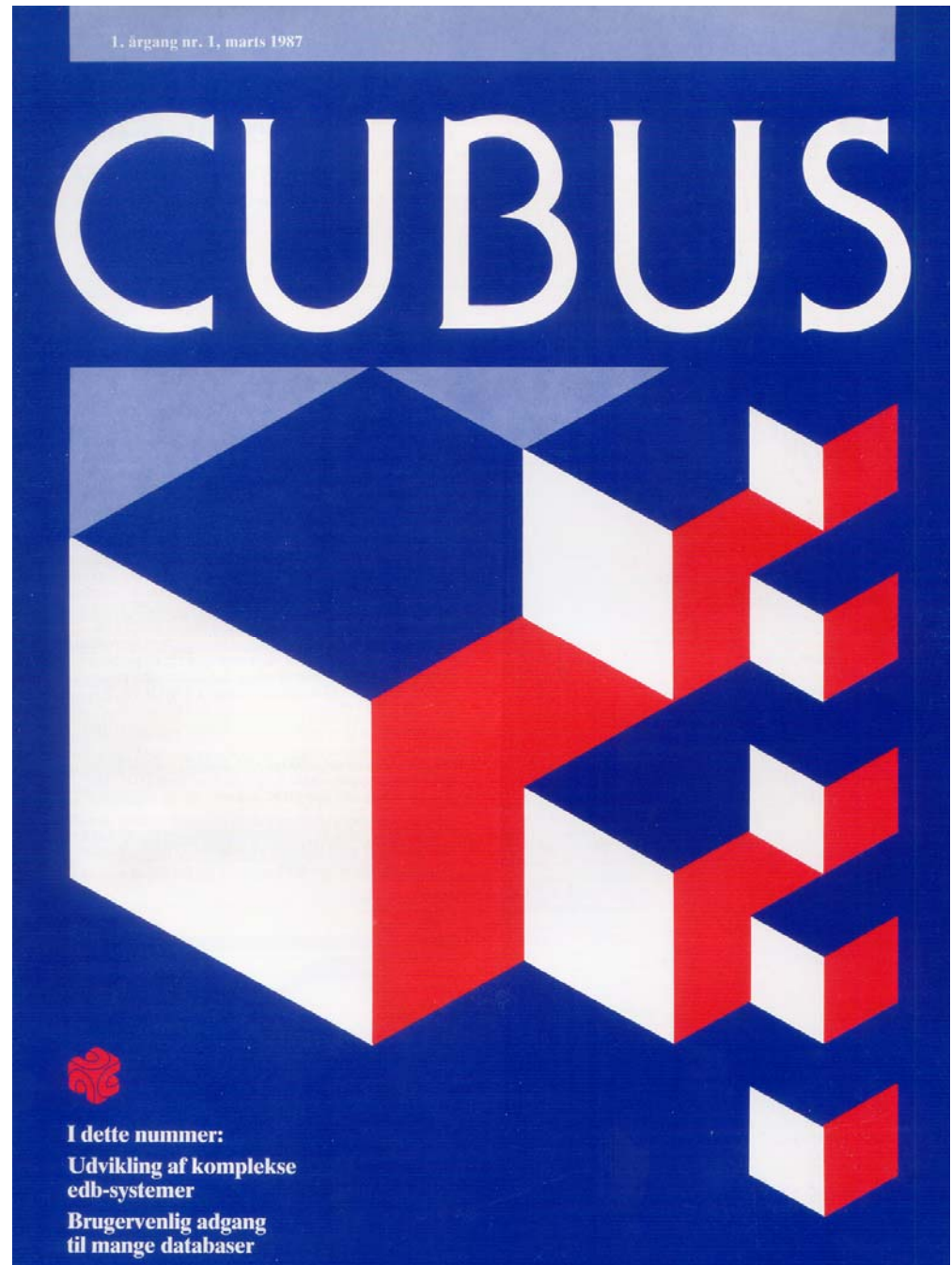
Ada - udvikling og status

RAISE - metode til udvikling
af komplekse systemer

Brugervenlighed og databaser

Datalogi - 5 artikler

Kontorarbejde og -analyse



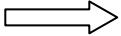
DDC closed after 10 years, because:

- DDC's major SW products had **no interest** for the Danish IT-companies.
- DDC **failed to convince** Danish IT-companies of the usability of Formal Methods.
- EU and Government **funding** not enough to run DDC.
- and we failed to cultivate and utilize **Nordic know-how**.
- ADA didn't get the expected **worldwide spreading**.
- but **DDC-I Inc.** has survived until now on Ada, C, C++, embedded systems, ...

DDC-I today:

The screenshot shows a Mozilla Firefox browser window displaying the DDC-I website. The browser's address bar shows the URL <http://www.ddci.com/>. The website header features the DDC-I logo and the tagline "Safety Critical Software Solutions for Mission Critical Systems". Navigation links include Home, Products, Services, Industries, News, Success, and Corporate. A search bar is present with a "Search" button and a checkbox for "only search DDC-I, Inc.". The main content area has a banner with the text "Safety & Mission Critical Software Certifiable RTOSes, Ada, C, C++ Compilers" and images of a yellow robotic arm and a laser cutting process. Below the banner, a paragraph states: "DDC-I offers complete solutions for embedded software developers including field proven safety critical real-time operating systems, multi-language compilers, integrated development environments and run-time systems." At the bottom, there are sections for "In The News" (dated January 2011) and "Industry Event" (listing DQ-178B, DQ-178C, DQ-254). The Windows taskbar at the bottom shows the Start button, several open applications, and the system clock at 11:35.

DDC Achievements:

- **Awareness** of modern SW techniques among Danish IT users + producers.
- The ADA system basis for **DDC-I Inc.**, USA.
- The **RAISE** methods + tools + people continued in SW company CRI Inc.
- 50-100 **young candidates** got experience with advanced SW technology
  new SW companies.
- Many publications and **international** contacts.
- Many projects **better performance + quality** than common in 1980s.

- with thanks to my co-authors

Dines Bjørner, Ole Oest, Leif Rystrom