

OPUS Entwicklungs und Vertriebs GmbH

Wilhelm-Raabe Strasse 4

73230 Kirchheim/Teck

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CO & CEO Ralf Weissinger, Roland Aukschat

Since 1980

Customers 800, Workstations 3000

Employees 20

Development in Germany

Further Sales through System Centers (independent companies)

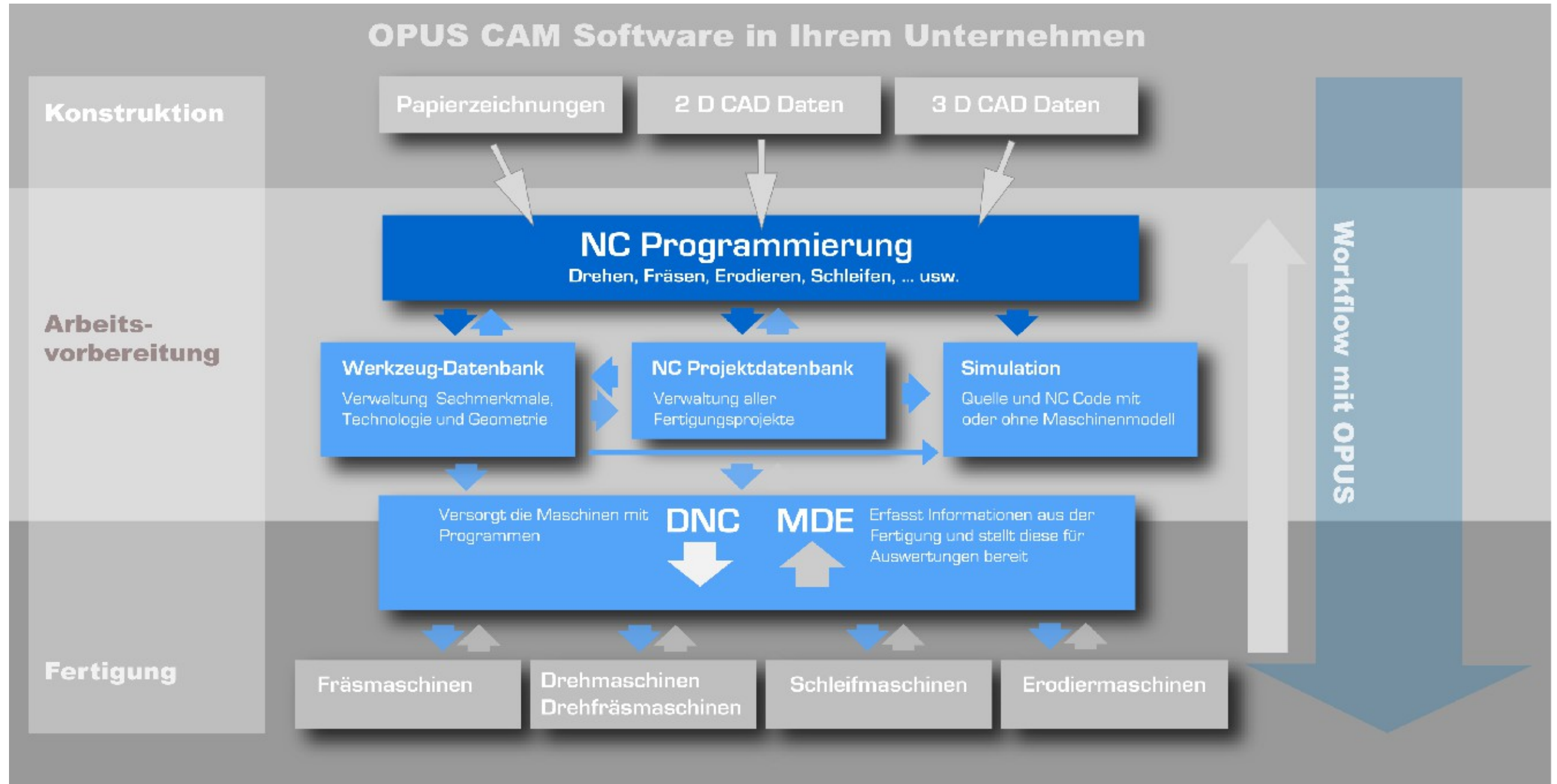
References

- BOSCH (Turning, Milling, Prototype to large amounts)
- LUK (Turning, Milling, Series)
- MAPAL (Turning, Milling, Eroding, Small Series)
- FLENDER (Turning, Milling, Small Series)
- VOITH Paper (Turning, Milling, Items=1)

OPUS Professional CAM

Workflow

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History

- 1980 Contour calculation and tool radius compensation with programmable calculators.
- 1982 available to first PC
Contour calculation tool radius compensation, program administration simulation
- 1984 Sirius Victor with 8080 Processor and 6 MHZ
- 1986 DNC im Hintergrund
Wang PC with 80186 Processor
IBM PC with 80286
- 1993 one of the first technical applications on Windows (2.11)



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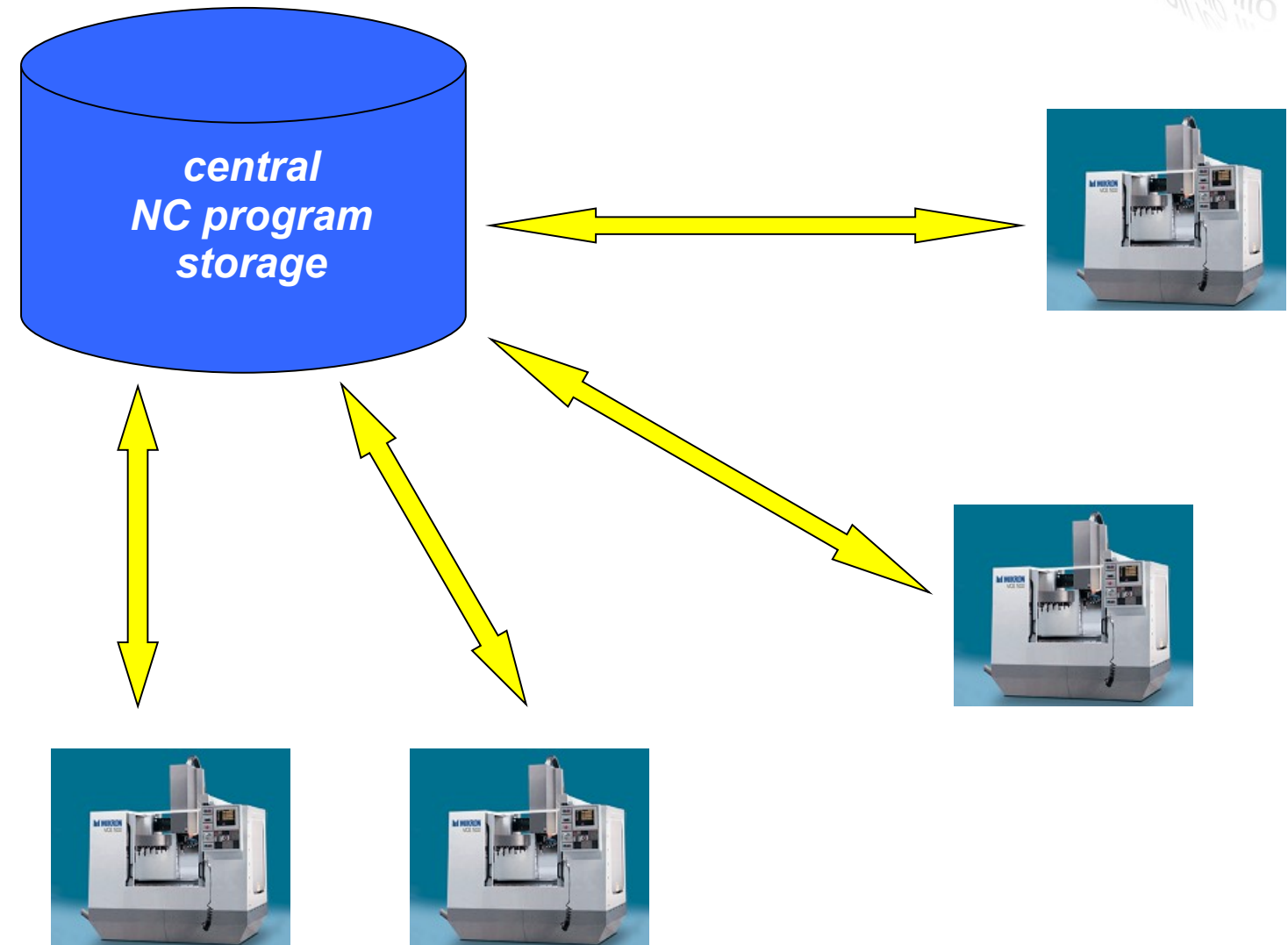


DNC-Basics

Simple problem

Transferring NC programs from host to NC machines and back

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DNC requirements

DNC functions

- Unlocking / locking of single (our groups) NC-program files
- Assigning single (our groups) of NC-program files to defined machine (our groups of machines)
- Transferring optimized programs back to host
- Compare Original and optimized program
- Create a protocol of all data transfers

To meet this requirements a a NC program management /administration tool is necessary

- Exact specifying and naming of each NC-program
- Automatic managing of creation and last changing date and time
- Multi criteria search
- Version management

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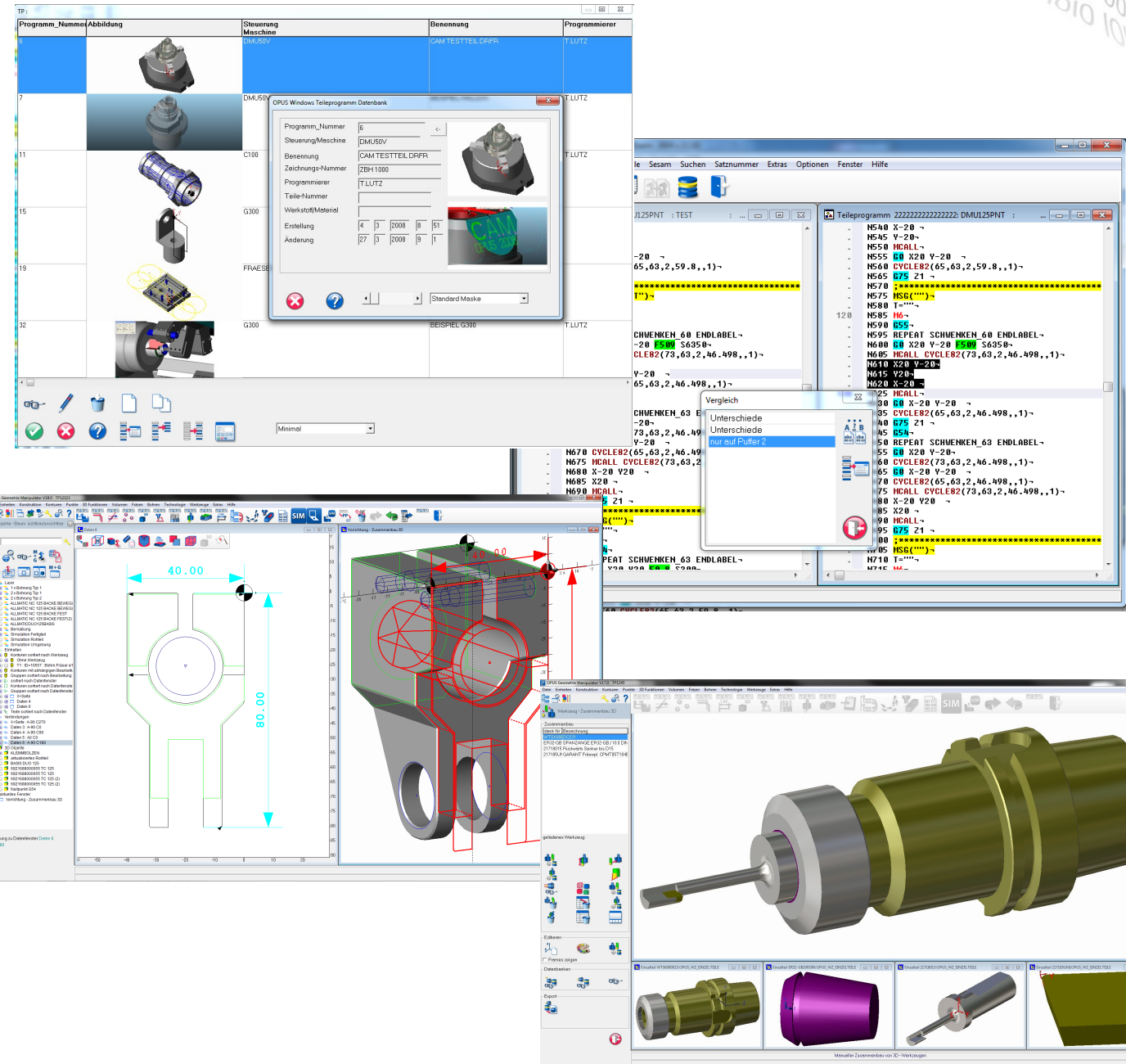


OPUS Professional Basic

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- OP010 Basic Package
 - Project Management
 - SESAM
 - NC Editor
 - Version Management
 - Databases
 - 3D Viewer
- OP012 Geometry 2D/3D
 - 2D / 3D Construction
 - 2D / 3D Variants
 - CAD Import 2D / 3D
 - Processing of Part
 - Blank, Tool, Clamping
 - Drill analysis
 - Fotos and Bitmaps



OP010 Basic Package

Project Management

- All related data under one number
- Database
- NC Program
- Drawings
- Configurable Management Data
- Setup Sheets
- Any additional documents

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OPUS Professional

TP Nummer: 32

Steuerung/Maschine: DMC60U

Benennung: Spearmount

Zeichnungs-Nummer: Z78124345

Programmierer: Weissinger

Werkstoff/Material: MG5

Bemerkung: Test neuer Spannturm

Erstellung: 21 7 11 17 54

Änderung: 25 7 11 13 7

Werkstoff/ Material	Abbildung
MG2	
MG2	
MG1	

32 DMC60U Mehrfachspannung

FORMAT1



OP010 Basic Package

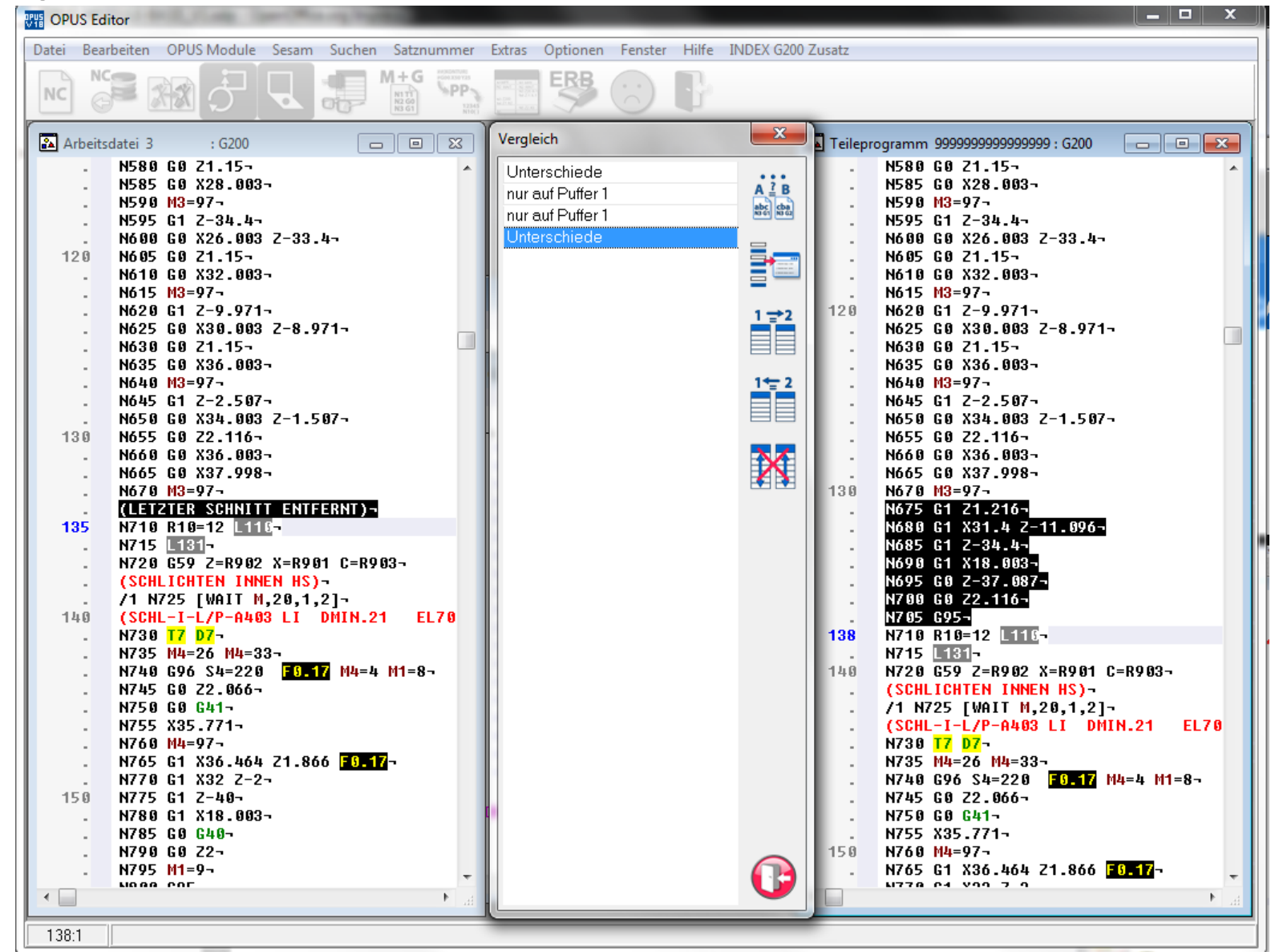
Editor

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The Editor to write and change NC-Programs and or setup sheets.

- Several part Programs Parallel
- Compare Data
- Multiple Windows to one File
- Syntax Recognition / Display



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OP010 Basic Package

Version Management

- Automatic Version with every Change
- Number of Versions adjustable
- Contain DNC Actions

The screenshot shows the OPUS Editor interface with a G-code file open. A dialog box titled 'Versionsverwaltung für TP 18' is overlaid on the editor. The dialog contains a table with the following data:

Aktion	Datum	Uhrzeit	Von Station
Editor Puffer schließen	08.07.11	12:27	
Editor Puffer schließen	08.07.11	16:17	
Editor Puffer schließen	11.07.11	10:10	
Editor Puffer schließen	11.07.11	13:20	

The background G-code file contains the following text:

```

1  %MPF1006-
  (REV-1, TEST Drehen)-
  (DNC-0)-
  ( Datum 11.07.11 Zeit 10:10)-
  N100 L100-
  N105 G90 G95-
  N110 R10=6 R11=1 R12=550 L146 (Synchro. auf Achsposition)-
  /1 N1005 [WAIT M,5,1,2]-
  N115 G0 G53 X340 Z350 D0-
10  N120 G92 S4=-
  N125 G59 X=R901 Z=R902 C=R903-
  N130 G0 G53 X340 Z350 D0-
  N135 L130-
  N140 G59 Z=R906 X=R901 C=R902-
  (SCHLICHTEN)-
  /1 N145 [WAIT M,10,1,2]-
  (SCHR-A-L/P-A201 95GD LI)
  N150 T12 D5-
  N155 M3=26 M3=33-
20  N160 G96 S3=120 F0.2 M3=4-
  N165 G0 Z1.7-
  N170 G0 G41-
  N175 X81.6-
  N180 M3=97-
  N185 G1 Z0.1 F0.2-
  N190 G1 X-2.4-
  N195 G0 G40-
  N200 G0 X-0.4 Z1.331-
  (SCHLICHTEN)-
30  N205 G0 Z0.868-
  N210 G0 G42-
  N215 X77.76-
  N220 M3=97-
  N225 G1 X75.071 Z0 F0.2-
  N230 G1 X75.327 Z-0.198-
  N235 G1 X75.455 Z-26.383-
  N240 G1 X75.431 Z-30.359-
  N245 M5=9-
  N250 G95-
40  N255 G40-
  N260 R10=12 L110-
  (BOHREN KURZLOCH SACKLOCH)-
  (SHARK-CUT Ø20.0 LI AK10 R0.4 EL86 Q70 mittig abgenommen)-
    
```



OP010 Basic Package

Database

- Any Data
(Pictures, Graphics, Memo Fields)
- Any Engine
(Mysql, Firebird, Oracle..)
- Secure and Selective Archiving

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OPUS Teileprogramm + Zusatzdaten

Programm_Nummer: 5100 2142 1
 Steuerung/Maschine: HELLER
 Benennung: Mischblock 2K
 Zeichnungs-Nummer: 52161876
 Programmierer: Osen
 Teile-Nummer: 52161876
 Werkstoff/Material: 1.4305
 Kommentar:
 Erstellung: 7 12 2009 17 49
 Änderung: 17 12 2009 7 14
 Laufzeit: Zusatzdaten

1 Spannungen und Vorrichtungen | Spannpläne 3 bis 6

Spannpläne 1 und 2




Vorrichtungen

Nr 1. zeigen N L

Keine Vorrichtung definiert

Zeichnung


 NC Zeigen
 Akt. Zeigen
 Akt. Eintrag

Nr 2. zeigen N L
 Nr 3. zeigen N L
 Nr 4. zeigen N L
 Nr 5. zeigen N L

TPundZusatz

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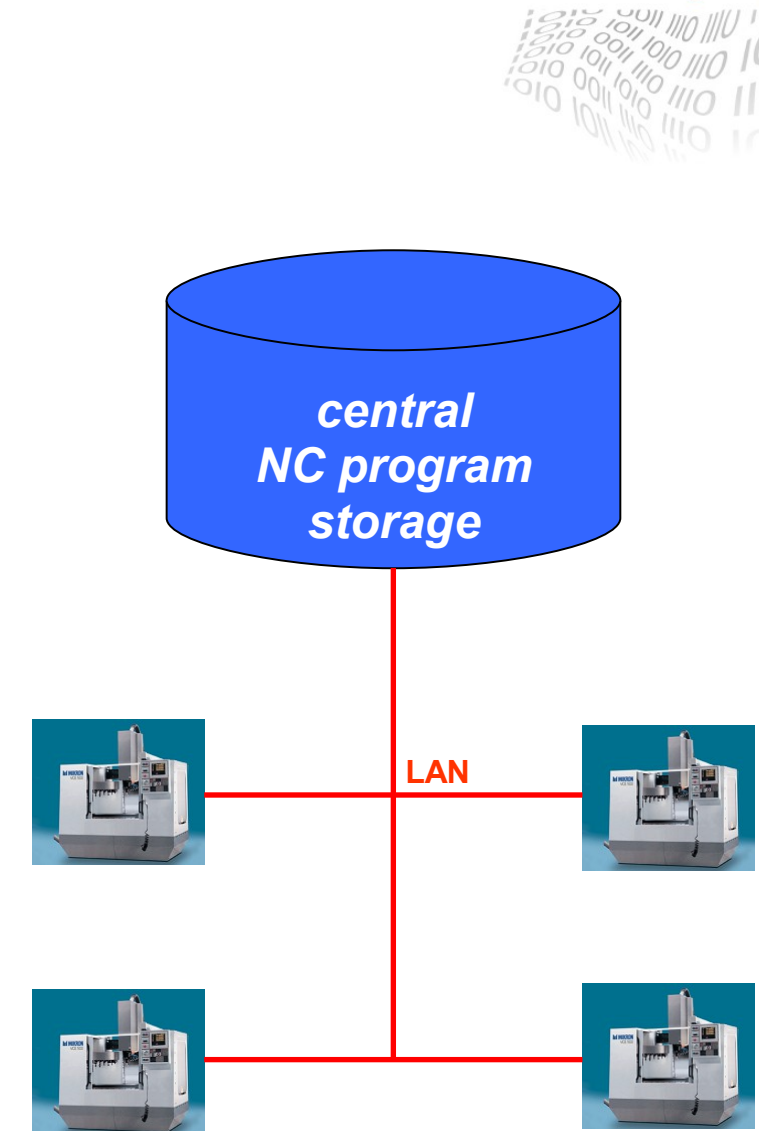
- **DNC transport hardware**
- **DNC transport user interface**

DNC transport hardware

network (LAN) direct

- **Network (LAN) direct**
Requires a network adapter in the machine and control must be able to run a program
- **Serial (RS232) direct**
Restrictions in cable length max. 80 m, amount of serial interfaces per DNC Server limited
- **Network LAN + serial (RS232)**
No limitations
The long distance to the machine is covered by LAN connection.
Only the for the rest V24 is used.
The conversion is done with LAN serial Adapters (COM Servers)

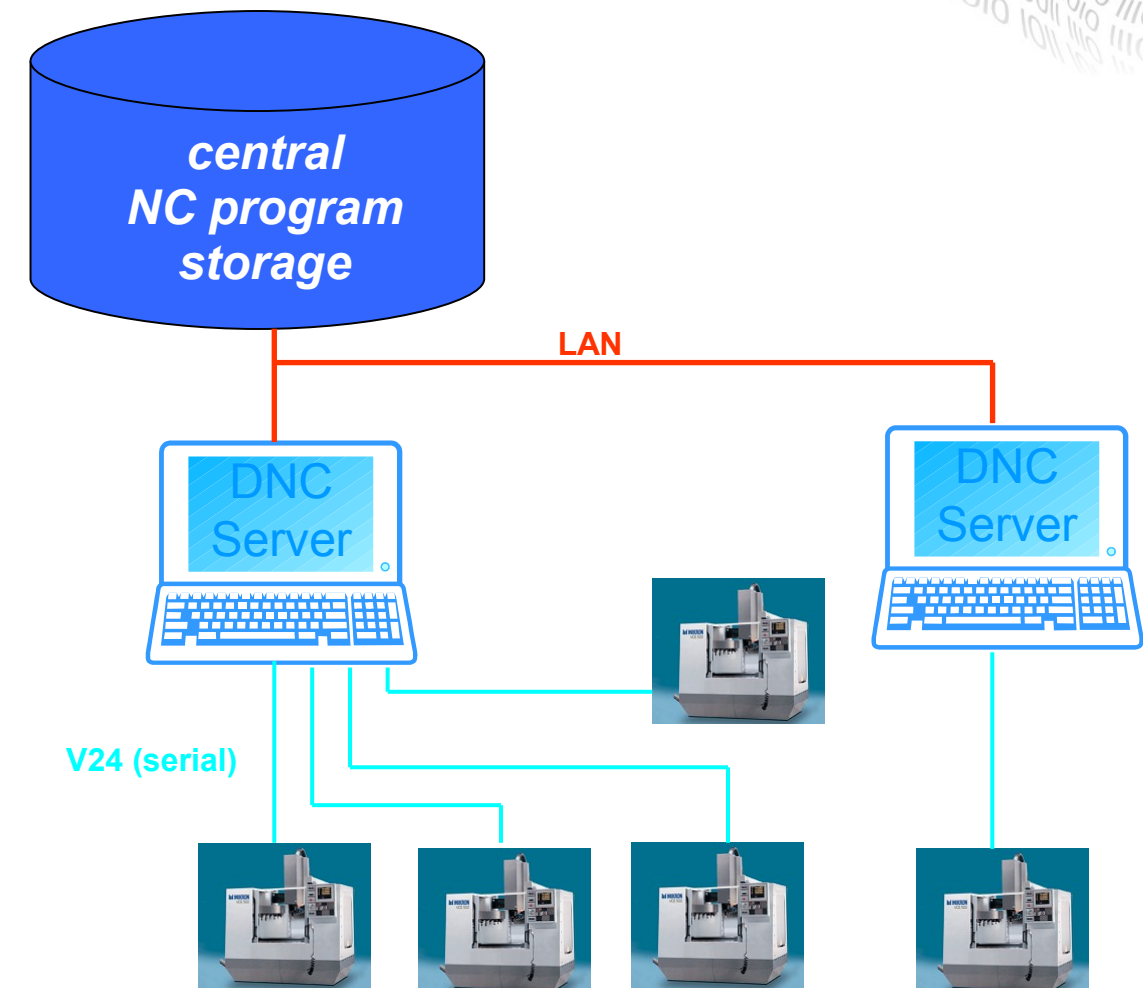
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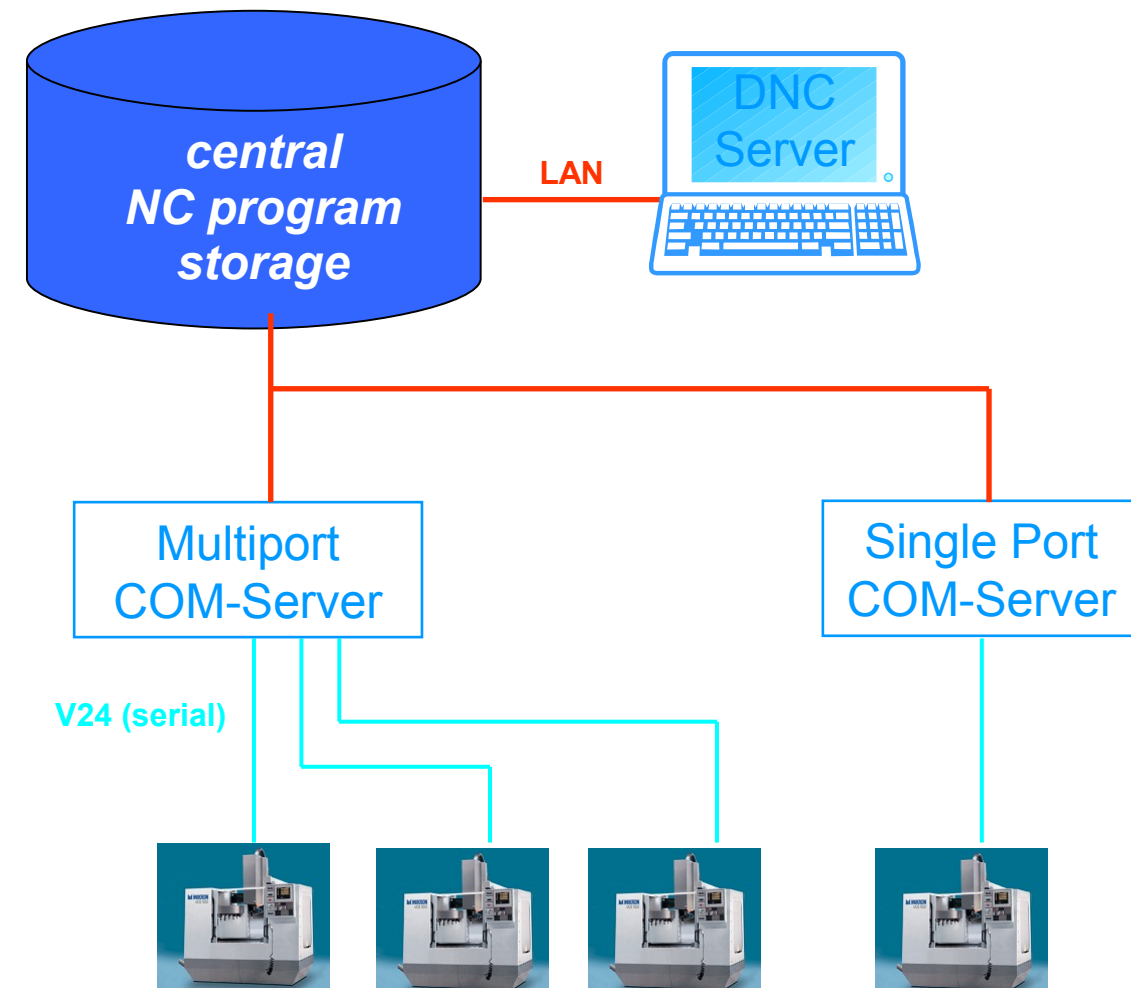


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DNC transport user interface

- central distribution from one point to many machines
- OPUS WIS (shopfloor PC) near the machine usable for further tasks
- machine control panel

different DNC user interface options can be used within one installation, even on a specific machine different options possible

DNC transport user interface

OPUS WIS

- select program via database query
- preselection of programs on terminal
- transfer to/from machine control
 - nc program
 - tool data
 - zeropoint tables
 - ...
- display / edit
 - nc program
 - tool list
 - clamping plans
 - ...
- display /edit additional data
 - time sheets
 - measurement plans

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```

OPUS Editor - [NC Programm0 /12 Benennung:Hohlrad GPV 442]
OPUS WIS Bearbeiten Suchen Satznummer Optionen Fenster Hilfe
NC
N4800 G17 G55 G90 G95 G97 S2=1273 F0.25-
520 N4810 M203 M242 M275-
N4820 G00 C=DC(10.731)-
N4830 G00 X1603.689-
N4840 G00 Z339.9-
N4850 F0.25-
N4860 G81["Z",339.9,314.26,0,367.9]-
N4870 ( D-20H12 UND SCHNITT C-C )-
N4880 G00 C=DC(10.731)-
N4890 G00 X1604. C=DC(70.896)-
N4900 G80-
530 N4910 G00 Z390. M205 M9-
N4920 (MSG FASWERKZEUG NR.2 UERMESSEN D-20 IDNR.: L=0 Q=0 RS/DMR.=30)-
N4930 TN["230020"]-
N4940 ED1-
N4950 G47(ActPlane)-
N4960 SF[PAUSE%,LAUF%]-
N4970 M8 M52 M63-
N4980 G17 G55 G90 G95 G97 S2=1061 F0.3-
N4990 M203 M242 M275-
540 N5000 G00 C=DC(70.896)-
N5010 G00 X1604.-
N5020 G00 Z339.9-
N5030 F0.3-
N5040 G01["Z",339.9,314.26,0,367.9]-
    
```

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Erstellung: 7 12 2009 17 49

Änderung: 17 12 2009 7 14 Laufzeit Zusatz

1 Spannungen und Vorrichtungen Spannpläne 3 bis 6

Spannpläne 1 und 2

Vorrichtungen Nr. 1. zeigen

Keine Vorrichtung definiert

Zeichnung

NC Zeigen

Akt. Zeigen

Akt. Eintrag

N L

TPundZusatz

Sprimag OPUS Komplettwerkzeuge

Identnummer: 5100_525680 Maschine: HELLER

Typ: Fräsen Identnr (alt): 525680

Planmesserkopf Ma. Aufnahme: SK40

Tech-Typ: WSP-Beschichtet Werkzeugart: FRAESER

Bezeichnung: Planfr. Seco R220.43-0080-07W/ø92 ST

Bezeichnung 2:

DB Vorlagen

Zusammenbau

manuell

automatisch

Stücklisten Baum

Stückliste bearbeiten

Verwendung

Maße Grafik Technologie Information Einzelteile Frei Frei

Simulation Modell (erstellt aus 2D oder 3D Modell)

3D Werkzeug Modell

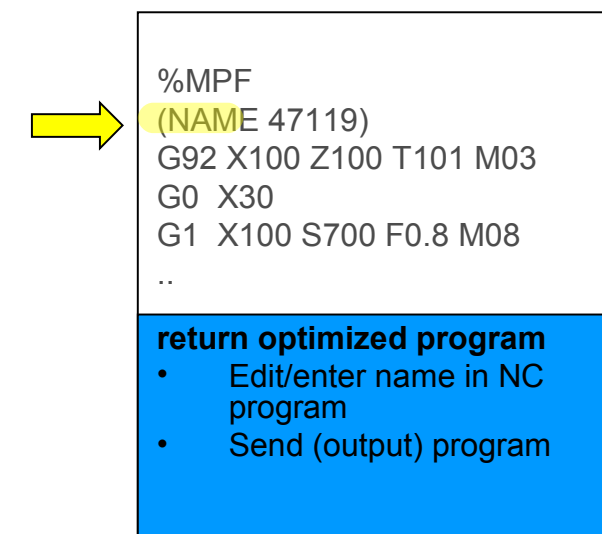
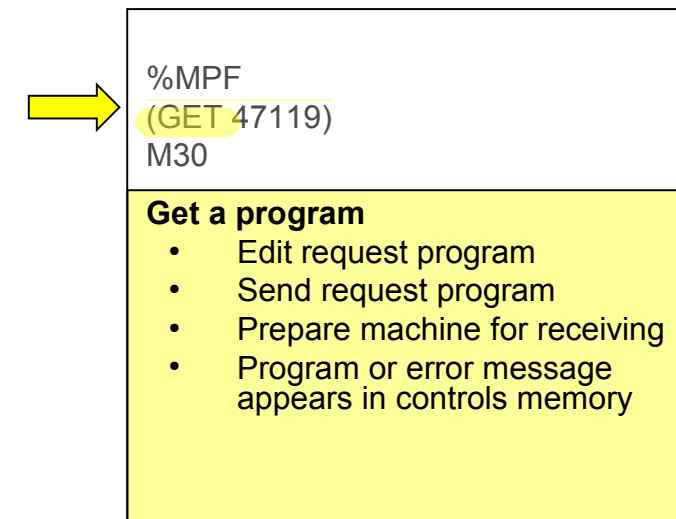
OPUS_WZ_KPL_ALLES

DNC transport user interface

Machine console

- Request program is located in control memory and treated as all other NC-programs to get a program only the name/number has to be changed
- Optimized NC program each program includes a line which enables the DNC server to identify it

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DNC program administration

OPUS Basic package DNC functions

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- unlock / lock
 - programs
 - groups of programs
 - machines
 - groups of machines
- optimised programs
 - separate storage
 - compare functions with original
 - many versions of optimized programs
 - automatic compare
- automatic processing of optimized programs
 - formatting
 - insert of OPUS Name
 - sort of subroutines