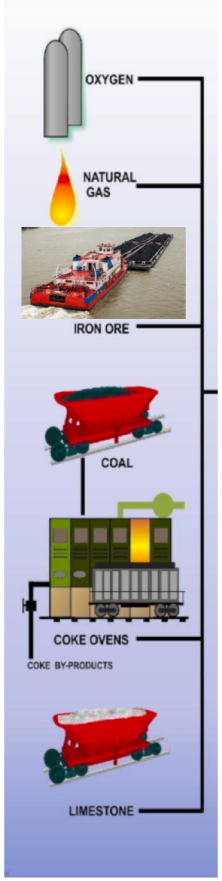

Migration MQ V5 -> MQ V8
NS1206 -> NSX3
16. May 2018 Ingo Weyck
engineering. tomorrow. together.
thyssenkrupp

# Migration MQ V5 -> MQ V8

- Material flow in an integrated steel plant
- Information flow in an integrated steel plant  (OPC / OLE for process control, ODBC/JDBC, **IBM-MQ**)
- The interaction between material flow and information flow
- IBM-MQ server installations and monitoring
- History of TANDEM/NONSTOP-Server  Hot Metal Department and the launch of MQ
- Planning, installation, tests and the  decision to migrate
- Test environment of IBM MQ V8
- Channels, queues, the adminstration with IBM-MQ Explorer 9 /6.0.4
- High availability (HANSQM)
- Measure counters, the impact of MQ on CPU-performance
- Outlook “operational NONSTOP-Server and IBM MQ”

# Material flow in an integrated steel plant

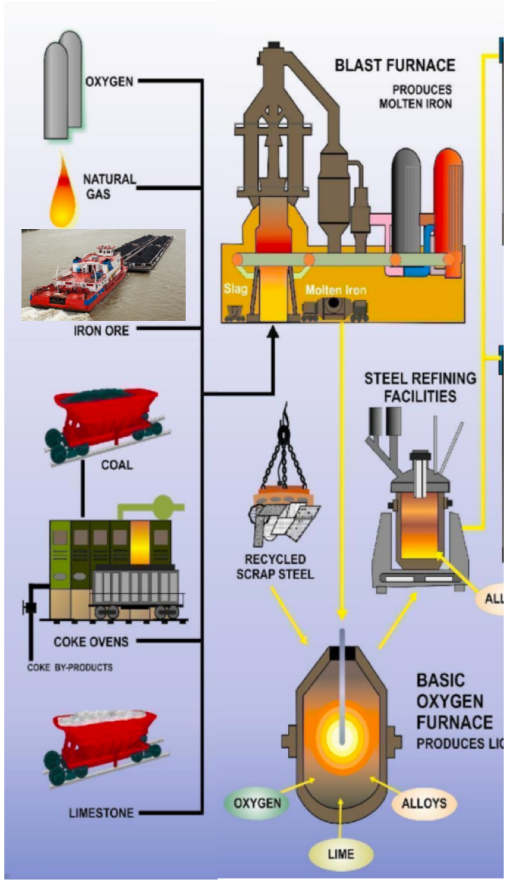


raw materials

## Raw material supply and distribution

- Iron ore, coal, coke, limestone
- Shipping of raw materials from all over the world to Rotterdam
- Shipping from Rotterdam to the harbour in Duisburg with barges
- discharging barges and transport the raw material via conveyor belts to:
  - Blending beds (coal / iron)
  - Sinter plants
  - Blast furnace bunkers
- Control systems for ore preparation, sinter plants, coke plant and blast furnaces

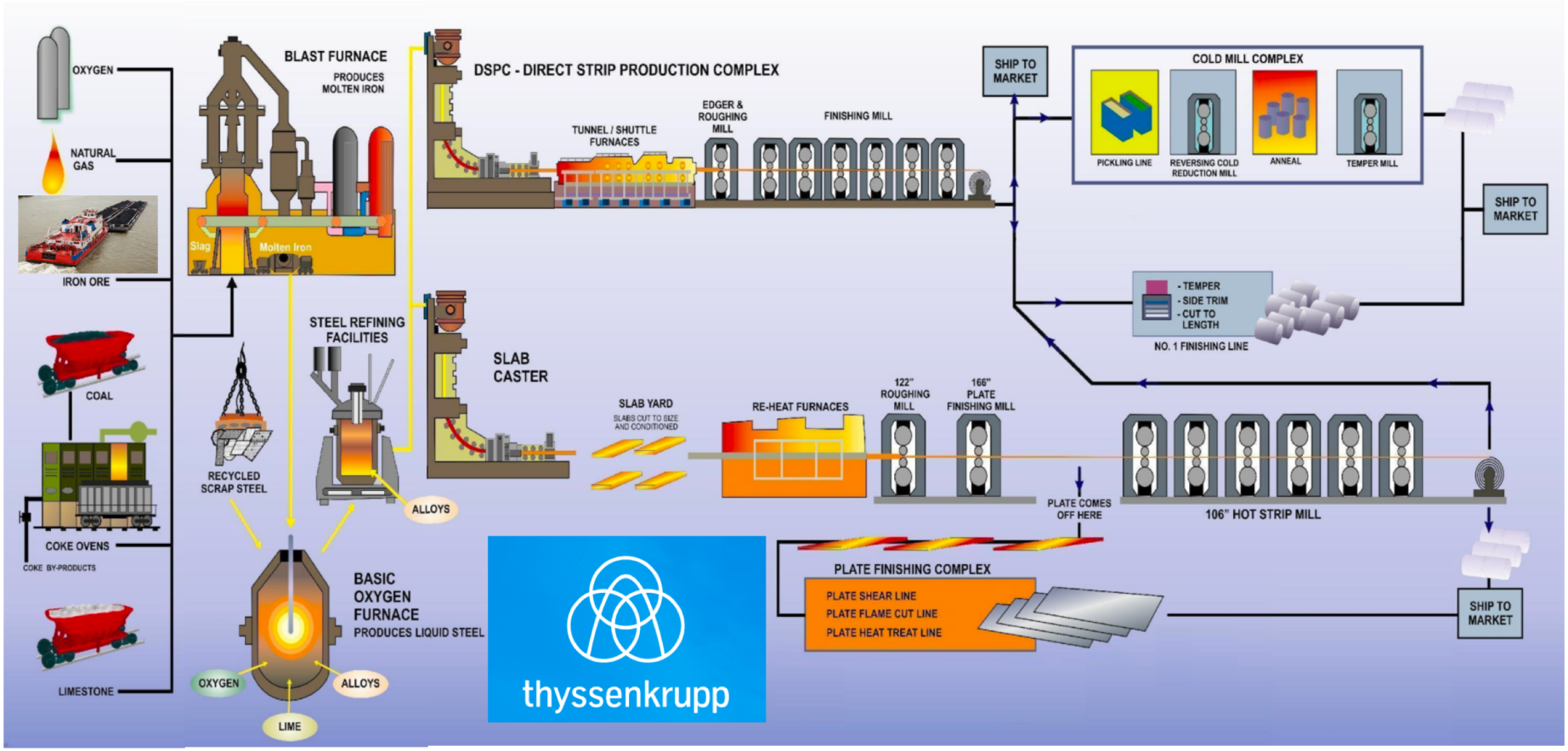
# Material flow in an integrated steel plant



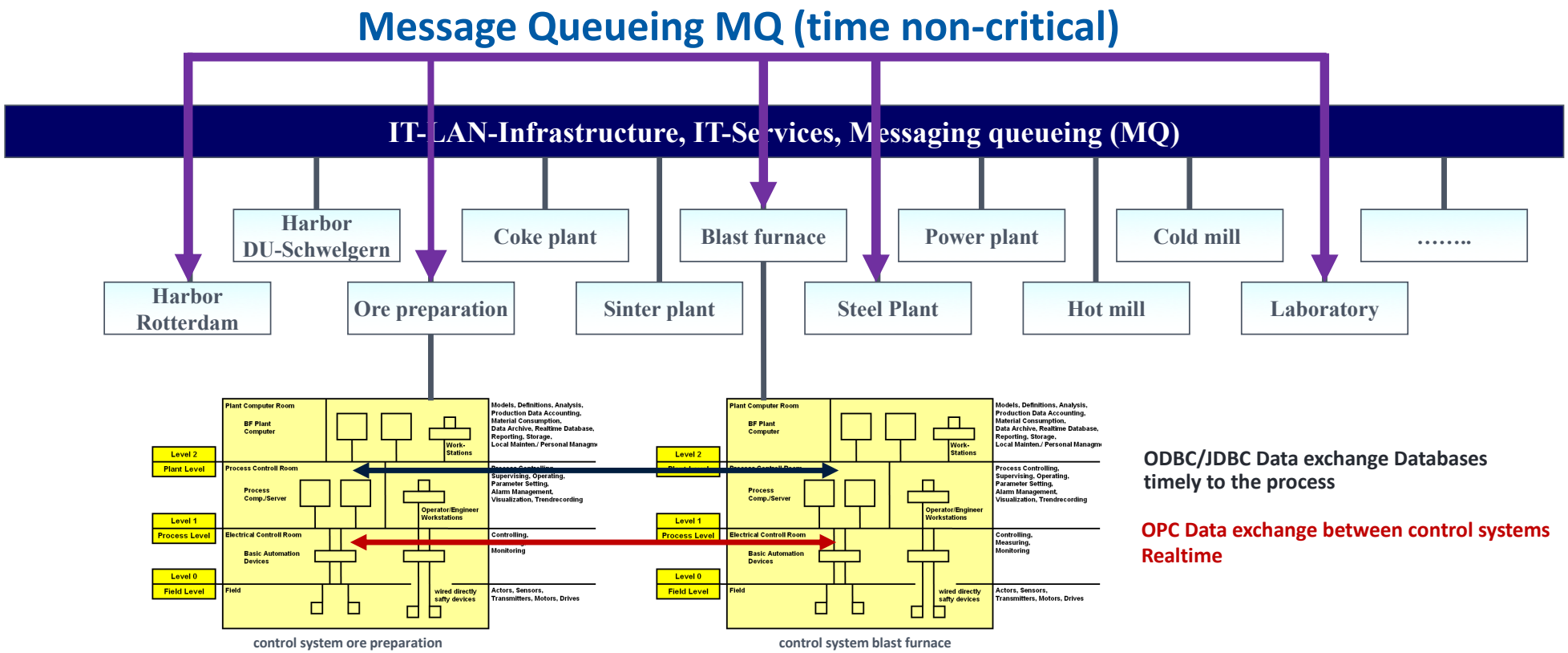

## Material processing blast furnace and steel plant

- Burden optimization program
- Blast furnace charging system (alternating coke and iron ore)
- Reduction process of the iron ore
- Iron ore becomes liquid and descending down
- Approximately after 6 hours the iron ore has been molten and is being tapped at a temperature of 1500 degree Celsius
- Tapped into torpedo ladles and transported to the steel plant

# Material flow in an integrated steel plant



# Information flow in an integrated steel plant (OPC / OLE for process control, ODBC/JDBC, **IBM-MQ**)

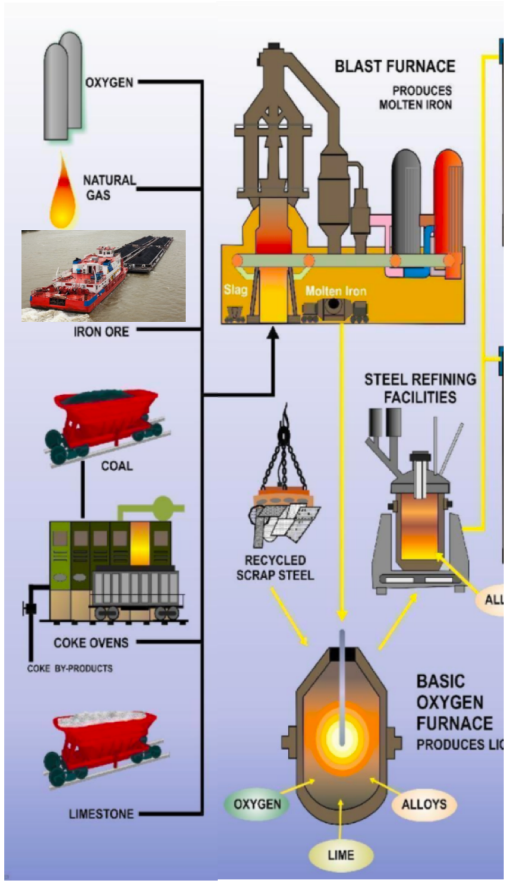



**ODBC/JDBC Data exchange Databases timely to the process**

**OPC Data exchange between control systems Realtime**

# The interaction between material flow and information flow

Hot metal production, taking a sample and receive the analysis via IBM-MQ




## Material processing blast furnace and steel plant

- Burden optimization program
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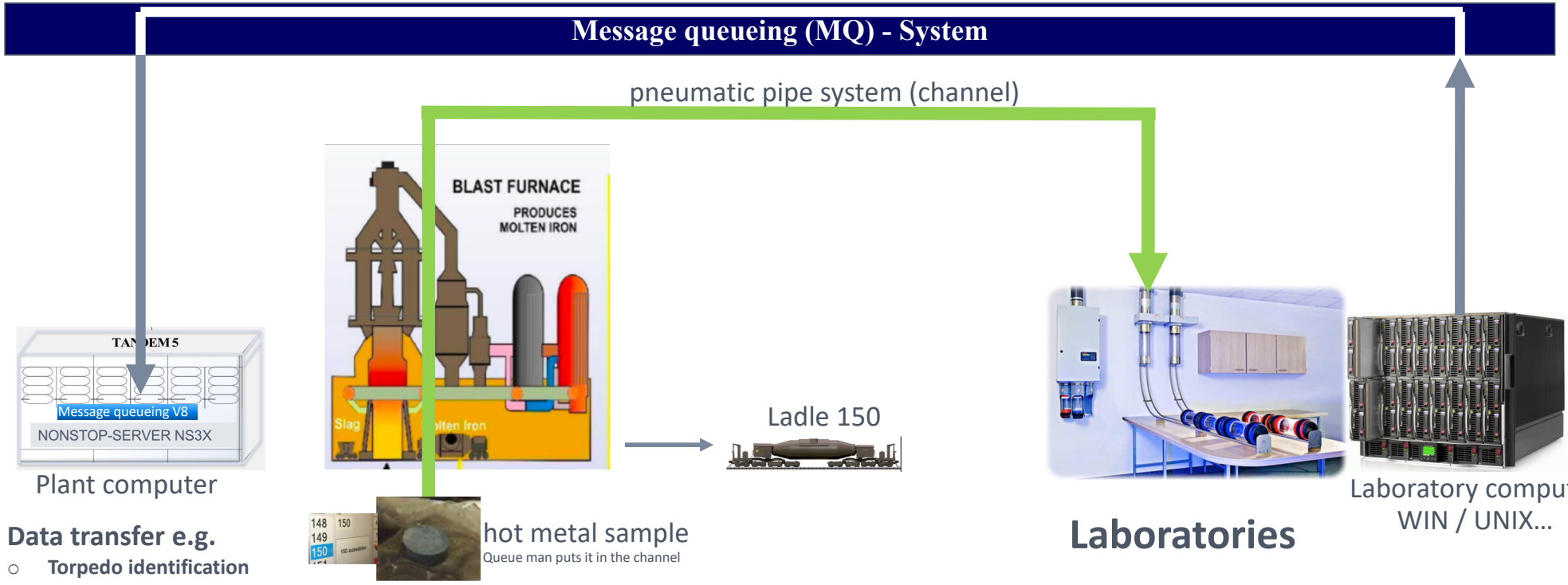
# The interaction between material flow and information flow

**deliver a sample to the lab via pneumatic pipe and receive the analysis from the lab via IBM-MQ**

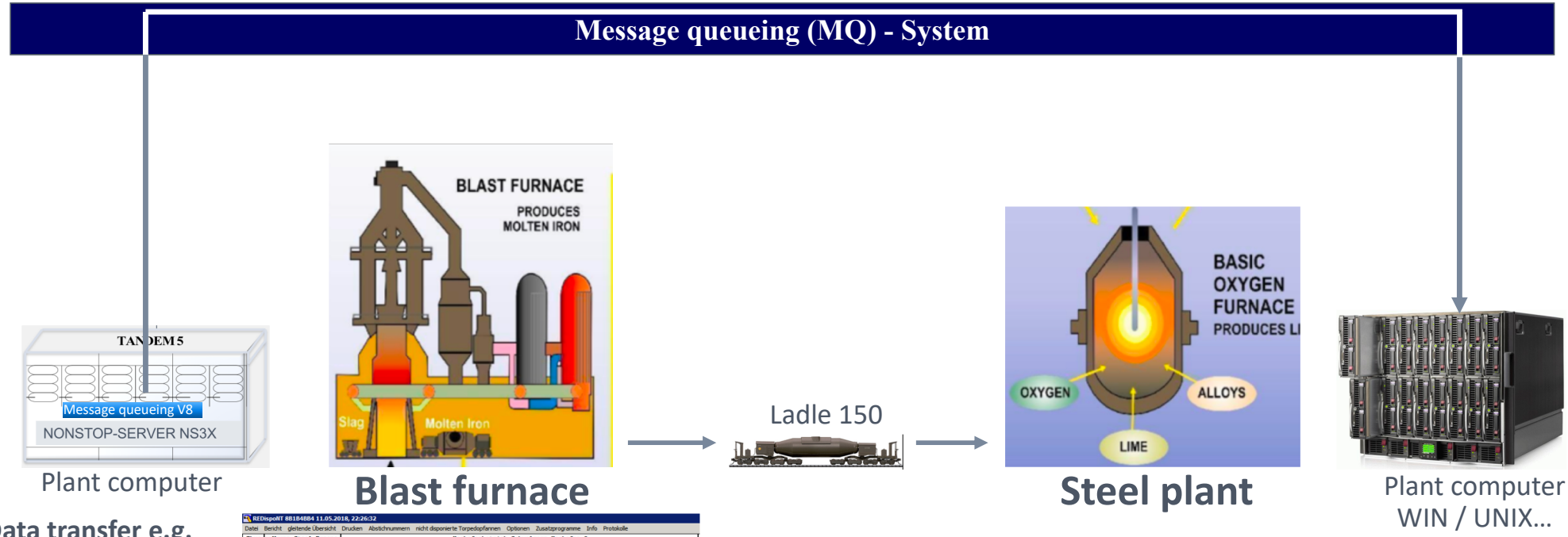



**Data transfer e.g.**

- **Torpedo identification**
- **Pig iron analysis**
- **Slag analysis**

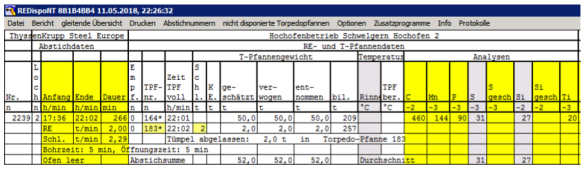
# The interaction between material flow and information flow

**Hot metal transport to the steel plant and transfer of the hot metal analysis via IBM-MQ**




**Data transfer e.g.**

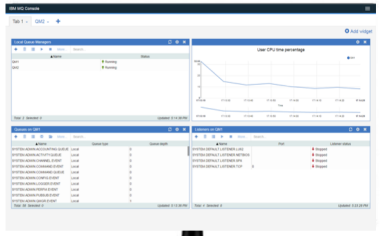
- **Torpedo identification**
- **Hot metal temperature**
- **Pig iron analysis**



# IBM-MQ server installations and monitoring

**More than 120 IBM MQ-Servers are monitored by DXC**

**Monitoring application developed by DXC**

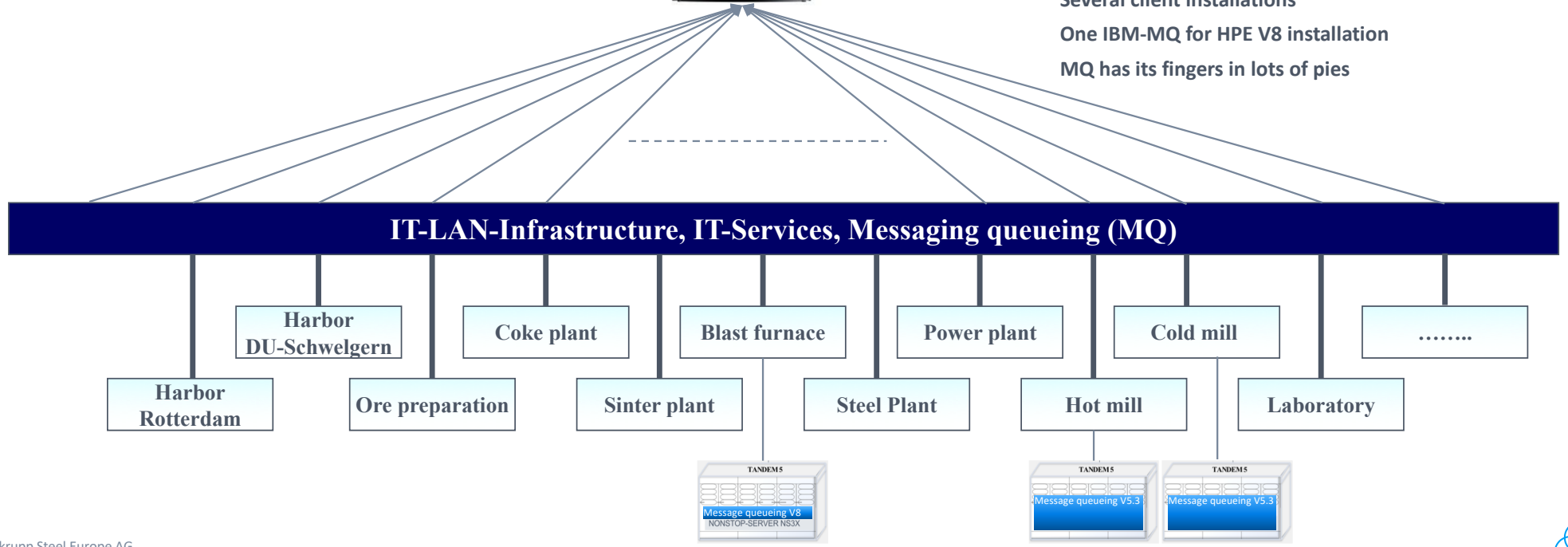


**MQ-Server installation on Linux, UNIX,Windows and NONSTOP**

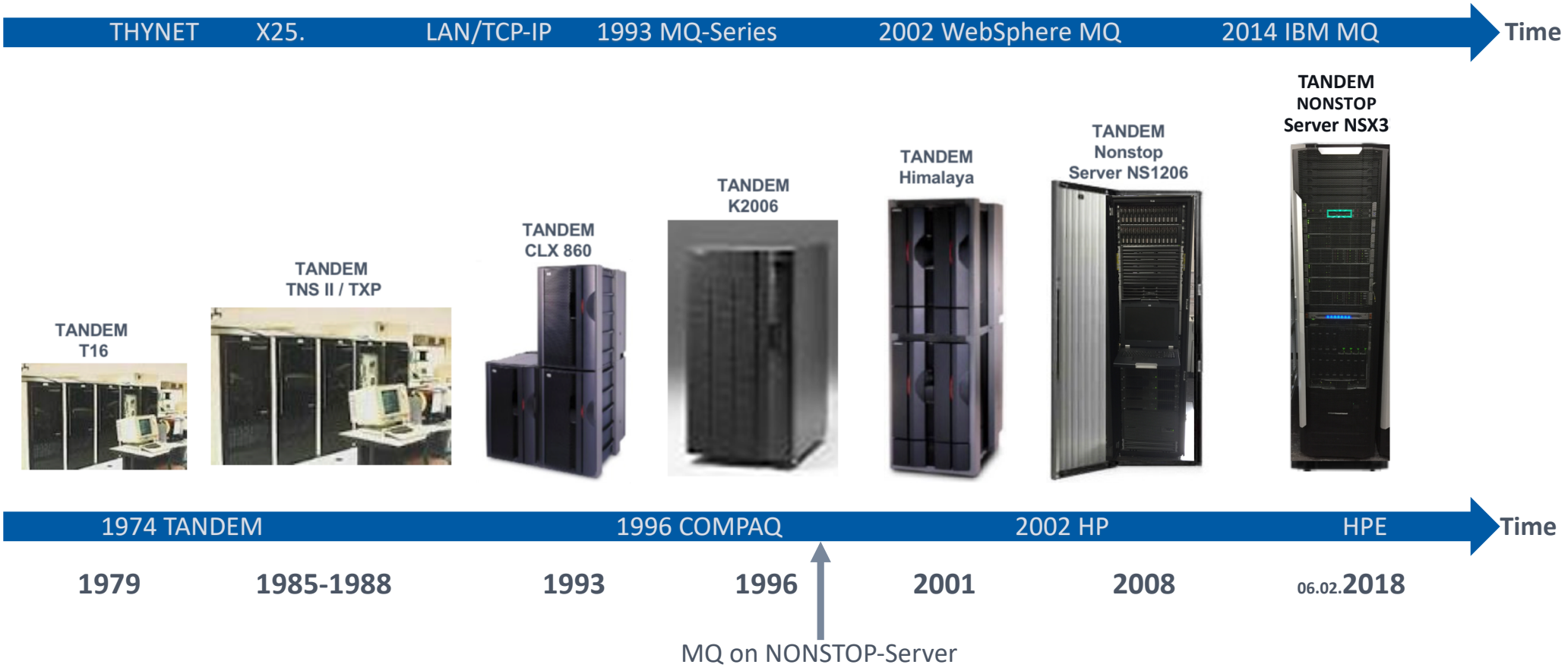
**Several client installations**

**One IBM-MQ for HPE V8 installation**

**MQ has its fingers in lots of pies**



# History of TANDEM/NONSTOP-Server  Hot Metal Department and the launch of MQ



# Planning, installation, tests and the  decision to migrate

IBM and comForte to provide IBM MQ v8 on HPE NonStop

05. Dec 2016

Today, comForte announced that it is working with IBM to bring out a new version of IBM MQ on the HPE NonStop Platform.
This will allow customers currently running IBM MQ on both the NonStop X and NonStop I platforms to benefit from the additional capabilities IBM MQ v8 delivers.

comForte works closely with its partner CS Software GmbH providing key development and support resources to the project.

**meeting with CS and IBM developers to inform TKS about the status of development**

**IBM MQ V8.0 is available on the HPE NonStop platform**

IBM United States Software Announcement 217-266
June 20, 2017

**Ordering NSX3**

**NS3X Installation**

**MQ Installation and tests**

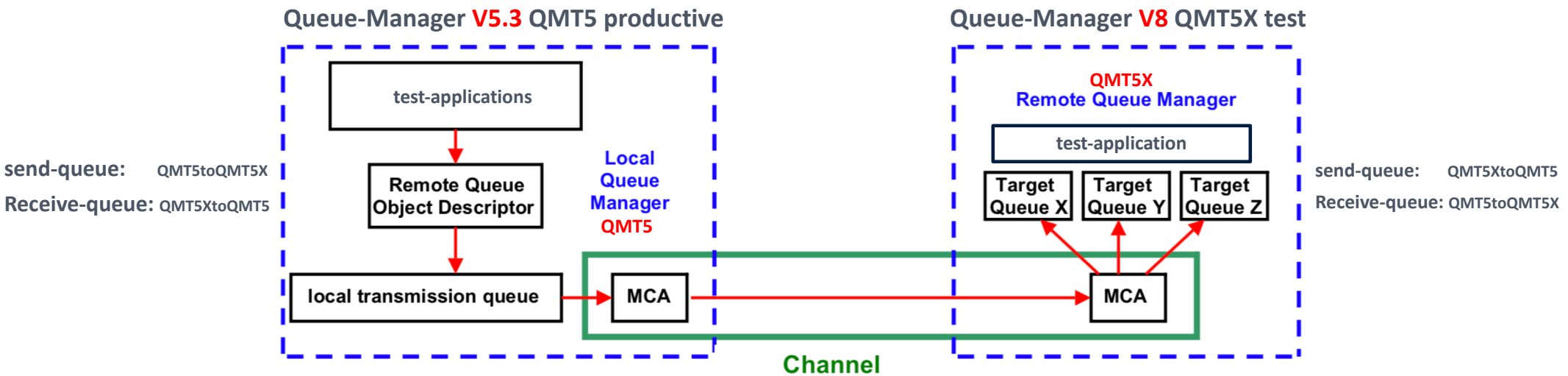
**Day of migration**

2016 / 2017 | May | June | July | September | October | 06.02.2018

## Planning, installation, tests and the  decision to migrate

- **Some considerations:**
  - MQ for NONSTOP NSX3 had to be available
  - Implementation of MQ in close cooperation with DXC and Proservia
  - Installation of MQ Proservia, tests TKS
  - Simple start and stop of the MQ-System
  - control of CPU-time consumption
  - Reliabilty and availability is important (24/7)

# Test environment of IBM MQ V8 October 2017




TANDEM Nonstop Server NS1206

production

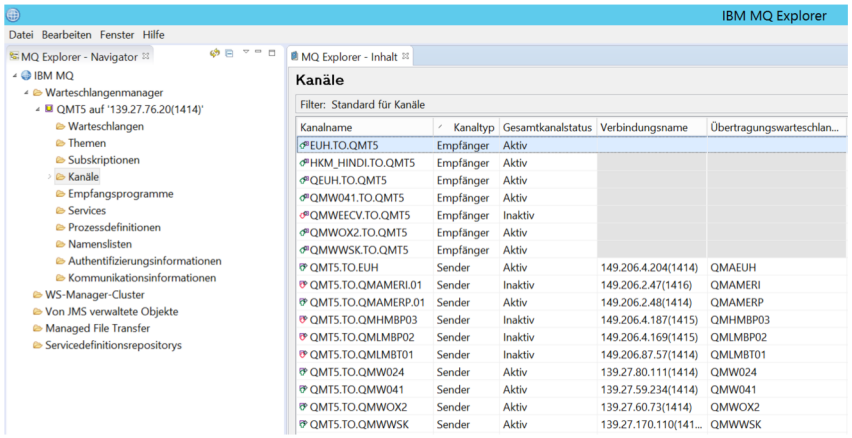
TANDEM Nonstop Server NSX2

test

## Easy start and easy stop

```
COMMENT ++++++++++++++++++++++++++++
COMMENT MQS   STARTEN
COMMENT ++++++++++++++++++++++++++++

osh -c "/home/mqv8/START_MQS_QMT5.sh"

strmqm QMT5


COMMENT ++++++++++++++++++++++++++++++++
COMMENT   MQS STOPPEN!
COMMENT ++++++++++++++++++++++++++++++++

osh -c "/home/mqv8/STOP_MQS_QMT5.sh"

endmqm -i QMT5
```

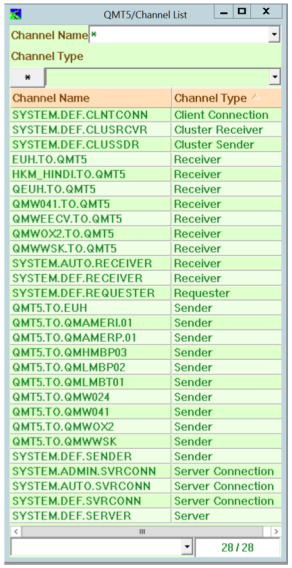
# Channels, queues, the adminstration with IBM-MQ Explorer 9 /6.0.4

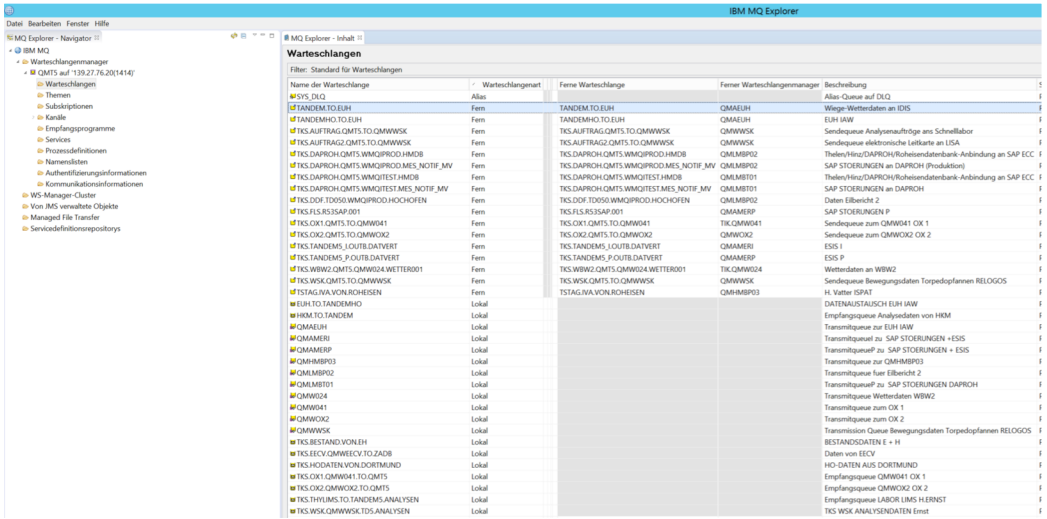



## Channel-List

**7 receiver channels**

**10 sender channels**

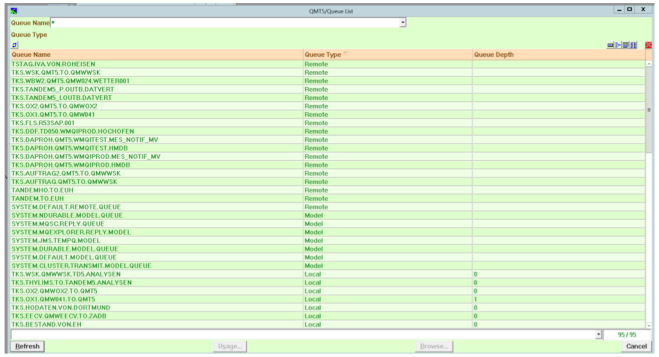



## Queue-List

**18 Remote Queues**

**17 local Queues**




We rarely work with the Command Line program.

# High availability (HANSQM)

```
lrwxrwxrwx    1 MQM.MANAGER        MQM           14 Oct 24  2017 G -> /G/disc06/mqv8
-rwsr-s---    1 MQM.MANAGER        MQM        40068 Oct 24  2017 addmqinf
-rwsr-s---    1 MQM.MANAGER        MQM       106941 Oct 24  2017 altmqfls
-rwxr-x---    1 MQM.MANAGER        MQM        35677 Oct 24  2017 altmqusr
-rwsr-s---    1 MQM.MANAGER        MQM       726354 Oct 24  2017 amqcache
-rwsr-s---    1 MQM.MANAGER        MQM       536692 Oct 24  2017 amqcchsv
-rwsr-s---    1 MQM.MANAGER        MQM       730391 Oct 24  2017 amqcnmgr
-rwsr-s---    1 MQM.MANAGER        MQM       846360 Oct 24  2017 amqconfg
-rwsr-s---    1 MQM.MANAGER        MQM        27083 Oct 24  2017 amqcrsta
-rwsr-s---    1 MQM.MANAGER        MQM        17562 Oct 24  2017 amqfcxba
-rwsr-s---    1 MQM.MANAGER        MQM        17559 Oct 24  2017 amqfqpub
-rwxr-x---    1 MQM.MANAGER        MQM        78467 Oct 24  2017 amqicdir
-rwsr-s---    1 MQM.MANAGER        MQM        40248 Oct 24  2017 amqiclen
-rwsr-s---    1 MQM.MANAGER        MQM        32085 Oct 24  2017 amqldmpa
-rwxr-xr-x    1 MQM.MANAGER        MQM        27205 Oct 24  2017 amqlrepa
-rwsr-s---    1 MQM.MANAGER        MQM        89760 Oct 24  2017 amqmfsck
-rwx------    1 MQM.MANAGER        MQM        22627 Oct 24  2017 amqmimpc
-rwxr-x---    1 MQM.MANAGER        MQM        48134 Oct 24  2017 amqoamd
-rwsr-s---    1 MQM.MANAGER        MQM        26704 Oct 24  2017 amqorxr
-rwsr-s---    1 MQM.MANAGER        MQM        22233 Oct 24  2017 amqpcsea
-rwsr-s---    1 MQM.MANAGER        MQM        35559 Oct 24  2017 amqrcmla
-rwsr-s---    1 MQM.MANAGER        MQM        44339 Oct 24  2017 amqrdbgm
-rwsr-s---    1 MQM.MANAGER        MQM       108642 Oct 24  2017 amqrfdm
-rwsr-s---    1 MQM.MANAGER        MQM        17589 Oct 24  2017 amqrmppa
-rwsr-s---    1 MQM.MANAGER        MQM        21999 Oct 24  2017 amqrrmfa
-rwxr-xr-x    1 MQM.MANAGER        MQM        31800 Oct 24  2017 amqrsslc
-rwsr-s---    1 MQM.MANAGER        MQM        94650 Oct 24  2017 amqspdbg
-rwsr-s---    1 MQM.MANAGER        MQM       536817 Oct 24  2017 amqssmgr
-rwxr-xr-x    1 MQM.MANAGER        MQM        50127 Oct 24  2017 amqtnssc
-rwxr-xr-x    1 MQM.MANAGER        MQM          640 Oct 24  2017 amqwCleanSideQueue.sh
-rwxr-xr-x    1 MQM.MANAGER        MQM          957 Oct 24  2017 amqwclientConfig.sh
-rwxr-xr-x    1 MQM.MANAGER        MQM          576 Oct 24  2017 amqwclientTransport.wsdd
-rwxr-xr-x    1 MQM.MANAGER        MQM          775 Oct 24  2017 amqwdeployWMQService.sh
-rwxr-xr-x    1 MQM.MANAGER        MQM         4220 Oct 24  2017 amqwsetcp.sh
-rwxr-xr-x    1 MQM.MANAGER        MQM          689 Oct 24  2017 amqwstartwin.sh
-rwxr-xr-x    1 MQM.MANAGER        MQM        26652 Oct 24  2017 amqxdbg
-rwsr-sr-x    1 MQM.MANAGER        MQM        31150 Oct 24  2017 amqxmsg0
-rwsr-s---    1 MQM.MANAGER        MQM        21962 Oct 24  2017 amqzfuma
-rwsr-s---    1 MQM.MANAGER        MQM        72178 Oct 24  2017 amqzlaa0
-rwsr-s---    1 MQM.MANAGER        MQM        22293 Oct 24  2017 amqzlga0
-rwsr-s---    1 MQM.MANAGER        MQM        22299 Oct 24  2017 amqzlsa0
-rwsr-s---    1 MQM.MANAGER        MQM        31755 Oct 24  2017 amqzlwa0
-rwsr-s---    1 MQM.MANAGER        MQM       136676 Oct 24  2017 amqzmgr0
-rwsr-s---    1 MQM.MANAGER        MQM        22173 Oct 24  2017 amqzmuc0
-rwsr-s---    1 MQM.MANAGER        MQM        22172 Oct 24  2017 amqzmuf0
-rwsr-s---    1 MQM.MANAGER        MQM        22170 Oct 24  2017 amqzmur0
-rwsr-s---    1 MQM.MANAGER        MQM        22057 Oct 24  2017 amqzxma0
-rwxr-xr-x    1 MQM.MANAGER        MQM        72666 Oct 24  2017 crtmqcvx
-rwxr-xr-x    1 MQM.MANAGER        MQM        43773 Oct 24  2017 crtmqenv
-rwsr-s---    1 MQM.MANAGER        MQM        81674 Oct 24  2017 crtmqm
-rwsr-s---    1 MQM.MANAGER        MQM        17595 Oct 24  2017 dltmqbrk
-rwsr-s---    1 MQM.MANAGER        MQM        42128 Oct 24  2017 dltmqm
-rwsr-s---    1 MQM.MANAGER        MQM        36180 Oct 24  2017 dmpmqaut
-rwxr-xr-x    1 MQM.MANAGER        MQM      1135780 Oct 24  2017 dmpmqcfg
-rwxr-xr-x    1 MQM.MANAGER        MQM       491956 Oct 24  2017 dmpmqmsg
/home/mqv8/opt/mqm/bin:
-rwsr-sr-x    1 MQM.MANAGER        MQM       449966 Oct 24  2017 dspmq
-rwsr-s---    1 MQM.MANAGER        MQM        31713 Oct 24  2017 dspmqaut
-rwsr-s---    1 MQM.MANAGER        MQM        22572 Oct 24  2017 dspmqcsv
-rwsr-s---    1 MQM.MANAGER        MQM        35510 Oct 24  2017 dspmqfls
-rwsr-s---    1 MQM.MANAGER        MQM        27061 Oct 24  2017 dspmqinf
-rwxr-xr-x    1 MQM.MANAGER        MQM        22268 Oct 24  2017 dspmqini
-rwsr-s---    1 MQM.MANAGER        MQM        26637 Oct 24  2017 dspmqras
-rwxr-xr-x    1 MQM.MANAGER        MQM       738770 Oct 24  2017 dspmqrte
-rwxr-xr-x    1 MQM.MANAGER        MQM        92049 Oct 24  2017 dspmqtrc
-rwsr-s---    1 MQM.MANAGER        MQM        40207 Oct 24  2017 dspmqtrn
-rwxr-x---    1 MQM.MANAGER        MQM        35765 Oct 24  2017 dspmqusr
-rwxr-xr-x    1 MQM.MANAGER        MQM       124939 Oct 24  2017 dspmqver
-rwsr-s---    1 MQM.MANAGER        MQM        17554 Oct 24  2017 endmqbrk
-rwsr-s---    1 MQM.MANAGER        MQM        35378 Oct 24  2017 endmqcsv
-rwsr-s---    1 MQM.MANAGER        MQM        27094 Oct 24  2017 endmqlsr
-rwsr-s---    1 MQM.MANAGER        MQM        36312 Oct 24  2017 endmqm
-rwxr-xr-x    1 MQM.MANAGER        MQM        45301 Oct 24  2017 endmqtrc
-rwxr-xr-x    1 MQM.MANAGER        MQM        26213 Oct 24  2017 fdcclean
-rwxr-x---    1 MQM.MANAGER        MQM        44510 Oct 24  2017 ffstsummary
-rwx------    1 MQM.MANAGER        MQM        17411 Oct 24  2017 importmqm
-rw-r--r--    1 MQM.MANAGER        MQM        79980 Oct 24  2017 isa.xml
drwxr-xr-x    1 MQM.MANAGER        MQM         4096 Oct 24  2017 mig
-rwxr-xr-x    1 MQM.MANAGER        MQM       363868 Oct 24  2017 mqrc
-rwxr-xr-x    1 MQM.MANAGER        MQM         5429 Oct 24  2017 mqtrig
-rwxr-xr-x    1 MQM.MANAGER        MQM      4691744 Oct 24  2017 openssl
-rwsr-s---    1 MQM.MANAGER        MQM        32158 Oct 24  2017 rmvmqinf
-rwsr-s---    1 MQM.MANAGER        MQM        31164 Oct 24  2017 rsvmqtrn
-rwsr-s---    1 MQM.MANAGER        MQM        17555 Oct 24  2017 runmqbrk
-rwsr-s---    1 MQM.MANAGER        MQM        62931 Oct 24  2017 runmqchi
-rwsr-s---    1 MQM.MANAGER        MQM        22392 Oct 24  2017 runmqchl
-rwsr-s---    1 MQM.MANAGER        MQM       131053 Oct 24  2017 runmqdlq
-rwsr-s---    1 MQM.MANAGER        MQM        54703 Oct 24  2017 runmqlsr
-rwxr-xr-x    1 MQM.MANAGER        MQM         3739 Oct 24  2017 runmqras
-rwsr-sr-x    1 MQM.MANAGER        MQM        35447 Oct 24  2017 runmqsc
-rwxr-xr-x    1 MQM.MANAGER        MQM        45118 Oct 24  2017 runmqtmc
-rwxr-xr-x    1 MQM.MANAGER        MQM       126981 Oct 24  2017 runmqtmf
-rwsr-s---    1 MQM.MANAGER        MQM        45118 Oct 24  2017 runmqtrm
-rwxr-x---    1 MQM.MANAGER        MQM       148750 Oct 24  2017 runnscnf
-rwsr-s---    1 MQM.MANAGER        MQM        49052 Oct 24  2017 runswchl
-rwsr-s---    1 MQM.MANAGER        MQM        34019 Oct 24  2017 sdcp
-rwsr-s---    1 MQM.MANAGER        MQM        35880 Oct 24  2017 setmqaut
-rwxr-xr-x    1 MQM.MANAGER        MQM         5757 Oct 24  2017 setmqenv
-rwxr-xr-x    1 MQM.MANAGER        MQM        22263 Oct 24  2017 setmqini
-rwxr-x---    1 MQM.MANAGER        MQM        22555 Oct 24  2017 setmqprd
-rwxr-xr-x    1 MQM.MANAGER        MQM        52595 Oct 24  2017 setmqtmf
-rwsr-s---    1 MQM.MANAGER        MQM        22280 Oct 24  2017 strmqcsv
-rwsr-s---    1 MQM.MANAGER        MQM        17786 Oct 24  2017 strmqm
-rwxr-xr-x    1 MQM.MANAGER        MQM        45664 Oct 24  2017 strmqtrc
```

# Measure counters, the impact of MQ on CPU-performance

**IBM MQ processes unique to IBM MQ for HPE NonStop V8**

Several new process types have been added to IBM MQ to provide NonStop specific functionality.

- **Cache Manager Supervisor: amqcchsv**
- **Cache Manager: amqcache**
- **Config Manager: amqconfg**
- **Setsignal Manager: amqssmgr**
- **Consistency Manager: amqcnmgr**
- **Guardian Bindings Agent: amqzlga0**

**Measom**

- **ADD CPU ***
- **ADD PROCESS ***
- **START MEASUREMENT measMQV8,OSS,INTERVAL 30 MINUTES, FOR 8 HOURS**
- **Add measMQV8**
- **list process $OSS.ZYQ00001.Z0000K02, format brief,rate off,by cpu-busy-time,totals on**

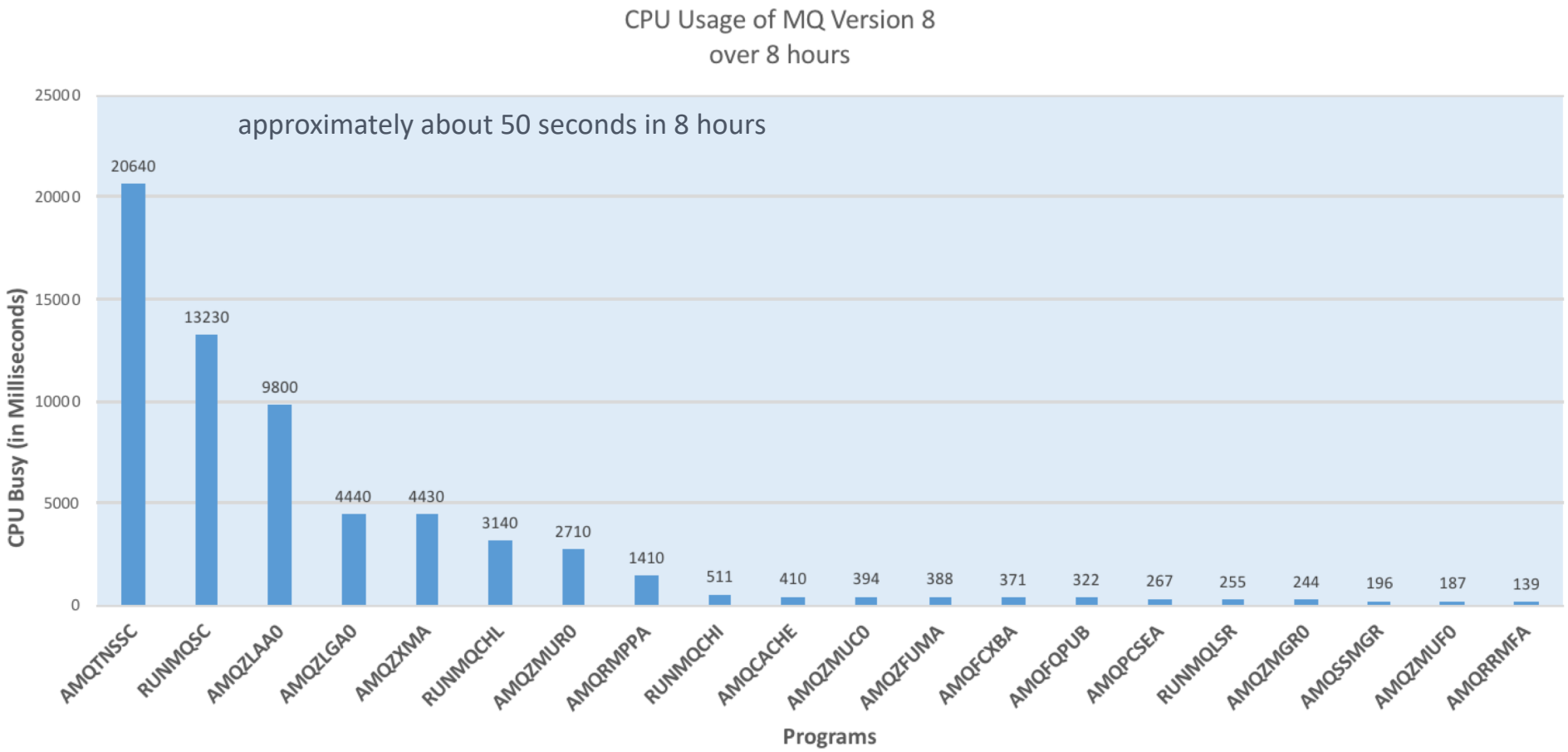
```
-  Process Entity
-  Total for 3 Records
-  From  20 Apr 2018,  7:08:30    For     8 Hours
-
-  ------------------------------------------------------------------------
-  Cpu-Busy-Time               9.80 sec  Dispatches               309,645 #
-  Ready-Time                 34.73 sec  Comp-Traps
-  X-Interrupts                          Y-Interrupts
-  Messages-Sent            117,989 #    Messages-Received
-  Msgs-Sent-Qtime             7.72 sec  Recv-Qtime
```

- **……..**
- **……..**
- **list process $OSS.ZYQ00001.Z0000K11, format brief,rate off,by cpu-busy-time,totals on**

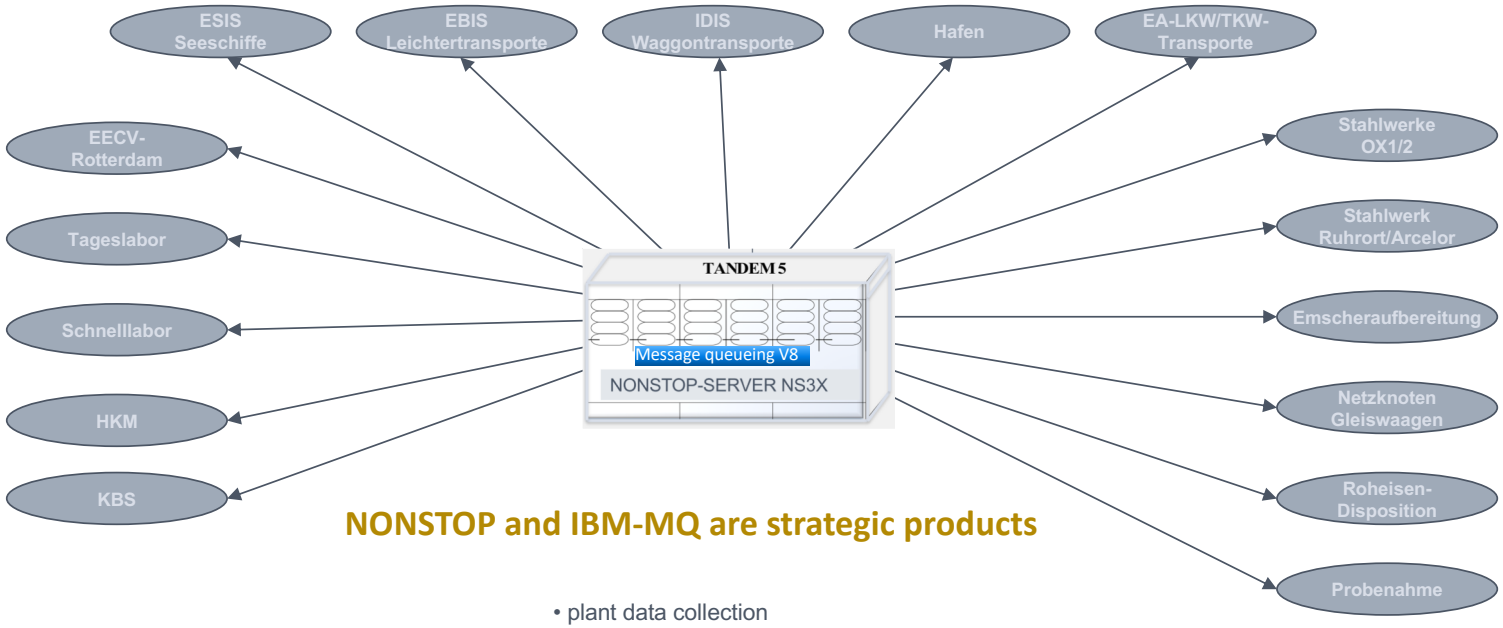
Summary cpu-time consumtion over 8 hours

| Program Name | CPU Busy % | # Processes | CPU Busy (in msec) | TMF Trans | File Opens | Messages Sent | Reggages Received |
|---|---|---|---|---|---|---|---|
| amqtnssc | 0.07 | 1480 | 20640 | | 50320 | 972848 | 17837 |
| runmqsc | 0.05 | 421 | 13230 | | 23690 | 321843 | |
| amqzlaa0 | 0.03 | 3 | 9800 | 5501 | 1227 | 117989 | |
| amqzlga0 | 0.02 | 1 | 4440 | 104 | 10672 | 71537 | 17942 |
| amqzxma | 0.02 | 2 | 4430 | 0 | 0 | 68990 | 4440 |
| runmqchl | 0.01 | 110 | 3140 | 312 | 5731 | 110570 | 208 |
| amqzmur0 | 0.01 | 1 | 2710 | 0 | 1560 | 49219 | |
| amqrmppa | 0.00 | 1 | 1410 | 105 | 695 | 11245 | |
| runmqchi | 0.00 | 1 | 511 | 312 | 312 | 11889 | |
| amqcache | 0.00 | 1 | 410 | 0 | 0 | 1998 | 4570 |
| amqzmuc0 | 0.00 | 2 | 394 | | 96 | 2320 | |
| amqzfuma | 0.00 | 2 | 388 | | | 5778 | |
| amqfcxba | 0.00 | 1 | 371 | 0 | 0 | 2879 | |
| amqfqpub | 0.00 | 1 | 322 | 0 | 0 | 6994 | |
| amqpcsea | 0.00 | 1 | 267 | | 94 | 5079 | |
| runmqlsr | 0.00 | 1 | 255 | | 42 | 3046 | |
| amqzmgr0 | 0.00 | 1 | 244 | | | 1920 | |
| amqssmgr | 0.00 | 2 | 196 | | | | 5456 |
| amqzmuf0 | 0.00 | 1 | 187 | | | 960 | |
| amqrrmfa | 0.00 | 1 | 139 | | 24 | 1080 | |

# Measure counters, the impact of MQ on CPU-performance



# Outlook “operational data processing on NONSTOP-Server  Hot Metal Department”




**NONSTOP and IBM-MQ are strategic products**

- NONSTOP-Kernel
- NONSTOP-SQL
- Guardian / OSS
- IBM MQ

- plant data collection
- material flow control and data acquisition
- process data collection
- central analytical database
- tapping data acquisition
- burden optimization
- models
- accounting system
- CO2-management
- KPI‘s key performance indicators
- data exchange

# Thank you !