

DBBC3 eVLBI tests

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DBBC3 Formatter tests

- Medicina, Yebes, Onsala
- Network test, use FlexBuff or switch
- Let's recap

- DBBC2/FILA10G has separate output for station/JIVE
- No direct connection from the DBBC3 outputs
- Use switch or a FlexBuff as router, configure NAT
- Documentation on Deki
`deki.mpifr-bonn.mpg.de/Working_Groups/EVN_TOG/DBBC3_eVLBI`

DBBC3 packets forwarding for eVLBI observations

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EVN TOG meeting, Torun - 13-14 December 2023

Overview

In this document it will be explained how Medicina and Noto have configured their new DBB3 and FlexBuffer(FB) backend to perform local recording and even the data forwarding to remote location, like international correlator. The basic idea is to extend the DBBC2 well tested VLBI configuration and operations actually in use, to the most performing DBBC3 VLBI backend¹. We will refer to the DDC_Ev126² firmware, the last available and specifically developed for EVN observations in Digital Direct Conversion (DDC) mode.

DBBC3 and FlexBuffer configuration

The DDC_Ev126 gives first 8 bbc group from IFA, other 8 bbc (9 to 16) from IFB and following 8bbc groups for the others IF. To keep the schema most closed as possible to actual DBBC2, just to make easy the Field System(FS)³ schedule adaption even to DBBC3, we connected IFA to rcp and IFB to lcp of the "in-line" receiver, so first 8 bbc (1-8) bring rcp and second group (9-16) the lcp. The others IF are supposed to be connected to others receivers or pols in case of a multi band/beam receivers, like the CTR (Compact Triband Receiver) we soon will mount on Medicina and Noto radio telescope, or stay unused, in case of single band/beam receivers.

For each used IF (or core), only one eth of the four, eth0, is now used and connected to our new FlexBuffer's(FB) 10Gbps interface. In a next firmware release, might be possible that another eth can mirror the same eth0 traffic, so permitting local recording and correlator forwarding. But this option seems not very important, since so far all eVLBI observations never required the simultaneous local recording.

The core3h and FB Ethernet interfaces are configured in private LANs, all prefixed by 192.168. We assigned a different LAN to each eth, because this is a point to point connection schema with no network switch involved. We decided to compose the third IP digit with the core number plus the eth number, just to make easy its identification, while the fourth IP digit is usually '1' for the eth and '30' for the FB. This is the last number available in a /27 class C network and is assigned to FB that act as gateway for each LAN. Below an example table.

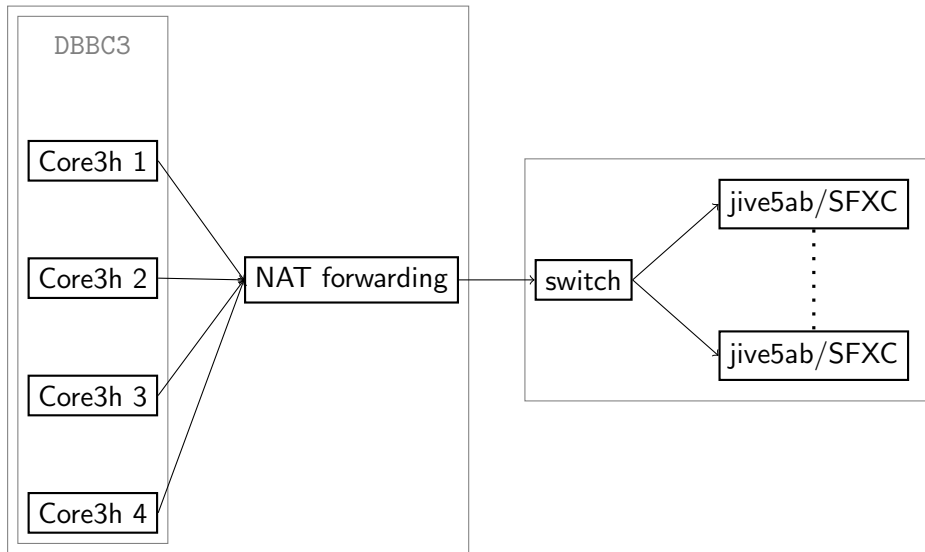
Riscipol	IP core	0	1	2	3	gateway	who	dev	Destinations	IP
IFB (dbbc2A)	A	192.168.10.1	192.168.11.1	192.168.12.1	192.168.13.1	192.168.10.30/27	FB	ens1049n	192.168.10.30	
IFA (dbbc2C)	B	2.192.168.20.1	192.168.21.1	192.168.22.1	192.168.23.1	192.168.20.30/27	FB	ens1049f	192.168.20.30	
IFB (K1P)	C	3.192.168.30.1	192.168.31.1	192.168.32.1	192.168.33.1	192.168.30.30/27	FB	ens1048f	192.168.30.30	
IFA (K1L)	D	4.192.168.40.1	192.168.41.1	192.168.42.1	192.168.43.1	192.168.40.30/27	FB	ens1048f	192.168.40.30	
IFB	E	5.192.168.50.1	192.168.51.1	192.168.52.1	192.168.53.1	192.168.50.30/27	FB	ens1048f	192.168.50.30	
IFA	F	6.192.168.60.1	192.168.61.1	192.168.62.1	192.168.63.1	192.168.60.30/27	FB	ens1048f	192.168.60.30	
IFB	G	7.192.168.70.1	192.168.71.1	192.168.72.1	192.168.73.1	192.168.70.30/27	FB	ens1048n	192.168.70.30	
IFA	H	8.192.168.80.1	192.168.81.1	192.168.82.1	192.168.83.1	192.168.80.30/27	FB	ens1048f	192.168.80.30	
net_post		46220	46221	46222	46223					

¹ G.Tucciari & all - DBBC3 - the new wide-band backend for VLBI (<https://pos.sissa.it/344/140/pdf>)

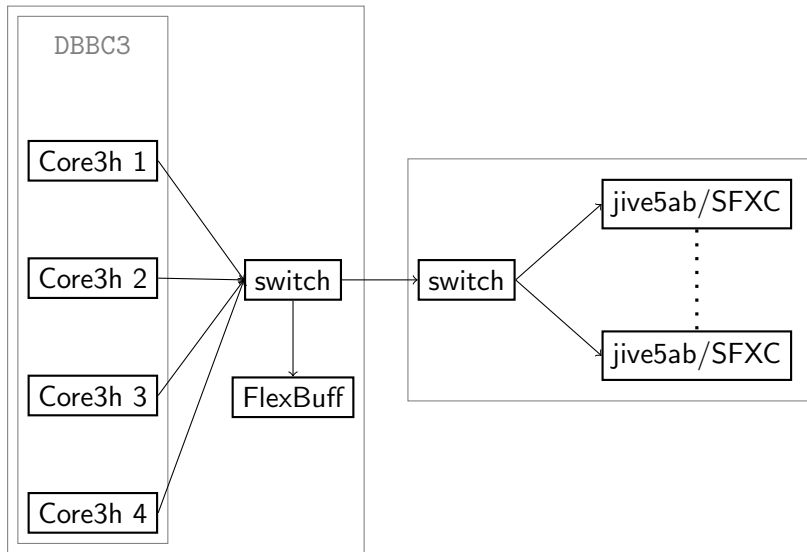
² Sven Dierbach, MPFR - Setting up the DBBC3 for DDC_E mode manual

³ Himwich, E., "Introduction to the Field System for Non-Users", IVS 2000 General Meeting Proceedings, N. R. Vandenberg and K.D. Baver, 86-90, 2001

eVLBI using NAT forwarding



eVLBI using switch



Results

- Medicina, Yebes, Onsala
- 2x2Gbps

- Using a FlexBuff as a router
- Some commands/answers seem to be scrambled with previous
- But got 2x2Gbps quite easily

- Using FlexBuff as a router
- Communication with the DBBC3 worked flawlessly
- First day, data rate limited to 100 - 200 Mbps
- Second day, FlexBuff was rebooted and perfect 2x2Gbps

- Using a switch
- First day
 - Couldn't get commands through from JIVE
 - Did get a bit of data, but unreliable
- Second day
 - Applied dbbc_proxy adjustment from Onsala test
 - Network reconfigured for public IP address space

Lessons learned

- `dbbc_proxy` code.jive.eu/verkout/dbbc_proxy
- `vlbish` github.com/jive-vlbi/vlbish
- Network

Next step

- Update eVLBI control code
- Fringe test