

Equipment used to facilitate betting at the NSW TAB 1964 to 2004

December 1964 Operations commenced in cash offices using modified NCR (National Cash Register) 1493 type cash registers. Telephone betting relied upon hand written tickets.

August 1971 *On-line computer controlled processing commenced. The main equipment comprised:*

Computer Room

Two International Business Machines (IBM) 360/44 type central processors, each processor had 128K memory storage and operated in dual, master/slave, modes. During the system set-up the storage was extended to 256K each. The software used the IBM Assembler language.

Four IBM 3967 telecommunications processors.

12 IBM 3970 telecommunications adapters.

5 IBM 2314 disk drives for each central processor.

One IBM 2415 magnetic tape drive for each central processor.

One IBM 1403-N1 and One 1443-N1 printer (shared via 2914 switch)

One IBM 2501 card reader for each central processor.

One IBM 1442 Card Punch (shared via 2914 switch)

One IBM 2848 visual display unit controller for each central processor.

12 AWA (Amalgamated Wireless Australasia) telecommunications interface racks.

Control Centre

Six IBM 2260 visual display units.

Two IBM 1053 golf ball type printers.

STC (Standard Telephones and Cables) KSR33 type teletypewriters.

PMG (Telecom) telex machines.

Telephone Betting

85 AWA TBIDs (Telephone Betting Input Devices).

STC teletypewriters.

Cash Offices

AWA BIDs (Branch Input Devices).

STC teletypewriters or PMG telex.

From June 1977 *Implementation of the computer sub-system concept commenced. (Installation, development and testing occurred earlier)*

Computer Room

One IBM 370/135 type central processor with 384K storage for each of Telebet and Cashbet

One IBM 370/145 512K storage for backup, and development and testing.

One IBM 3704 telecommunications processor for each of Cashbet, Telebet, and Backup.

Three IBM 3705 telecommunications processors for Cashbet.

Four IBM 3340 disk drives (70 MB) for each of Cashbet, Telebet, and Backup.

Two IBM 3410 magnetic tape drives for each of Cashbet, Telebet, and Backup.
One IBM 1403 printer shared by Cashbet, Telebet, and Backup.
One IBM 3505 punch card reader for each of Cashbet, Telebet, and Backup.
One IBM 2914 peripheral switch.
Four Data General NOVA mini-computers as telecommunications controllers for Telebet.

Control Centre

Three IBM 3277 visual display units.
Three IBM 3288 printers.

Telephone Betting

90 Information Electronics (IE) Tbet terminals.

Cash Offices

IBM 5983 terminal controllers
IBM 5934 mark-sense reader terminals.

From 1979-82: *Master Collator/Race Day control, Management Information System (MIS) and New MRT2 Cash Betting terminals (BID replacement) Cash Betting now called "TABMARK" and Telephone Betting now called "PhoneTAB"*

Computer Room

1979: 2 X IBM 4955 Series/1 minicomputers installed for Master Collator Function

1980: IBM 3031 Central Processor (1.1MIP, 2MB of Main Storage) "the Red" for MIS/RDC including 6 X 317MB 3350 fixed disk drives, 3 X 3420-008 Tape drives, 3203 line Printer, 3274 vdu controllers and 24 X 3278 VDUs
IBM 3031 Central Processor with (1.1 MIP, 2MB Main Storage) "the Blue" for the forthcoming MRT2 SNA mark sense terminals. Included 4 X 3340 disk drives, 2 X 3420-006 Tape drives, and additional 3270 VDU controller and 6 x 3278 VDUs.

Control Centre

- IBM 4987 Series/1 VDUs
- IBM 3278 Mainframe type VDU's
- IBM 3287 and 3289 remote printers,

Sales Outlets

- IBM 5934/5983 terminals installed in country NSW
- AWA MRT2 SNA Mark Sense terminal selected for Metropolitan and BID replacement.

From 1982-85: *First full PhoneTAB re-write went 'live', TABMARK2 (& 3) (MRT2) implementation .continued, as did MIS and end-user computing. MRT2 implementation involved installation of 4(+1 spare) IBM 3705 F08 Communications controllers over the period.*

Computer Room

1982

- 2nd Hand IBM 370/148 Central Processor (0.4mip ,2MB) for "new" PhoneTAB system installed
- IBM 4341-L1 (1.2 MIP 4m, later upgraded to 4m 1.7Mip to L12) for dedicated MIS system.
- Race DAY Control Sub-system went live.

1983

- IBM 4341-k09 (.9 mip ,2MB) (yellow and grey)
- IBM 4341-L12 (1.7 mip 4MB) installed, also, previous 4341s upgraded to L12s (1.7 mip, 4MB Main Storage)

1984.

- 2 X IBM 4946 Series/1 Minicomputers installed (destined to be Message switch sub-system)
- Kodak Komstar Microfiche printer installed (for "printing" of pre-result trifecta collation counters).
- TABMARK3 and Message Switch sub-systems went live.

1985

- IBM 4381-P02 Central processor "the grey" (2.8mip, 16MB main store) installed for Program development, testing and backup for all of the Betting Systems.
- IBM 4381-P02 Central processor "the blue" (2.8 MIP, 16MB main store) installed. This one was for the increased function MIS/RDC system.
- First delivery of new 3380 disk drives commenced, destined to eventually replace all existing 3340 disk drives.
- TABMARK2 and TABMARK3 running on Yellow and Red 4341 processors.
- TABMARK1 and PhoneTAB transferred onto Grey and Blue 4341 processors.

Control Centre

- 360/44 (a.k.a. BID system) discontinued
- Multiple sub-systems needing to be managed (chiefly via RDC): PhoneTAB, TABMARK1, 2&3, Race course transmitting etc. Also Online Initialisation and Race day accounting in place.
- Betting to advertised race start time implemented along with the printing of trifecta collations
- A proliferation of different type of terminals and equipment in evidence.

Sales Outlets (including Account Betting)

- All cash outlets online, via MRT2s in the Metropolitan areas, and 5934s in country areas.
- Some Pub TAB terminals (General Instruments (GI) RT7A) deployed in licensed outlets. These pretend to be MRT2's, connected to TABMARK2&3.

- PhoneTAB has two large rooms full of IE terminals.

From 1986-90 *Opening of Second site at Granville, Major review of Mainframe processor strategy, New PhoneTAB terminals, re-write of Phone TAB in a High Level language(PL/I), and later, New Cashbet system also mainly PL/I. Yet more MIS. End-user computing proliferating. New GI RT4 terminals for PhoneTAB require installation of 2 IBM 3725-1 communications controllers. For Cashbet, MTR2s and Flight terminals also predicate the installation, first of 3725-2 communications controllers, and later the more modern and powerful 3745/6 units.*

Computer Room

1986.

- Betting system converted to IBM's VSE/SP operating systems.
- Betting systems converted to use the newer 3380 disk drives. (eliminating the old 3340s)
- IBM 3480 (8 actuators) Cartridge tape drives installed. Cartridge 200MB capacity each.
- IBM 4381 P13 (3.5 MIP, 16MB main store) the "Green" installed as first stage of handling new, High function, PLI-based, SNA PhoneTAB system.

1987

- Microwave link between soon-to-be-opened Granville site and Ultimo installed
- Hyper Channel units, permitting high speed inter-Mainframe communication, are installed; this facility used some of that Microwave Link, and was backed up by a high speed land line (2Mb/s) installed between the sites.
- 2 X IBM 4956-E70 Series/1 Minicomputers installed, for forthcoming two-way Racecourse communications.

New Mainframe Strategy implementation commences here. (This **fully** embraced use of IBM's VM/HPO operating system as pivotal to TAB's disaster recovery strategy)

- IBM 3090-150E (10.5 MIP, 32 Mb main stores) installed in Ultimo. ("Grey" – intended for MIS, testing/Backup /Program development).
- IBM 3090-150E (10.5 mip, 32MB main Store) also installed in Ultimo. ("Blue" intended for Tabmark1, TABMARK2 and the New PhoneTAB)
- IBM 3090-150E (10.5 MIP, 32MB main store) installed at Granville. ("Brown" initially service as testing and Ultimo's Disaster recovery facility.)
- IBM 3820 Laser printer installed... TAB's first Office-type Laser printer is installed at Ultimo (not in computer room).

1988

- IBM 3480 Tape Cartridge Drives (4 actuators) installed at Granville.

- Micro-wave and Hyper channel were fully implemented, ensuring a high level of inter-site communications.
- Additional IBM 3812 Page printers were installed all over the Ultimo premises and at Granville, as were many IBM 3179/3192/3742 Colour VDU's.
- All IBM 4341 processors were decommissioned and disposed of.
- IBM 3745/3746 Communications controllers, one for Granville and one for Ultimo were installed. These units were fully duplexed internally, and hence did not need a back up unit.

1989

- After some refinement, the new PL/I based PhoneTAB system was fully live on the Blue 3090 in Ultimo.
- IBM 4381-P13 moved from Ultimo to Granville. This Machine becomes the (forthcoming) CASHBET "A" machine, thus making Granville a 'HOT' site
- First IBM 3990/3390 disk units installed. (For MIS).

1990.

- TABMARK2 outlets, now all converted onto the 3090-based, PL/I, CASHBET "B" system, located in Ultimo.
- Grey 150E Central processor upgraded to 64 MB main Store, a reflection of is increasing MIS and Office Automation use.
- IBM 6262-14 channel attached line Printer installed. It replaced all mainframe line/impact printers. This was the last one.
- CASHBETA sub system in introduced, running initially on the 4381 P13 (renamed the "Pink") at Granville. TABMARK3 outlets commenced being cut over to the CASHBET A system.
- 2nd Hand IBM 3090 15E (still 10. 5 Mip/32MB main Store) installed at Granville. Destined to be the permanent home of CASHBETA. The displaced Pink kept, for some time, as a 'No Commercial value 'spare'.
- Additional peripherals, including yet more IBM 3880/3380 disk drives were installed, mainly at Granville.
- Last TABMARK3 outlets converted to CASHBET A

Control Centre

- New versions of sub-systems bring yet more new terminal types to use and new environments to master.
- Not covered in this document , additional non-TAB mainframe systems include TELETXT, race results services, assorted race result services, and other information dissemination functions
- Control Centre itself becomes a significant user of 'end user computing' office automation.

Sale Outlets (incl. Account betting)

- RT7As Pub TAB keyboard/mark sense cash terminals
- Elimination of older IBM 5934 mark sense terminals from all outlets almost complete.
- Greatly extended use of Customer displays (SKYCHANNEL, TELETXT etc).
- PhoneTAB expanded greatly, at both Ultimo and Granville, with General Instrument (GI) RT4 terminals.

From 1991-99 *IBM 3090s upgraded early in this period and were eventually replaced towards the end of this period with much cheaper and smaller CMOS technology processors. Dual site operations are fully implemented, and magnetic storage devices (chiefly disk) were upgraded to newer technology and greatly expanded capacity. This supported the ever-increasing usage of office automation, not to mention the considerable expansion in the size of the Wagering Business.*

Computer Room

1991.

- (April) 2 Memorex model 9020 channel extenders installed. This allowed the Granville mainframe to back up the Granville Disks to Ultimo Tape units, using a 2Mb/s sub channel on the Microwave link. This greatly increased TAB's ability to run the Granville Computer room unattended. (i.e. controlled from Ultimo)
- (DEC) last skerrick of TABMARK1 (5934) country outlets are converted to Cashbet B

1992.

- Additional 3390 Disk drives installed. At both sites.
- Blue, Green and Brown IBM 3090s all upgraded IBM 3090-17T (18 MIPS, 64MB Main Storage).
- Grey 3090 upgraded to IBM 9021-330 (23MIP, 96MB main storage, 128M Expanded Storage).

1993

- 2 X IBM 9033 ESCON Directors were installed, at Granville and Ultimo. These permit the mainframes at each site to talk to each other via the FAST fibre optics based 10MB/sec ESCON technology.

1994

- All IBM 3380-AD4 disk drive were urgently replaced with 3380-AJ4 units due to a world-wide problem discovered with their bearings wearing out prematurely. IBM assisted greatly with this.
- Fibre Optic link ("DATAVAULT") established between Ultimo and Granville. This link was used solely for ESCON and enabled the replacement of the slower Hyper Channel inter-site communication equipment. . This in turn, also freed up Microwave capacity.

1996

- First IBM RAMAC disk drives installed, intended to replace the 3380 disk units. These devices employed 'RAID' technology, which meant they employed inexpensive PC style Hard disks, with built-in redundancy to achieve the reliability required for the Mainframe environment. This technology allowed increase to disk capacity one 11GB drawer at a time.

1997

- 2 X IBM 9672-RB5 CMOS processors installed, one at Granville and one at Ultimo. These were 2 way machines rated at 89 Mips with 2GB main STOR allocated per LPAR (logical Partition) this was a major change in Processor strategy, with the 'coming of age' of CMOS technology, and brought to TAB very significant operational cost savings. The intersite escon link (installed in 1994) allowed for the Processor at one site to back up the Processor at the other site, in real time.
- The FMIS ("SAP") project commenced. This required the installation of two IBM RS/6000 processors, a model F40 and a model F50. Complete with the requisite disk units etc.

1999

- IBM 3590 (4 of) Tape drives installed at Ultimo. These High-speed, high capacity density (10GB/cartridge), new generation tape drives were needed to back up the data from the ever-increasing disk storage units.

Control Centre

- (93) many enhancements to Austext, Footytab and other Wagering activities
- (Nov'93) Syco Sub-system replaced Race Day Control Sub-system.
- (dec'97) New Race day Business centre opened

Sale Outlets (incl. Account betting)

- (May'91) first FLIGHT mark sense terminals went live.
- (Jan '92) First 40 'office printers' (very modestly priced AEG OLYMPIA NP136s) were delivered to trial outlets (mostly branches). These were destined to print race result sheets over night, as well as being able to do 'screen dumps' from the attached Flight Terminals. The overnight printing is achieved via IBM software product RSCS which was already in place for Head Office printing.
- (FEB '92) all TAB outlets were equipped with Flight Terminals.
- (June '92) Remainder of outlets received their (customer setup) office printer kits and overnight printing of race results commences.
- (March '97) First INTERNET Bet sold.

From 2000-04 *the looming obsolescence of SNA and the consequent rise of TCP/IP (ABC, EUREKA, HALO) resulted in greatly increased requirement for CPU power. WISE, PIMS and HALO systems all pressure the introduction of HDS 9980V disk storage facilities. A lot of to-ing and fro-ing takes place in the Mainframe arena. At the end of this period, TAB Limited is taken over by TABCORP.*

2000

Computer Room ("Data Centre")

- WISE development starts. This Project, managed by Computer Associates, entails the development of a new WINTEL & IBM RS6000 (later called

I/Series) based Wagering Information System. Employing a lot of Computer Associates' newly acquired knowledge processing software. ("Forest and Trees, Platinum, Nugents, etc). This system was envisaged to provide a much more attractive user interface to that then provided by the existing Mainframe-based one. This WISE system necessitates the installation of the following equipment:

- IBM Netfinity 4500 server (2 of) – Testing and OLAP servers
- IBM Netfinity 5000 server - Geographic Information System
- IBM Netfinity 5500 server META data server
- IBM Netfinity 7000 server – WISEETL: Home of most of the CA products themselves...
- IBM RS/6000 H70 WISEEDW this is the DATA Warehouse (sic) itself.
- IBM RS/6000 44P WISEDATAMART. "Data marts" were sales information in pre-digested format.
- EXABYTE EX200 TAPE Library – required backing up the large amounts of data planned to be kept in the EDW.
- IBM 3490-E02 (2 of) Tape drive that could read PhoneTAB and Cashbet log tapes, in order to load their daily ticket data into WISE
- A Loan HDS san unit (a 9100) leased from Hitachi Data Systems.
- Migration of PhoneTAB to the TCP/IP-based ABC terminals was in full swing.
- The IBM 9672-RB5 at Ultimo was upgraded to a full speed R25 model, an upgrade from 89 MIPS to 117 MIPS. This was in anticipation of much higher loading caused by the direct connection of TCP/IP based ABC terminals, as distinct from via the 3475/6 communications controller in the case of the previous SNA-based RT4 terminals. – Subsequent measurement revealed that the RB5 could not have managed the 2000 Melbourne cup.

2001

- 2 x IBM RS/6000 F80 are installed, upgrading the Board's SAP system in preparation for the forth-coming PIMS (Personnel Information System). PIMS is an implementation of the H.R. component of SAP, customized for TAB.
- The PhoneTAB NLSR (Natural Language Speech Recognition) system is implemented. This consists of some 70 or so Compaq (later to become HP) DL380 servers, which communicated with the PhoneTAB system via TCPIP. These servers occupied nine racks, installed in the Ultimo Computer room.
- The IBM 9672-R25 at Ultimo was replaced with an IBM 9672-R26, taking Ultimo's MIPS from 117 to 219. This was required in anticipation of the 2001 Melbourne cup. (Yet greater load being placed by TCP/IP as all PhoneTAB terminals were using that Protocol, as well as the 200 new "EUREKA" cash betting terminals that had been installed in PUB tabs.) Like previous year, subsequent measurement proved that the model R25 could not have handled the 2001 Cup.

- The displaced IBM 9672-R25 was moved to the Granville Data Centre, in preparation for projected increases in CPU requirement out there, now that the EUREKA conversion was progressing well.

2002 *The following five bullet points are all as a result of the EUREKA (and hence TCP/IP) Conversions of all remaining Cashbet Outlets.*

- The IBM 9672-R25 that had been shipped to Granville was put into production (taking over from the 9672-RB5 that was already there.)
- Given the imbalance in load between the Ultimo Processor (all of PhoneTAB, plus 50% Cashbet) and the Granville Processor, (50% Cashbet), a number of Cashbet outlets were shifted to from Cashbet' (at Ultimo) to Cashbet 'A' (at Granville.).
- The IBM 9672-R26 at Ultimo was temporarily upgraded to a 3 three way model RC6, rated at 311 MIPS. This was an IBM 'loan' and was in preparation for:
- The installation of z/800-002 (+IFL) at Ultimo (two way processor, 334 MIPS, 8GB Main Storage) with an additional 181 MIP processor (the IFL) dedicated to running LINUX only.
- The installation of an identical z/800 at Granville. Note: this configuration (z/800-002s at each site) successfully handled 2002 Melbourne cup with 100% TCP/IP terminals. (Both PhoneTAB and CASHBET).
- Hitachi Data Systems (HDS) 9980V storage facility was installed at Ultimo. This device was initially configured with 6 Terabytes (6,000 GB) of disk storage. It displaced the rented HDS unit being used for WISE, the forth-coming HALO Internet Betting system, as well as the SAP systems, and, later all of the Mainframe disks at Ultimo.

2003

- A second HDS 9980V was installed at Granville. This unit had less disk storage configured: 2 Terabytes. This unit replaced all Mainframe disks at Granville, plus it provided disaster backup capacity for critical Ultimo data storage.
- IBM P Series P670 (a large mid-range unit) was installed to facilitate the WISE project.
- Mainframe disk data was migrated onto the HDS units, this displacing the RAMAC units.
- New increased capacity Fibre links between Granville and Ultimo were installed, utilising "Diverse Routing". This theoretically eliminated any single point of failure with the inter-site communications. It also eliminated the 'data vault' service. That was introduced in 1994 (q.v.). Apart from handling the Mainframes' ESCON traffic between the sites, this facility, apart from any other functions not relevant to this document, also linked the two HDS 9980vs together, providing real-time disk mirroring between the sites, thus providing the potential for full 'HOT SITE' disaster recovery.

2004

- The validity of running a Linux-based TCPIP front end (in that IFL) was shown via load testing. The decision was taken to 'down grade' both z/800's to model 001s (except for spring racing carnivals). This resulted in a significant reduction on Software licensing fees. The subsequent 'upgrading' and 'down grading' of both z/800's is not noted further. Suffice to say, this ability to tailor the machines' capacity to TAB's requirements brought about considerable cost savings.
- March: After much testing and development, the Linux based front end (or Host Access gateway a.k.a. "H.A.G.") was implemented.
- July 2004 TABCORP achieved takeover of TAB Limited.

Sale Outlets (incl. Account betting)

- PhoneTAB: ABC TCP/IP terminals replace the GI RT4s; NLSR speech recognition system is implemented. Minimum value bets for operator assistance is introduced.
- Cash outlets: TCPIP/Based EUREKA terminals replaced FLIGHT terminals in all sales outlets. "Office Controller" (TAB supplied IBM PC and Kyocera Laser printer) were supplied to all sales outlets.

From 2005-08 *Halos were fully operational. Major focus of this period was the shifting of all 'live' wagering hosts to Melbourne.*

Computer Room ("Data Centre")

2005

- The new HALO internet betting system, live in March, started making inroads into TAB's internet traffic. In June, it accounted for 20-25% of the older OS/2 based NETTAB system. The HALO system consisted of about 70 servers, most of which were DELL 1750 and 1850 Dual processor machines. They take up 6 full racks in the Computer Room at ULTIMO.

2006

- After the TABCORP Takeover the previous year, most SAP applications were shifted to Melbourne Head office.
- Feb: NETTAB was finally switched off, leaving HALO as the sole Internet Betting Facility.
- September: TABCORP milestone 6A is implemented, this results of the decommissioning of PhoneTAB in favour of the Melbourne based BRAVO/CAM systems, and the elimination of TABFO (replaced by Spectrum) and the introduction of HALO2.0, which talked to BRAVO/CAM in lieu of PhoneTAB.
- R.O.D. (Retail Outlet Deployment) was proceeding, with NSW sales outlets being swapped off the Cashbet systems and connected to the NSW version of Bravo.

2007

- August: last Cashbet-connected sales outlets were swapped over to BRAVO. The Cashbet systems were now surplus to requirement.

- December: Syco functionality ceases.
Contract awarded to HAL Data Systems for the removal and disposal of all remaining Mainframe equipment installed at Ultimo and Granville.(as well as the Granville HDS 9980V which was being used solely for the Mainframe there)
- Ultimo Data centre now housed KENO, NLSR, HALO and Disaster Recovery equipment for Melbourne.
- Granville Data centre still housed the SUN servers, which enabled the Account betting ABC terminals to function. There was some D.R. equipment for KENO, and the Bulk of NSW cash sales traffic was still routed to Melbourne via equipment at this site.
- June 2008.... Significant shortfall in availability of UPS power at Ultimo was experienced.

Control Centre

- Sep '06: Majority of function transferred to Melbourne Race day Business Centre after Milestone6A 'goes live'
- Nov'07: remaining function ended. Race day Business Centre in Ultimo closed.
- Dec '07 the SYCO system was now defunct.

Sale Outlets (incl. Account betting)

- September '06: PhoneTAB (a.k.a. Account Betting) all terminals (ABC, NLSR and HALO) now communicated with BRAVO and CAM. The PhoneTAB system was defunct. .
- August '07: Last NSW cash outlets were now connected to BRAVO system. The Cashbet systems were now defunct.