



St-13 Patient Entertainment System ICT Standard

Version 2021.1.0-Approved



Please Read

IMPORTANT COMPLIANCE REQUIREMENTS

Note: The following instruction applies to all documents in this library.

1. This is a controlled document and is reviewed every two years. The last review was carried out in March 2020. If you are viewing this document after March 2021, you will need to contact the sender to confirm you are working from the latest revision.
2. It is the responsibility of the contractor/vendor to read and adhere to the procedures, processes and guidelines set out in the following document when quoting for or carrying out work for the ACT Public Health System Sites.
3. If you have questions or require clarification of any of the procedures, processes or guidelines in the following document please contact the sender of the document in writing with your questions so that a formal response can be provided. If any specific requirement is unclear, it is expected that clarification will be sought from the ACT Public Health System's Digital Solutions Division (DSD) Critical Systems Infrastructure (CSI) Hub - Information Communications and Technology (ICT) architect(s), rather than a decision made and a design implemented and based on unclarified assumptions.
4. These standards are applicable to ALL ACT Public Health System Sites or any work funded by ACT Health Directorate (ACTHD) (e.g. Calvary, ACTHD provided NGO sites) unless specifically exempt.
5. All Greenfield ACT Public Health System Sites are expected to be fully compliant with all appropriate standards.
6. Brownfield ACT Public Health System Sites undergoing refurbishment should be fully compliant unless an exemption is provided by DSD's CSI Hub.
7. In the event of any design non-compliance issues, a Departures document must be completed and submitted to DSD's CSI Hub. These issues should be resolved, in consultation with DSD's CSI Hub, as soon as possible within the project process and explicitly prior to site handover.

While some test cases have been cited within these documents as examples, the list is not exhaustive, and all appropriate test procedures shall be formulated, approved prior to testing and testing shall be performed by the client system administrators before full acceptance can be signed off by the Senior Director CSI Hub.

IMPORTANT:

Any departure from the standard, whether intentional or in error shall require a completed Departures Document to be submitted to DSD's CSI Hub for approval.

Any non-compliant designs without a pre-approved Departures Document by completion of the project or a nominated milestone or gateway, will require remediation by the Head Contractor at the Head Contractors cost.

Document Control

(to review detailed document updates [click here](#))

| Version | Summary of Changes | Author | Date |
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| 2020.1.0 | Release version | Nitin Saxena | 30/03/2020 |
| 2020.1.0 | Review-make doc consistent with PO's comments of other docs | Alkesh Hemrajani | 21/12/2020 |
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Document default review cycle

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| Senior Director, CSI Hub | , CSI Hub, Technology Operations, DSD ACTHD |

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1. Introduction

This document forms part of a suite of documents that describe ICT specifications and standards for the ACT Public Health System's, Non-Clinical Critical ICT Infrastructure support systems. It provides the ICT Specifications for Patient Entertainment System applicable to green-field and refurbished brown-field sites.

The Patient Entertainment System (PES) provides Free-to-Air television services streamed to a Light-emitting Diode (LED) or Liquid Crystal Display (LCD) television panel positioned for optimal patient comfort. The televisions are smart hospitality which integrate into the ACT Public Health System's Internet Protocol Television (IPTV) system.

The service is controlled by the patient using the latest version of the Nurse Call handset which also provides audio via the handset at the patient bedside to ensure discretion

The basic solution is a media and management server that provides a point of origin for streaming services to the display via the hospitality television. The content and panels are controlled using the nurse call handset or a television remote in common areas.

1.1. Purpose

The purpose of this document is to provide a set of standards for the design of Audio-Visual (AV) for patient rooms and other common areas in a ward or clinical space throughout ACT Public Health System's Facilities. It provides a summary of recommended technologies for several room types, along with various requirements for those technologies that can assist in the fit out of both new and existing spaces. There is an attempt to not be too prescriptive. The intention is to provide a simple list of room specifications which can be easily replicated across various sites. This will ensure that a common user experience is maintained across all the rooms or space instances while also ensuring the highest level of interoperability and supportability. The intention is to provide architecture and design guidelines which can be easily replicated across the beds within all ACT Public Health System's patient wards to ensure that a common user experience is maintained with respect to this solution. Additionally, this document shall provide a set of procedures for the procurement, installation and configuration of a display panel and media player to provide an instance of a PES.

1.2. Disclaimer

The following document provides ICT ONLY specifications and requirements for the PES throughout ACT Public Health System's Facilities and is by no means intended to cover all the comprehensive business requirements for the system. Additional business and user requirements will be presented in project specific documentation such as Business Requirements, Solution and Detailed designs.

2. Executive Summary

The specifications provided in this document are based on standardising architecture and integration for Patient Entertainment System across all the ACT Public Health System's sites. This architecture will provide the building blocks for a consistent implementation of systems for the ACT Public Health System's Facilities. Additionally, it provides the benefit of installations that have standardised configurations across the Directorate, enabling reusable patterns and repeatable system implementations. Applying consistent modular Internet Protocol (IP) head-end architecture will minimise the risks associated with ongoing support for disparate and replicated Master Antenna TV (MATV) implementations. This in turn simplifies future installations and upgrades whilst reducing ongoing maintenance costs and allows for progressive implementation of selective end user requirements.

Other advantages with this system are that it provides an open platform for easy integration of any required web browser, based applications or additional capability for the delivery of secure applications via Citrix. Starting with a basic Free-To-Air (FTA) Internet Protocol TV (IPTV) implementation, these services could be added incrementally over time and available through consumer owned or hired handheld devices.

This document provides specifications for systems that constitute various elements of PES which can be delivered either via bedside terminals or via non interactive terminals in public areas.

Implementation of any PES component should form part of an all-encompassing ACT Public Health System's site audio video distribution system (currently Exterity) and be integrated into all areas where patient entertainment needs to be provided.

It is expected that these entertainment services will be accessed via IP devices of different types. The design of these component systems should provide a consistent user interface which is both intuitive and easy to maintain. As such, the PES headend would provide the means to bring to the consumer a range of seemingly disparate services into a single unified front-end application.

Whilst PES is not a critical system, it will use network infrastructure that is compliant with the Medical Grade Network (MGN) architecture. The MGN architecture can be summarised as modular, Highly Available (HA) and resilient network which minimises the impact of a network component failure on ACT Public Health System's site systems. The architecture also provides sufficient capacity, to allow for growth in the form of additional PES components.

Note: Currently IPTV services are provided through Exterity devices or dedicated IPTV.

3. Architecture

The architecture presented within this document complies with the Architecture Principles (AP) as follows:

- AP1.** Control technical diversity to minimise the non-trivial cost of maintaining expertise in and connectivity between multiple systems;
- AP2.** Maintaining interoperability between systems to conform to defined standards that promote benefit to the business;
- AP3.** Commissioning systems to a defined level of availability, recognising increasing demand for services to be provided outside of traditional office hours. The system availability also considers the lack of tolerance for system outage over longer periods of time;
- AP4.** The architecture should cater for the lowest tolerance level. A Service Level Agreement (SLA) with each business unit will help prioritise the restoration of services in the event of a system failure;
- AP5.** The systems must be manageable remotely and be monitored;
- AP6.** Use of common systems for head-end and building concentrator layers throughout the ACTHD is preferred rather than use of separate vendor systems performing identical tasks; and
- AP7.** The systems must be able to adapt to change and growth. The architecture modularity allows for individual components to be upgraded without replacing the entire system.

The following Technology Principles (TP) are also applicable:

- TP1.** Interface between head-end and building concentrator (if it is used) will be IP;
- TP2.** Interface between endpoint devices and the head-end will use industry standards for IT and Audio Visual to support the PES (e.g. HDMI/MP4); and
- TP3.** In systems where the concentrator component of the architecture is in two parts (i.e. one of the two components is not IP), the interface will be an approved network/protocol standard (e.g. HDMI/MP4).

3.1. Two-Tiered Model

The preferred architecture model implemented at the ACT Public Health System's site complies with a two-tiered modular approach. The tiered model is based on the principles of hierarchy, modularity, resiliency and flexibility.

This model consists of two tiers, head-end servers/appliances and endpoint devices, which support a hierarchical and modular approach. The head-end tier within this model are intended to provide high levels of resiliency and availability over an IP network. The model also provides the flexibility of leveraging existing endpoint infrastructure, where practical (e.g. TVs with appropriate interfaces).

PES must be compatible with IP networks and should be able to leverage ACT Government layer-3 network infrastructure to enable effective distribution of audio-visual material.

The ACT Government network architecture has been provisioned to comply with the MGN architecture which supports the principles outlined previously, providing a robust and resilient network that supports all PES elements mentioned in this document.

Endpoint devices for most systems (supporting IP) will connect directly into the ACT Government network switches, which provide connectivity over the network to the head-end infrastructure. The head-end infrastructure is expected to comply with the standards outlined for either the two or the three-tiered system architecture. Infrastructure must support routing of protocols without resorting to broadcasting.

Note: MATV only implementations with distributed endpoint devices (either coax or TVs with RF baluns) will not be acceptable.

3.1.1. Head End Infrastructure

The PES head-end infrastructure will be composed of modular IP components providing different functionality and is expected to be deployed in a highly available model, whereby a set of primary and secondary systems will be provisioned. In the HA configuration, the secondary appliance must be ready to assume the primary role in the event of the failure of the primary appliance. The fail-over is expected to be automatic in order to minimise the impact on system users. The High Availability of the Free-To-Air channels will be provided via redundant SAP announcements over IP via 2 disparate geo-isolated TV Gateway servers. The TV Gateways are not redundant but provide 2 simultaneous identical streams which are made redundant via the end devices.

The primary and the secondary systems must be built to the same specifications (i.e. same model appliance, capacity, etc.) and must operate on the same level of software including patches. It is expected a heartbeat will be maintained between the two systems and failover will take place when the secondary system does not receive a configurable number of heartbeats from the primary. This heartbeat, must occur at both the transport level and the application level.

The primary and secondary systems may present a Virtual IP (VIP) address to the endpoint devices accessing the head-end appliances.

These system Servers/Appliances will support the following capabilities:

- Geographically separates physical locations;
- Automatic failover from primary to secondary system;
- Manual failover capability; and
- System support over Layer-3 IP network.

This infrastructure will be located within separate ACT Government data centres or communication rooms that are located in geographically disparate locations in ACT. Connectivity between the locations have been provisioned over ACT Government layer-3 IP network. ACT Government, own and maintain their own state-wide high-speed optical

network. The delays and timing issues usually associated with traversing third party networks is not an issue for non-campus-based devices.

The primary and secondary head-end infrastructure should be able to leverage the ACT Government layer-3 IP network. DSD's CSI Hub through ACT Government's Digital, Data and Technology Services (DDTS), will allocate the public IP addresses used by the system to communicate with other Health systems. This means that generic pre-set IP addressing of preconfigured devices will not be suitable. In the event the system has a requirement to use a private network, this information should be provided to the project team. The primary and secondary servers will present a Virtual IP (VIP) address to the devices accessing the head-end appliances. The individual IP addresses allocated to the appliances will not be exposed to other devices.

The head-end infrastructure will provide the following functionality:

- Support IP connectivity;
- Capable of supporting Virtual Local Area Network (VLAN) to system specific network traffic from other systems;
- Capable of supporting 802.1X authentication protocols;
- Support highly available servers operating in primary and secondary configuration;
- Individually, primary and secondary server infrastructure should be able to support the entire ACT Public Health System's site system specific requirements. Hence, in the event the primary servers are inoperative, the secondary servers should be capable of supporting the functionality and capacity provided by the primary servers;
- The failover from the primary to the secondary should be automatic without any intervention. The vendor should state the length of time taken (and mechanism) to failover from primary to secondary system;
- The failback from the secondary to the primary should be configurable to be either manual or automatic;
- The system must be able to send alerts, via emails or other means, to the nominated personnel when the secondary servers assume the role of primary servers;
- Maintain logs which record system errors and events such as date and time of configuration changes, synchronisation status with the secondary system, primary system fails over to the secondary system, etc;
- The primary and secondary appliances must be capable of synchronising configurations when a change is implemented. The synchronisation should be configurable to be automatic or manual;
- Must be able to synchronise time with the ACT Public Health System's Network Time protocol (NTP) servers;
- Should integrate with other IP-based services (e.g. Web based services); and

- Provide reporting features (including access and usage of content by individual consumers).

3.1.2. Building Infrastructure

It is expected that all endpoint devices will be IP based. As such there should not be a requirement for the site-based building concentrators.

Note: All cabling should be CommScope Systemax CAT 6_A between the wall outlet and rack in Communications Room as per the current ACT Public Health System's standards.

3.1.3. Endpoint Devices

Endpoint devices will be connected to services directly over the ethernet network:

- IP devices requiring IPTV functionality, will access the head-end infrastructure directly via the ICT network; and

It is expected that the endpoint devices will:

- Be physically robust and able to withstand regular use over its lifetime;
- Are Exterity conformance tested third party LED/LCD Hospitality Smart Televisions;
- Have mounting brackets/arms suitable for the area where the device is being installed;
- Support High-Definition displays (1920 x 1080 resolution) or greater;
- Support CEC control over HDMI or RS232 control availability;
- Support PES Portals provided via Exterity (ArtioGuest and ArtioPortal);
- Provide a 3.5mm audio jack for integration with the nurse call system at patient beds;
- Support IP connectivity and have at least one Ethernet connection (for connection to internet/IP networks) – may be wired/wireless depending on application;
- Support capability to restrict access to content (i.e. limit channels available in sensitive areas – such as children's and mental health areas);
- Be controlled by a nurse call handset at the patient bed or treatment space and use a television remote control in all other spaces such as common rooms or staff stations.

Depending on the application/usage, consideration should also be given to:

- Enclosed in a tamperproof casing (e.g. for areas such as Mental Health);
- Infection control – ease of cleaning the device (especially the remote control) due to infection control requirements;
- Support Ultra High-Definition displays (3840 x 2160 resolution);

- Display size – patient waiting areas to have appropriately sized displays with both landscape and portrait mode capability (e.g. 55” or greater);
- Teletext, Closed Captions or other methods of supporting the hearing impaired or low volume environments;
- Support a variety of physical interfaces (e.g. HDMI, USB-C, DisplayPort, etc);
- Support a variety of wireless interfaces (e.g. Bluetooth, Wifi); and
- Support alternate interfaces to provide people with a physical impairment access to services provided by PES e.g. Disability handset.

Note: This is a guide only. Each implementation should be customised to suit the specific requirements of that environment and approved by DSD’s CSI Hub.

3.2. Exceptions and Exemptions

Any departure from the above architecture, shall only be accepted when a full assessment of the system has been completed by the DSD’s CSI Hub, endorsed by ACT Public Health System and shown to provide an acceptable alternate architecture model after technical, operational and risk assessments have been satisfied.

A departure document must be completed by the head contractor and provided to the CSI Hub team for assessment prior to proceeding with the implementation of the system at the site.

The existing systems will not be required to undergo an assessment, unless they are not compliant with the architecture principles outlined in this document.

4. Design Recommendations

4.1. Patient Entertainment System Procurement

All procurements for the display panel, the media player and other equipment will be managed, or a list of preferred suppliers will be provided by members of the DSD's CSI Hub.

4.2. Endpoint Equipment

For an instance of a PES to be deployed, the following equipment must be procured and services available:

- A 32 or 55 inch LCD/LED hospitality display (depending on the use case) if mounted on a wall at foot of the bed at a patient bed;
- A 32 (or larger) inch LCD/LED hospitality display when mounted from the ceiling on an arm at the patient bed;
- For a full list of compatible televisions, refer to Appendix B;
- If the panel is to be “hung” from the ceiling, a Vogel ceiling mount of suitable size will need to be procured whilst wall mounted instances will make use of an angled mount wall bracket;
- The television panels will utilise Hospitality displays which support native support to directly connect to the Exterity IPTV system to use ArtioGuest and ArtioPortal;
- A double General-Purpose Outlet (GPO);
- Dual network/data connections to provide network access for the Hospitality Smart TV; and
- If the display is ceiling mounted, the services will terminate in the ceiling space directly above whilst with wall mounted instances they will be located just above the panel.

4.3. Headend Configurations

The following headend infrastructure resources and services must be configured:

- The power supply will be connected to a non-essential power circuit; and
- The network switch port to which the television is attached/connected must be configured for access to the ‘Devices’ network;
- The switch stack will need to be configured for Internet Protocol (IP) multicast and have Dynamic Host Configuration Protocol (DHCP) enabled for the ‘Devices’ network;
- The Hospitality Smart Television will need to be configured as an ArtioGuest endpoint and will need to be assigned to the PES group for a specific ward where it will be deployed

4.4. Installation of the Panel

The Patient Entertainment and Information System solution will be deployed to each bed and will be either installed as a ceiling or wall mounted instance. The following must be considered:

- The size of the panel to be installed is dependent on its location and mounting type.
 - If the panel is ceiling mounted the 32-inch sized screen will be used to ensure adequate head room; and
 - The 55-inch unit can be used in a wall mounted instance provided there is adequate room;
- The connections for this solution are as follows:
 - The panel is connected to the power using the GPO;
 - The Hospitality Smart Television is connected to the network using a CAT 6_A Reduced Diameter patch lead (refer to St-2 Communications and Cabling Infrastructure for further information).
 - The nurse call system will be connected to the panel via a serial interface or via an IR blaster.
- Wherever possible, the shortest cables shall be employed to provide the easiest cable management; and
- The nurse call controller will connect to the panel via an infrared (IR) based connection and control of the Exterity device is unit achieved using a CEC connection from the display panel to the Exterity unit.

Appendix A – Document Details

Abbreviated terms and definitions

| Glossary of Term | Definition |
|------------------|---|
| ACT | Australian Capital Territory |
| ACTHD | ACT Health Directorate |
| AP | Architecture Principles |
| AV | Audio Visual |
| CHS | Canberra Health Services |
| CEC | Consumer Electronic Control |
| CSI | Non-Clinical Critical Systems and Infrastructure – A department of Digital Solution Division, ACTHD |
| DDTS | Digital, Data and Technology Solutions |
| DHCP | Dynamic Host Configuration Protocol |
| DSD | Digital Solutions Division- A division of ACTHD |
| FTA | Free-to-Air |
| GPO | General Purpose Outlet |
| HA | High Availability |
| HDMI | High-definition Multimedia Interface |
| ICT | Information and Communications Technology |
| IP | Internet Protocol |
| IPTV | Internet Protocol Television |
| IR | Infrared |
| LCD | Liquid Crystal Display |
| LED | Light-emitting Diode |
| MATV | Master Antenna Television |
| MGN | Medical Grade Network |
| NTP | Network Time Protocol |
| PES | Patient Entertainment System |
| POE+ | Power over Ethernet Plus |
| TP | Technology Principles |
| UTP | Unshielded Twisted Pair |
| VIP | Virtual Internet Protocol |
| VLAN | Virtual Local Area Network |
| VoWiFi | Voice over WiFi |
| WAP | Wireless Access Point |

Appendix B – Hospitality Smart TV List

| Manufacturer | Model |
|--------------|---|
| Samsung | AT690 Series, AT790 Series and AT890 Series |

Amendment history

| Version | Author | Summary of Changes | Date |
|----------|--|---|------------|
| 2020.0.1 | Document creation | Manfred Kahl | 17/02/2020 |
| 2020.0.2 | Peer Review | Nitin Saxena | 23/03/2020 |
| 2020.1.0 | Review -make doc consistent with PO's comments of other docs | Alkesh Hemrajani | 22/12/2020 |
| 2020.1.0 | Patrick Premnath | Reviewed and updated. | 30/03/2021 |
| 2021.1.0 | Alkesh Hemrajani | Reviewed and updated for consistency of Non-Technical language. | 30/03/2021 |
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Appendix C-Details of changes

| Version | Last Modified date | Author Name | Summary of changes | Section No. | Section Details | Page. No. | Revision/Changes Made |
|----------|--------------------|------------------|--------------------|-------------|-------------------------------|-----------|--|
| 2020.1.0 | 30/03/2020 | Nitin Saxena | Update | | For Approval | | Updated VESDA Isolation switch details |
| 2020.1.3 | 16/12/2020 | Alkesh Hemrajani | Reviewed as per PO | | Review | | Reviewed the docs per PO's comments |
| 2020.1.3 | 16/12/2020 | Alkesh Hemrajani | PO's Comments | | Main Page with picture | 1 | Removed page footer words |
| 2020.1.3 | 16/12/2020 | Alkesh Hemrajani | PO's Comments | | Blank page removed | 2 | Blank page has been removed |
| 2020.1.3 | 16/12/2020 | Alkesh Hemrajani | PO's Comments | | Please Read | 3 & 4 | Non-Technical words and Font formats has been changed |
| 2020.1.3 | 16/12/2020 | Alkesh Hemrajani | PO's Comments | | Document Control | 5 | Non-Technical words and Font formats has been changed |
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| 2020.1.3 | 16/12/2020 | Alkesh Hemrajani | PO's Comments | | Document Owner | 5 | Non-Technical words and Font formats has been changed |
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| 2020.1.3 | 16/12/2020 | Alkesh Hemrajani | PO's Comments | 2 | Executive Summary | 9 | Technical and Non-Technical words has been changed |
| 2020.1.3 | 16/12/2020 | Alkesh Hemrajani | PO's Comments | 3 | Architecture | 11 | Font formats has been changed |
| 2020.1.3 | 16/12/2020 | Alkesh Hemrajani | PO's Comments | 3.1 | Three-Tiered Model | 11 | Three-Tiered name has been changed to Two-Tiered Model |
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| 2020.1.3 | 22/12/2020 | Alkesh Hemrajani | PO's Comments | 3.1.3 | EndPoint Devices | 14 & 15 | Technical words and Font formats have been updated |
| 2020.1.3 | 22/12/2020 | Alkesh Hemrajani | PO's Comments | 3.2 | Exceptions and Exemptions | | Non-Technical words has been changed |
| 2020.1.3 | 22/12/2020 | Alkesh Hemrajani | PO's Comments | 4.1 | Patient Entertainment System | 16 | Non-Technical words and Font formats has been changed |
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| 2020.1.0 | 30/03/2021 | Patrick Premnath | Technical Updates | 4.3 | Headend Configurations | | Technical words have been changed |
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