

V13 ODP Requirements as at 30 June 2023

PUNGGOL DIGITAL DISTRICT
OPEN DIGITAL PLATFORM REQUIREMENTS

PART A

1. INTRODUCTION

- 1.1 Jointly developed by JTC and GovTech, a Smart District Operating System, the Open Digital Platform (ODP) will be deployed at Punggol Digital District (PDD). The ODP allows inter-connected systems to share estate related data, control functions and provide an abstraction layer for smart business and social applications to connect to selected PDD systems, such as the systems for the lifts, doors, cooling system, lightings, car parks, etc.
- 1.2 The ODP will be used to meet the sustainability targets for PDD and to facilitate co-creation effort(s) in the development of a Smart City. This includes the use of the ODP to manage the common spaces within PDD, the PDD Living Lab Programme, and to serve other public and other Estate related processes in PDD. Further details of the ODP are set out in Part B below.

2. INTEGRATION WITH THE OPEN DIGITAL PLATFORM

- 2.1 Unless otherwise required by us, throughout the Lease Term, you agree to –
- 2.1.1 participate in our initiatives for the development of a Smart City, so that our sustainability, efficiency, and innovation objectives for PDD are achieved.
- 2.1.2 work with JTC to install, in the Property, smart electrical, water, BTU / gas meters that are based on open protocol communications standards within the Property and ensure that real time energy data can be ingested to the ODP via PDD's BMS to monitor the Property's utility consumption.
- 2.1.3 seek our approval if you plan to deploy robots and/or drones in common areas and facilities. A proposal including but not limited to the following details is to be submitted to JTC for governance purposes:
- (a) Mechanisms put in place to prevent collision of robots with human, or other robots sharing the common areas and facilities;
 - (b) Navigation path of the robots;
 - (c) Infrastructure requirements for deploying the robots to common areas;
 - (d) Mechanisms put in place to communicate with the ODP during emergency, and ensure robots deployed within common areas and facilities proceed to designated parking location during emergency;
- 2.1.4 You are required to work with us for integration with the ODP if the robots require access to the office towers through verticals such as but not limited to lifts, turnstiles and doors.
- 2.1.5 obtain mutual approval for all proposed smart systems to be interfaced to the ODP or from the ODP to your digital platform.

Optional – Specifications for ODP integration

- 2.2 Throughout the Lease Term, you may consider integration with the ODP including but not limited to the following smart systems should you choose to install them within your Property, subject to our approval: -

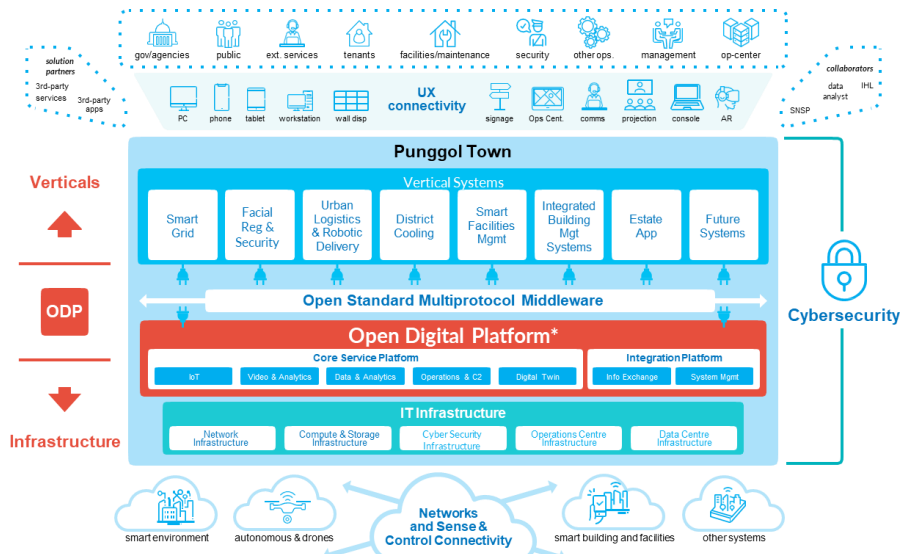
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- (a) Aircon systems with temperature and controls;
 - (b) Smart Lighting systems with occupancy sensors and/or lighting controls;
 - (c) People Counting Sensors; and
 - (d) Facial Recognition solutions
 - (e) BTU meters used for chilled water consumption.
- 2.2.1 The integration will enable monitoring, controls, and interoperability of the systems between the ODP and your smart systems. Refer to Clause 3 for protocols available for integration.
- 2.2.2 You are required to allow pre-commissioning and post-implementation testing of the smart systems to be interfaced with the ODP on mutually agreed timeline, your agreement not to be unreasonably withheld.
- 2.2.3 You are required to ensure your attendance and that of your Licensed Electrical Workers or other qualified persons (if required), for the testing or commissioning of your smart systems which are required to interface with the ODP, if so required.
- 3. The data collected-
 - 3.1 by us, from your smart systems listed in 2.2 above to the ODP; or
 - 3.2 by you, from the ODP to your smart systems,

shall be accessible through standard open protocols / APIs such as MQTT, REST / RESTful, AMQP and building industry standard protocols such as BACnet, Modbus, OPC, based on data interfaces and data format requirements, to be mutually agreed between us, such agreement not to be unreasonably withheld.
- 4. Any access to the smart systems shall be in accordance with industry standard protocols for authorization, such as but not limited to OAuth 2.0, CIAM, SSO (Single Sign On) and MFA (Multi Factor Authentication).
- 5. Notwithstanding anything herein contained,
 - 5.1 integration of the smart systems shall adhere to international cybersecurity standards such as IEC 62443-4-1, -4-2, -3-3, -2-4, ISO 27001, SOC2, GDPR, PDPA and other Data Privacy Regulations.
 - 5.2 standard SDL practices and testing, including static code analysis, vulnerability scanning and penetration testing, shall be in accordance with industry standards or guidelines set by the relevant authorities.
 - 5.3 Annual Vulnerability Assessment and Penetration Testing shall be conducted by both parties on their respective smart systems, and immediate remediation shall be carried out where the report of such assessment and testing reveals a medium or higher risk.
- 6. Any data collected according to this ODP Requirement can be released and disclosed by either party subject to the prior written consent of the other party.
- 7. The smart system can provide data to ODP, such as, but not limited to the following:
 - (a) Sensor data;
 - (b) System health statuses;
 - (c) Control statuses and feedback;
 - (d) Notification events;
 - (e) Alarms; and
 - (f) Any data deemed necessary for the successful integration of the Tenderer's System with ODP.

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PART B**CAPABILITIES OF THE OPEN DIGITAL PLATFORM****Figure 1: System Architecture of Open Digital Platform**

- 1 The base feature of the digital platform (see *Figure 1*) will be an integrated Estate Operations Centre (EOC) to manage and operate buildings, estates, infrastructure and security. The EOC will monitor the following:
 - (a) **Smart building and estate systems**, including building sensors, security systems, carpark monitoring, autonomous vehicle beacons, smart bus stops, lift monitoring sensors, adaptive traffic lights, and smart utility meters are some of the sensors envisioned.
 - (b) **Facilities management systems**. The Command, Control and Communications (C3) system will allow for integrated monitoring, analysis, optimization, and control at the building and estate level. This allows for reduced manpower requirements and improved energy efficiencies.
- 2 In addition to the EOC, we envision various smart products and services connected to the ODP to allow seamless communication and controls across systems. These systems would include autonomous vehicles, urban logistic systems, district cooling systems or pneumatic waste conveyance systems.
- 3 Selected data from the management systems will be published via an Application Programming Interface (API) for the use of researchers, lessees, licensees and tenants within the estate. This creates a platform on which, lessees, licensees, tenants, researchers, companies and agencies can use to develop digital applications to provide urban solutions and services. This way, the estate can function as a living lab to test and incubate solutions for a next-generation smart district.
- 4 Enhanced services (such as that listed below) that could be enabled by the integration of the ODP could be co-developed with you for your benefit. They can be developed between yourself and JTC's ODP team (or their appointed representative):
 - (a) Energy monitoring and optimization within your premises;
 - (b) Security monitoring and integration of your security system with that of JTC's (at Punggol Digital District);

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- (c) Robotic delivery services (e.g. meal delivery to your doorstep);
- (d) Smart Facility Management and Asset Management;
- (e) Facilitation in emergency response, and fire drills;
- (f) Visitor management and carpark reservation.