intdash Overview
(For intdash All-in-One Users)

intdash All-in-One Version 202209

7th edition (November 2022)
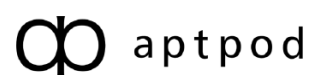
aptpod

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01 What is intdash?

> **Attention:** This document has been translated using machine translation services and may contain inaccuracies and translation errors. Please also refer to the official version in Japanese.

1.1 Industrial IoT platform, intdash

intdash is a bi-directional data transmission platform that stably streams time series data at high frequency intervals of 100 milliseconds to 1 millisecond through unstable networks such as mobile networks and Internet lines.
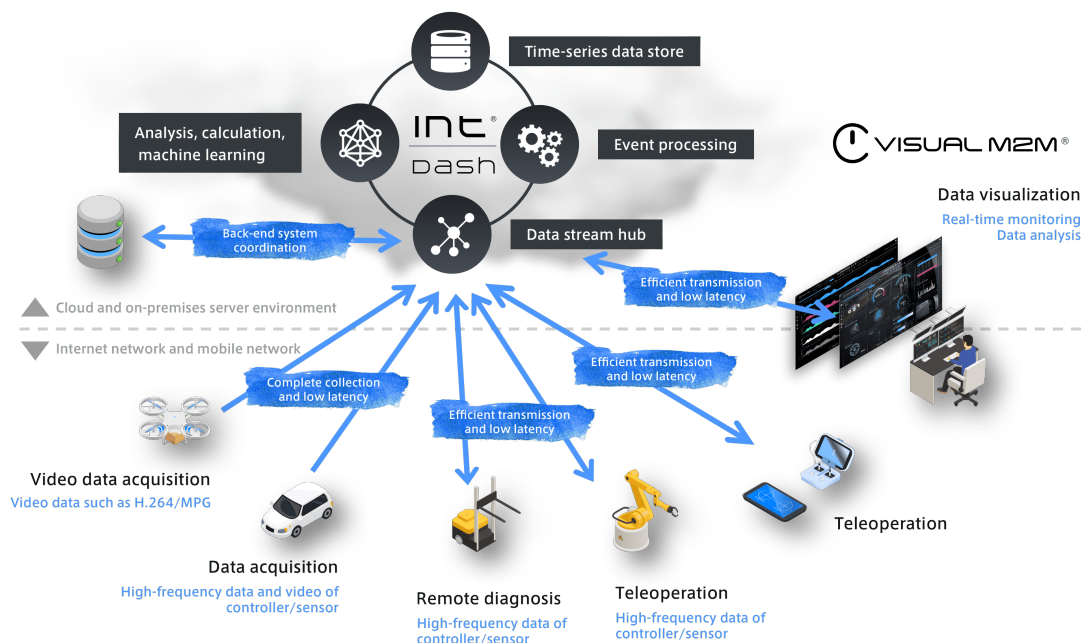
With intdash, devices that generate large amounts of data, such as automobiles, robots, and industrial machines, can be interconnected with each other in real time. Since the data is automatically saved by intdash, you can retrieve the data later and visualize it on the visualization dashboard or use it as data for machine learning.

1.2 Areas of application for intdash

intdash enables the high frequency time series data streaming required for industrial IoT systems. You can use intdash in the following cases.

- Data collection and measurement in R&D and verification processes
- Real-time monitoring of industrial equipment
- Remote fault diagnosis of industrial equipment
- Remote operation of construction machinery, heavy machinery, robots, etc.

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1.3 Aptpod products

intdash consists of server-side middleware (intdash Server) for cloud servers and edge-side middleware (intdash Edge) for edge devices.

Our product line includes a web dashboard (Visual M2M Data Visualizer) that visualizes intdash data, a smartphone application for simple measurements (intdash Motion), and hardware products designed by aptpod to connect various industrial fieldbuses and intdash.

Please visit our website for more information.
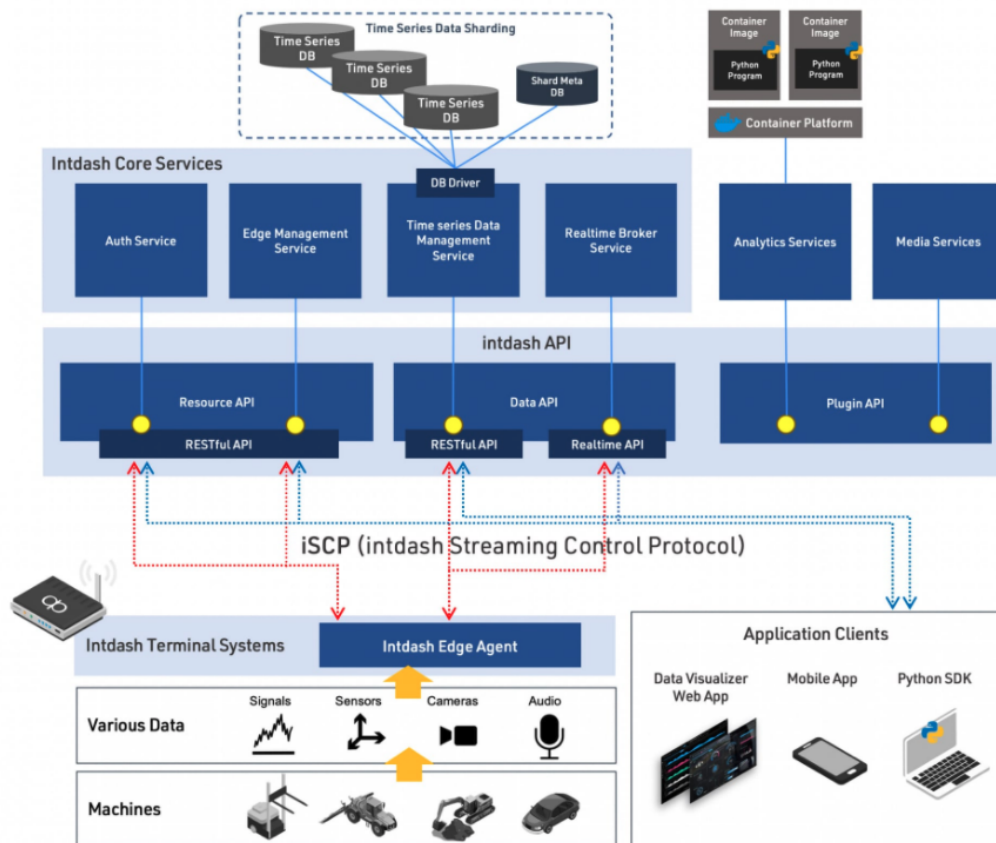
1.3.1 intdash Server

intdash Server is server-side middleware running on intdash cloud servers. Core Services transfer and store time series data and manage connected users and devices. Media Services handles media data such as video and audio. Analytics Services allows you to extend intdash by adding arbitrary function modules.

A machine image in now available on the AWS Marketplace so that you can easily set up and evaluate the intdash Server environment. See for more information.

1.3.2 intdash Edge
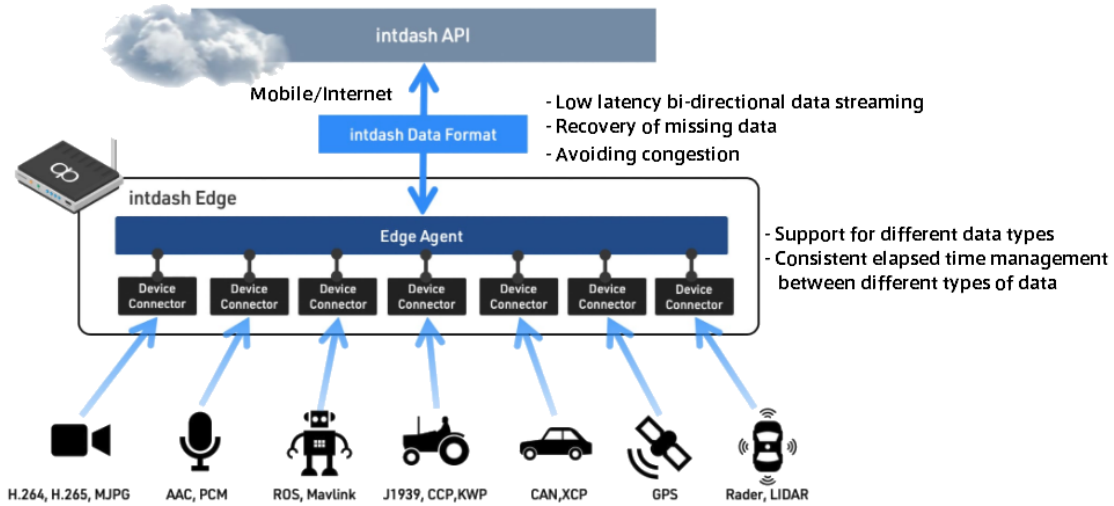
intdash Edge is edge-side middleware to connect to intdash cloud server. It provides intelligent functions for edge devices, such as transferring time series data from devices to the server and recovery of transmission losses under unstable networks.

In order to easily set up and evaluate the intdash Edge environment, we have prepared the agent software intdash Edge Agent for edge devices. See intdash Edge Agent (p. 12) for more information.

1.3.3 Visual M2M Data Visualizer

Visual M2M Data Visualizer is a web-based dashboard application that provides visualizations of time-series data flowing through intdash. Users can configure the dashboard by simply putting the parts into the panel and specifying the data with intuitive operation.

Visual M2M Data Visualizer is included in the server machine image provided on the AWS Marketplace. See Machine image to set up the intdash server (p. 11) for the server machine image.

1.3.4 intdash Motion
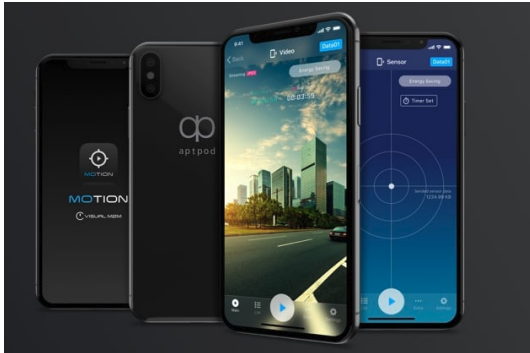
intdash Motion is an iOS application to use your smartphone as a simple measurement device. By using intdash Motion on your smartphone, you can easily send motion data obtained from accelerometers and gyro sensors, and media data such as video and audio to the intdash server.

intdash Motion can be installed from Apple's App Store.

1.3.5 Hardware

Terminal Appliances

EDGEPLANT T1   NEXCOM VTC 1910-S

We also offer appliance products with intdash Edge pre-installed. By installing these appliance products in automobiles, heavy machinery vehicles, or construction vehicles and connecting it to data buses, control signals and sensor signals can be easily transmitted to intdash.

CAN-USB Interface

The CAN-USB Interface is a USB device for connecting the CAN bus to a terminal appliance to acquire CAN signals. In order to improve the time stamp accuracy of the CAN signals, it has features such as hardware time stamping and clock synchronization between multiple devices using a synchronization line.

02   Usage examples

2.1 Usage example 1: Remote data collection/analysis platform

In the machine industry, especially in industries such as automobiles, construction machinery, and robots, there is increasing interest in data collection, and it is becoming more common to handle high-grain sensor data and diverse fusion data. If we can collect these data automatically via the mobile network, we can utilize the data more quickly. intdash enables remote data collection over mobile networks, dramatically improving data collection and analysis workflows.
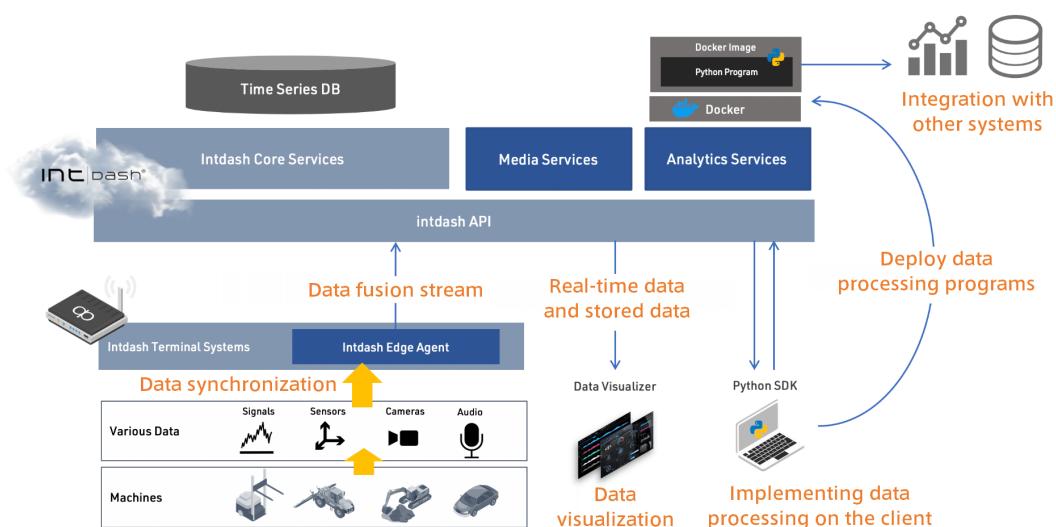
Fig. 1   Reference architecture for remote data collection/analysis platform

2.1.1 Data synchronization and fusion data transmission

intdash can support various data of various devices such as industry-specific fieldbus data, sensor devices data, video, and audio. Also, time-stamping the data with the same clock allows you to map all data on the same time axis. If a transmission failure occurs due to network instability, the edge automatically resends the data, and all data is stored on the server.

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2.1.2 Real-time streaming and visualization of stored data

Various fusion data mapped on the same time axis can be visualized in real time or can be saved and visualized later. You can use the Visual M2M Data Visualizer for visualization.

2.1.3 Various data processing and integration with secondary systems

The collected fusion data can be visualized using the Visual M2M Data Visualizer and can also be used with the intdash SDK for Python or Analytics Services. For example, you can perform arbitrary analysis to data, or transfer data to secondary systems and implement integrated processing.

2.2 Use Case 2: Data pipeline for AI development

There is a growing demand to combine large amounts of data with AI technologies, such as deep learning, to achieve digital transformation. The development of AI models requires a data pipeline that automatically and continuously collects and manages large amounts of data that have been correctly pre-processed. In addition to transmitting and collecting data, intdash provides powerful support for building flexible pipelines to take advantage of data, including automated processing and integration with external systems.
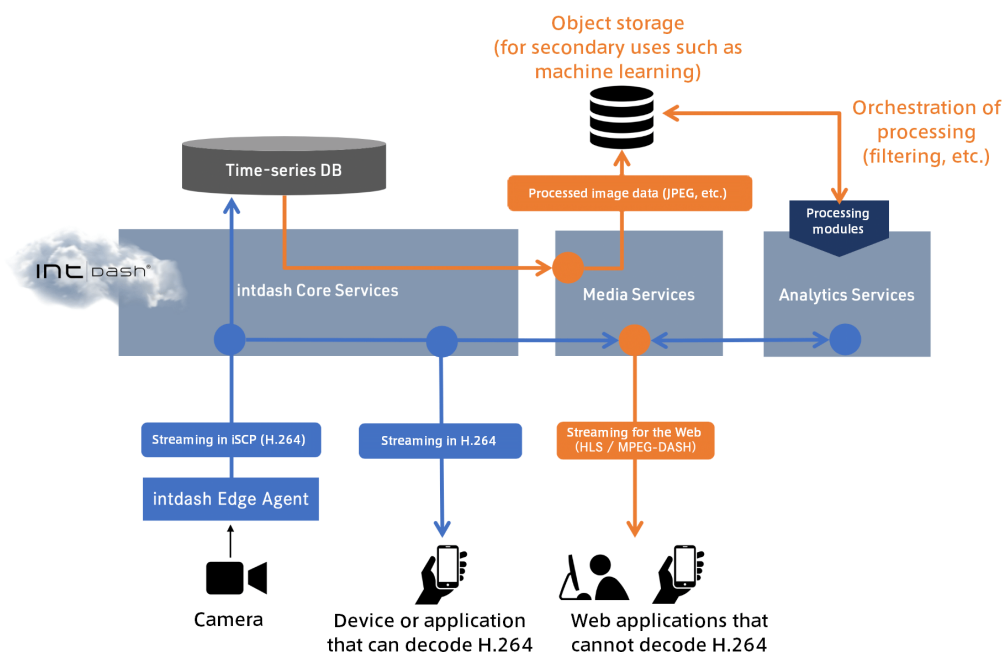
Fig. 2   Reference architecture for AI development data pipeline

2.2.1 Constantly collecting training data from running systems

By using intdash as a transmission backend, data for machine learning is automatically stored in intdash. Media Services and Analytics Services enable to automate troublesome processes such as codec conversion.

2.2.2 Calculation of accumulated data

Analytics Services can perform computational tasks to transform the collected data into training datasets. Processes such as automatic outlier filtering and time alignment can be incorporated into the pipeline to build higher quality datasets automatically.

2.2.3 Orchestration of complex data processing flows

Analytics Services allows you to orchestrate complex data processing flows. Analytics Services gives you the flexibility to build a variety of data flows for continuous development of your AI models, including continuous updates of your AI models while collecting data and evaluating your models with the data you have accumulated.

2.3 Usage example 3: Real-time data transmission and remote control

With the shrinking of the workforce, there has been an increase in automation efforts using AI and robotics technology. But there are very few cases where all operations are fully automated. We are focusing on remote control technology as an alternative to full automation. intdash enables remote monitoring and remote piloting through real-time, bi-directional data transmission, contributing to the efficient use of personnel resources.
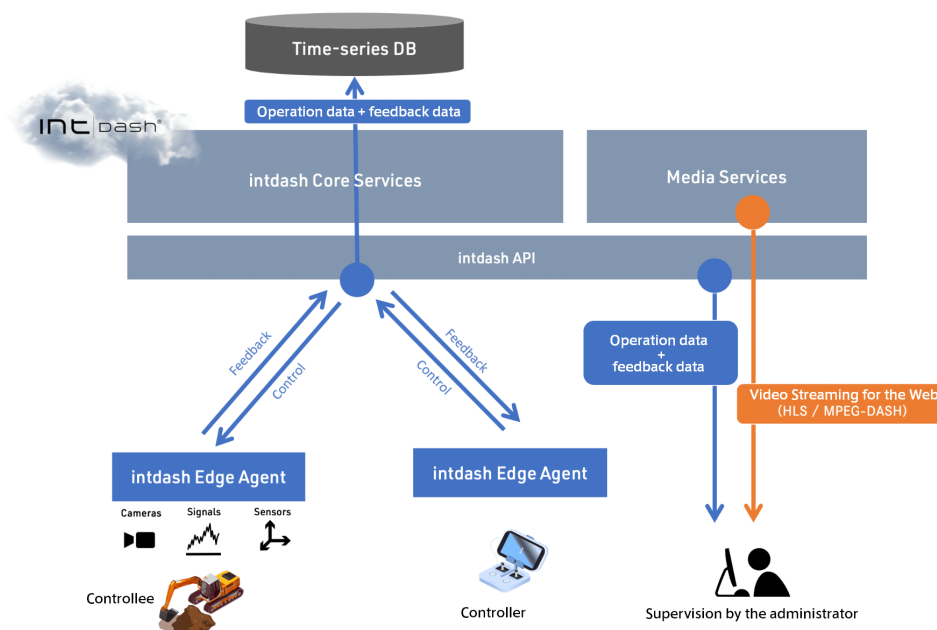

Fig. 3   Reference architecture for real-time data transmission and remote control

2.3.1 Low-latency/bidirectional transmission of operation data and feedback data

The operation data sent from the operation terminal is transmitted to the operation target via intdash. With low-latency transmission using our unique software protocol iSCP, you can operate the target from a remote location without any discomfort.

2.3.2 Remote monitoring

Real-time data exchanged between the operating terminal and the target can be monitored by a remote third party. For example, a centralized monitoring center can monitor a large number of operators and operation targets and assist them in case of a failure.

2.3.3 Automatic data storage and utilization/analysis

By using intdash as a transmission backend, the transmitted data is automatically saved. The information automatically saved during operation can be used in data-driven workflows, such as analysis of unexpected failures and improvements based on past performance.

03 Developer resources

Aptpod is releasing resources for developers to help you get started with intdash. The following resources are currently available:

3.1 Machine image to set up the intdash server

A machine image of intdash server is available on AWS Marketplace. You can set up your own server-side intdash environment and build a data pipeline. The machine image also includes Visual M2M Data Visualizer.

For more information, see the intdash product page on AWS Marketplace.

> **Important:** As of March 2022, only the machine image for trial is available. As this is only available on a private offer, please contact us at vm2m-support@aptpod.co.jp if you would like to request a trial.

3.2 intdash SDK for Python

A client library, intdash SDK for Python, is available to access intdash. The intdash SDK for Python provides the following functions and can be used to develop client applications using the intdash platform.

- Accessing time series data
- Accessing information of connected devices
- Sending and receiving data using real-time API

For instructions on how to install and use the intdash SDK for Python, see the API documentation provided with the SDK. We also have sample codes available on GitHub.

3.3 intdash Edge Agent

intdash Edge Agent, an agent software for edge devices to connect to intdash, is available. intdash Edge Agent implements cumbersome and complex device-side processing including real-time transmission and automatic recollection of time-series data. It can be used to develop edge devices to connect to intdash.

intdash Edge Agent is available from our private package repository. For access information to the repository, please contact our sales staff. intdash Edge Agent Developer Guide is also available for your reference.

04 Setup procedure and tutorials

To help you evaluate the usability and performance of intdash using the above-mentioned developer resources, we have prepared brief tutorials. The tutorials are as follows.

4.1 Procedure for setting up an intdash environment using a machine image

Setting Up intdash Server Using AMI

This is a step-by-step guide on how to set up an intdash server-side environment using the machine image on AWS Marketplace. Please read this first.

4.2 Uploading a CSV file and visualizing it with Visual M2M Data Visualizer

intdash Tutorial 1: Uploading a CSV File and Visualizing Data

This is a tutorial on uploading a CSV file and registering data to intdash. This tutorial briefly explains how to manage time series data on intdash. You can also experience the Visual M2M Data Visualizer, a dashboard for visualization, and various functions of intdash SDK.

4.3 Visualizing the real-time data transmitted from intdash Motion with Visual M2M Data Visualizer

intdash Tutorial 2: Visualizing Data from Your Smartphone Sensors

This is a tutorial on how to visualize real-time sensor data from the smartphone application, intdash Motion. In this tutorial, we will briefly explain how real-time data is handled on intdash. You can also experience the real-time performance of the data transmission.

4.4 Building a system that integrates intdash and AWS RoboMaker

intdash tutorial 3: Integrating intdash with AWS RoboMaker

> **Important:** After February 1, 2022, due to changes in AWS RoboMaker, you will not be able to run the tutorials using RoboMaker. For more information, please refer to the cover page of the linked document.

This is a tutorial on integrating intdash with third party services to build a sample system. In this tutorial, you will learn how to integrate AWS RoboMaker and intdash to efficiently develop, simulate and deploy robots. You will also experience the ease of use and transmission performance of intdash Edge Agent, the agent software for devices.