

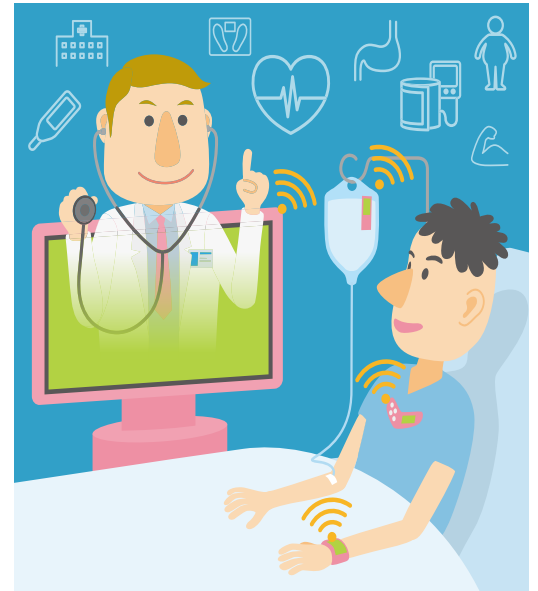


Vitabits is a platform for **monitoring patients at a distance**. It helps medical specialists to communicate with patients and continuously observe their vital signs measured in the patients' home environment.

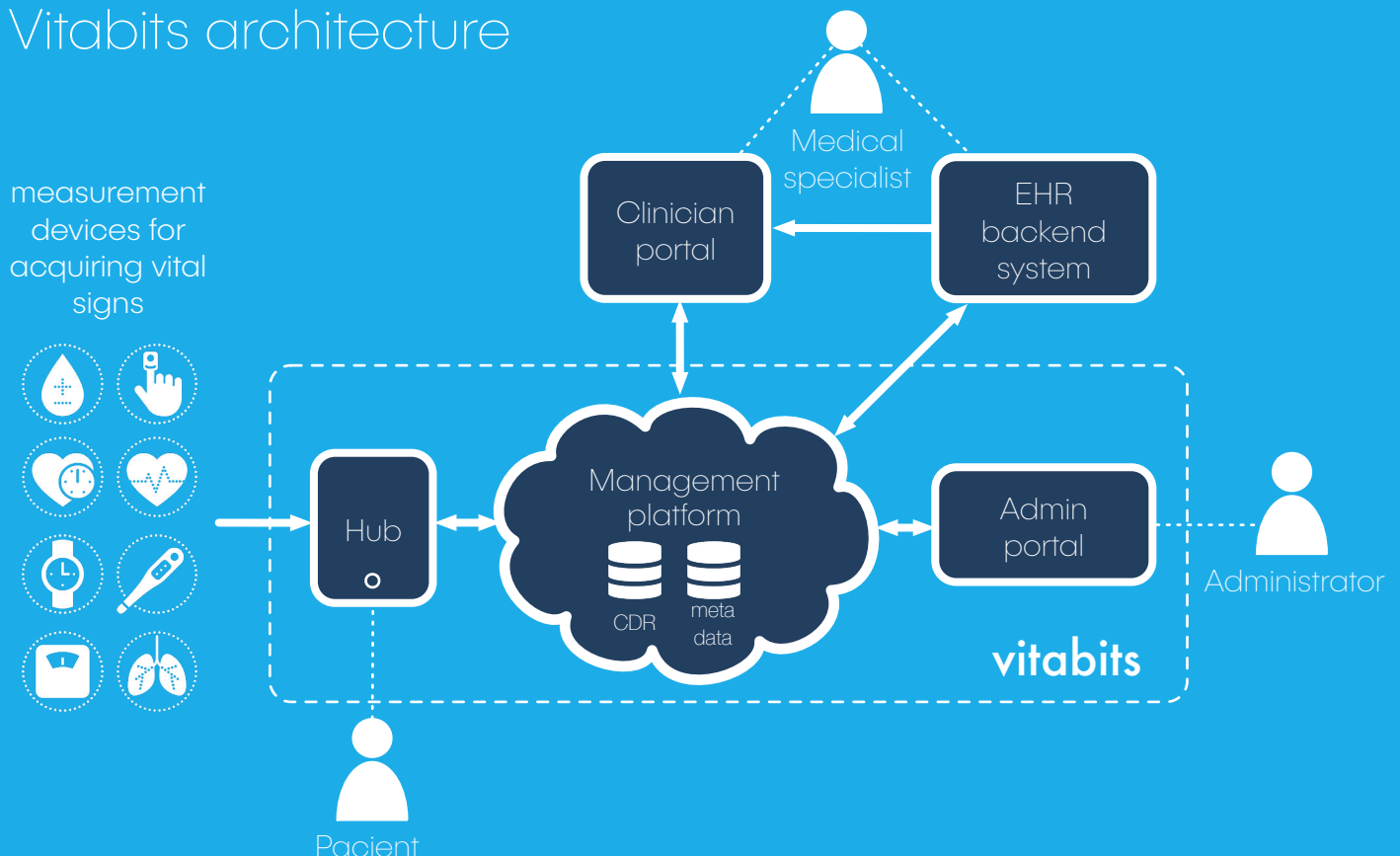
The platform is especially appropriate for remote monitoring of patients with **chronic diseases**, such as diabetes, asthma, congestive heart failure, arterial hypertension, COPD, etc.

Using the platform, the doctor can prescribe a **home care therapy** for a patient, including self-measurement of various vital signs and other activities to acquire data for efficient treatment. The platform allows the doctor to communicate with the patient over a video call and instant messaging and to call the patient for a physical visit if required.

Based on regular observation of patients' health conditions, medical specialists can provide **more accurate diagnosis** and **adjust treatments** as needed. This contributes to higher efficiency of health care and consequently lowers the associated costs.



Vitabits architecture

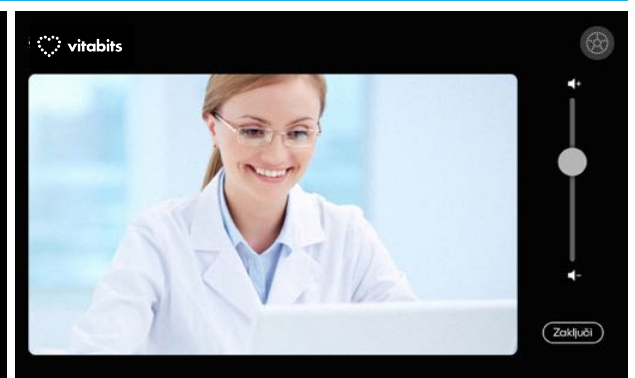
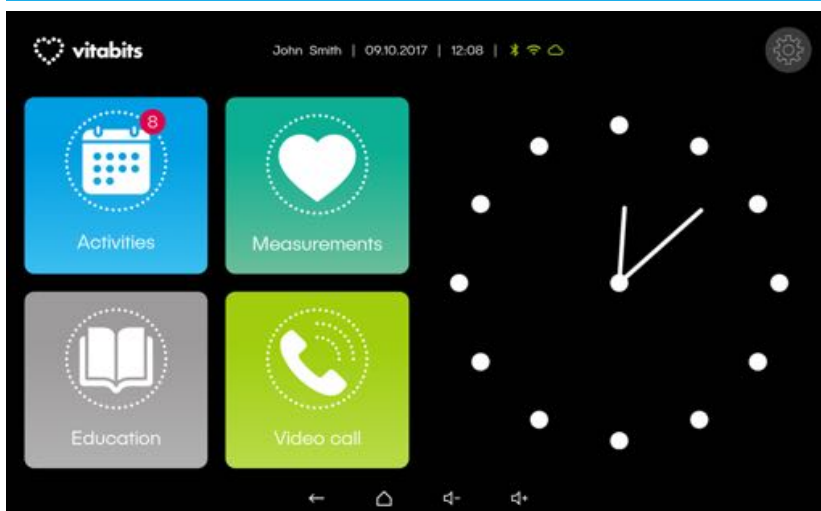


Hub

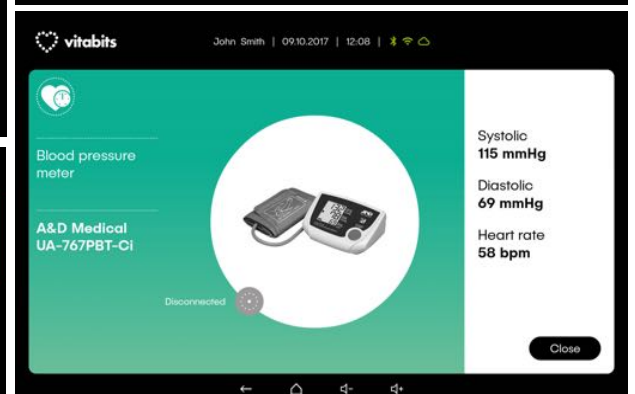
Hub or gateway is a software that supports an easy and efficient self-measurement of patient's vital signs and safe data transfer to the cloud. The software is generic, i.e. it runs on a [smart phone](#), [tablet](#), [TV-box](#) or on a [dedicated standalone device](#). Thanks to the hub, the whole measurement process is simple and transparent – patients don't need to care of anything – the measurement devices are [auto-detected](#) and measurements automatically sent to the backend system. At the same time, the hub acts as the main [communication channel](#) between patients and their treating physicians.

Basic functionality

- Easy integration with various measurement devices and sensors,
- Device auto-detection,
- Multi-user support,
- Voice commands and messaging,
- Secure transfer of data to selected backend systems,
- Support for chronic diseases, such as diabetes, asthma, CHF, COPD, arterial hypertension...
- Support for daily activities, reminders, and warnings,
- Representation of measurement data in a table or on a graph, with a reference intervals and trend lines,
- Support for video communication / instant massaging,
- Support for remote management of hub and connected devices.



Date	Systolic (mmHg)	Diastolic (mmHg)
13.04.2017, 14:10	126	69
13.04.2017, 09:50	146	69
13.04.2017, 04:44	114	60
12.04.2017, 22:13	163	60
12.04.2017, 14:54	150	60
12.04.2017, 01:23	133	90
11.04.2017, 10:14	140	58



Management platform & Admin portal

Management platform is a [cloud enabled server](#) that implements all required functions for remote management of vitabits hubs and connected devices. The management services are available through GUI of [Admin Portal](#) or over dedicated API. At the same time, the platform serves as a [safe and secure data storage](#).

Basic functionality

- Remote management and control of active hub and connected devices,
- Administrative support for the entire life cycle of remote patient monitoring, including technical support for service activation and deactivation, troubleshooting, system update, QoS assurance, notifications, remote device management etc.,
- Application program interface (API) implementing Push&Pull services for remote platform management and data retrieval,
- Safe and secure repository for data, captured within the remote patient monitoring. The data in the repository is encrypted and only available to patients (owners) and authorized medical personnel.

Admin portal



My last interventions:

Date and Time	Type	Details
1.3.2017, 11:35:55	Hardware failure	The blood pressure device remotely the hub and by c...
1.3.2017, 09:35:45	New device added	User needed new device to bind it.
27.2.2016, 07:20:39	Connection problems	WiFi connection didn't wo...

Messages from my hubs:

Hub	Date and Time	Message
S2017-34Q4895	7.6.2017, 15:42:30	Memory full, applica...
S2017-96Q2L	17.5.2017, 10:12:09	Cannot send measur...
S2017-106PRQ8	2.5.2017, 18:32:45	Daily activity to meas...
S2016-22ACF1Q21	25.4.2017, 19:44:11	Malformed bytes rec...

Measurement history table:

Date and Time	Measurement	Result	Unit
1 2.3.2017, 12:33	Blood pressure	130/90	mmHg
2 2.3.2017, 12:35	Pulse	88	topm
3 2.3.2016, 12:40	Weight	77	kg
4 3.3.2017, 19:30	Blood pressure	168/120	mmHg
5 4.3.2017, 21:44	Blood pressure	180/112	mmHg

Line graph: Blood pressure (mmHg) showing diastolic and systolic values over time.

Hub info:

- Type: VitaBB v0.9
- Firmware version: dataHubOS Core, build 6E2X84
- Last upgrade: 15.10.2016 @ 10:44:12
- Current status: Active

Hub state at last heartbeat signal:

- CPU: 69%
- Memory: 28%
- Disk Space: 8.4GB

Connected devices:

Last used	Connection	Type	Details
1.3.2017, 11:35:55	BTLE	Weight	OneTouch Continus 22b, FW id: 3ef616bd
1.3.2017, 09:35:45	ZigBee	Blood pressure	Contour 33, Model X, HW: AEF292845CKW
27.2.2016, 07:20:39	ZWave	Blood glucose level	BloodStart Advanced v2, S/N: 02X245AEF45

Intervention log:

Date and time	Agent	Type	Details
1.3.2017, 11:35:55	BlacS	Hardware failure	The blood pressure device wasn't working. After checking remotely the hub and by giving the user remote support, it turned out the device is in ...
1.3.2017, 09:35:45	JureK	New devices added	User needed new device for measuring glucose level. I helped him to bind it.
27.2.2016, 07:20:39	JovJG	Connection problems	WiFi connection didn't work. We didn't solve the problem yet as he need the password for his local ...

New intervention form:

Date and Time: 7.6.2017 04:45
Intervention Type: Hardware failure
Description: Problem description, details of troubleshooting, findings, actions, ...

Connectivity

Vitabits enables remote acquisition of all important [vital signs](#) and other data that can contribute to understanding of patient conditions and can help doctors to give [efficient treatment](#).

Vital signs



blood glucose level



heart rate and oxygen saturation



blood pressure



ECG signal



daily activity



body temperature



body weight



respiratory rate

Measurement devices

Vital signs can be measured by any measurement device that communicates over [Bluetooth](#) protocol (BT or BTLE) and is [Continua](#) certified or uses standard [GATT](#) services.



At the moment, vitabits hub integrates over 50 measurement devices selected by independent medical specialists. The device manufacturers include: Rossmax, Nonin, A&D Medical, ChoiceMMed, Roche, Philips, ForaCare, Contour, Fitbit,... All devices have acquired certificate of "European Conformity" **CE**



Measurement devices can be easily [added](#) or [removed](#) using graphical interface (over hub or management portal) or programmatically over API.

Supported backend systems

Vitabits offers an API with push&pull services for the communication with any available backend system. By design, it supports and promotes the communication with [FHIR](#) or [OpenEHR](#) compliant systems.

