



Empatica Connect

Rev 000 27 March 2015

Introduction

Empatica Connect is a secure, cloud-based web application that supports data management for researchers that use Empatica devices. Empatica Connect supports data visualization, download, and deletion. Empatica Connect is intended for researcher use only and Empatica Connect credentials should not be shared with end users who are participating in research studies. This manual documents use of the data management application, developer enrollment and study management feature package. Additional documentation and frequently asked questions related to Empatica Connect can be found in the Empatica Support Portal at support.empatica.com/hc/. Data is uploaded to Empatica Connect using APIs,

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Empatica Connect Data:

Empatica Products are intended for use in research settings, therefore two distinct groups of people interact with the software: the Customer, primarily a researcher who is managing a group of devices for use in a study and the End User, primarily research participants who will wear Empatica devices during a study. The Customer is allowed to use the device on clinical studies that involves humans and is responsible the safe keeping of any Personal information belonging to research participant / clinical subject that will be referred to as the **User**.

Note: There is no way to store personally identifiable information from end Users in Empatica Connect. Empatica provides researcher customers with session start time and a unique device identifier but the researcher is responsible for associating a given session stored on Empatica Connect with a study participant.

The following data are stored on Empatica Connect:

- Customer Identifier
- Session Start Date* [DD MONTH YYYY]
- Session Start Time* [HH:mm:ss]
- Session Duration [HH:mm:ss]
- Device ID [serial number]-[device version]
- Session Uploader API version

***Note:** Times in Empatica connect are rendered with the current time zone offset registered by your browser (this is typically the system time displayed on your computer or mobile device). E.g.: During the summer, session start time for a file starting at 12:00:00 UTC will be displayed with a start time of 06:00:00 in Cambridge, Massachusetts and 13:00:00 from a browser in Milan, Italy.

Compatibility:

Empatica Connect is a web application that can be accessed using most contemporary browsers including Google Chrome Version 41.0.2272.101+ and Safari Version 8.0.4 (10600.4.10.7)+ at the time of this publication. Please see [insert link here] for an updated list of supported browsers.

Account Registration:

Account registration process

Link to account registration homepage 'empatica.com/connect'

Limitations of accounts: Accounts are associated with a single email address that is used as Empatica account ID as well as the communication email that will receive messages related to Empatica products.

Note: The Empatica Connect username (the email address associated with your Empatica Account) is case-sensitive.

Walkthrough

Sessions:

The "sessions" page in Empatica connect is used to manage data uploaded by Empatica RealTime or Empatica Manager using the Empatica Connect account credentials.

All Sessions View (default)

The "All Sessions View" displays the start date, start time, duration and device identifier for all sessions associated with the Empatica Connect account.



Daily View

The “Daily View” filters the list view by date. A calendar is displayed to the left of the list view. Dates (in UTC) during which session recordings were started are emphasized with a red text background and the selected date filter is indicated with a blue text background.

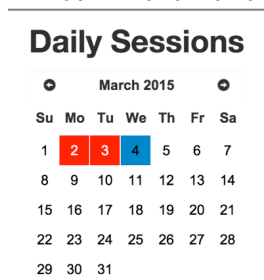


Figure 1: Daily Session calendar with recording dates highlighted in red and selected date indicated in blue.

Session View Actions

The Daily View and List view both offer the following data management actions:

1. **View** – Click here to launch the Empatica Connect Session Viewer. See the “Empatica Connect Session Viewer” section for more information.
2. **Download** – Click here to initiate an individual session download. See the “Download Formats” section for more information.
3. **Delete** – Click here to permanently delete a session from Empatica Connect servers. *Note:* You will need to confirm session deletion; this action cannot be reversed.

Empatica Connect Session Viewer

The session viewer renders the following data for a given session:

1. Electrodermal Activity in micro Siemens “EDA (μ S)” time-series
2. Blood Volume Pulse (BVP) time-series (sub-sampled at 16 Hz for browser efficiency)
3. Heart Rate in beats-per-minute (HR BPM) times series (only high-confidence information with related IBI data are displayed)
4. Peripheral Temperature (Temperature $^{\circ}$ C) time-Series
5. Movement and/or 3-axis acceleration Accelerometers (g) time-series – *Note:* this graph is configurable; see the section on “Display Settings” below.
6. Event mark overlay – event marks

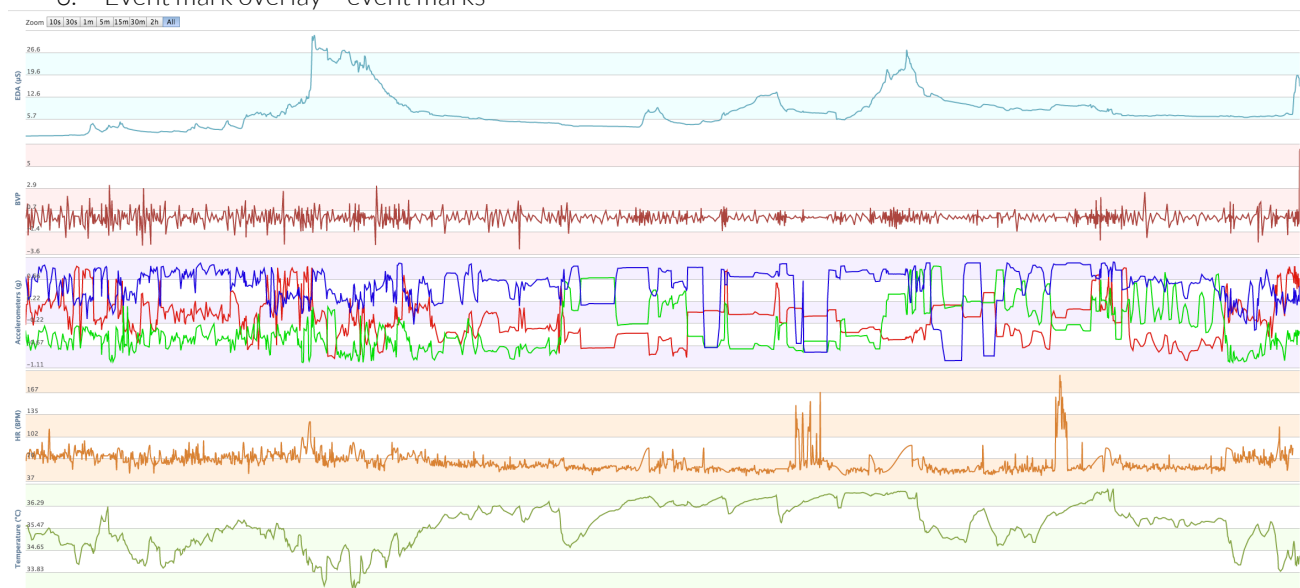


Figure 2: Session Viewer with time series displayed



The Session Viewer renders the entire duration of a session at launch. The Viewer supports dynamic zoom (select a range with a click-and drag action to zoom in) and multiple pre-configured zoom levels (bookmarks at 10s, 30s, 1m, 5m, 15m, 30m, 2h and “all” zoom levels).

Figure 3: Session Viewer windows duration shortcuts

The window selection tool at the bottom of the “Session Viewer” page can be used to modify the viewing window:

- Click on either one of the handles and drag left or right to change the duration of selected time range.
- Click between the handles and drag left or right to shift the selected range while maintaining the window duration.



Figure 4: Session Viewer window selection tool

User Settings

Empatica Connect settings can be modified by opening the ‘User’ menu. To access the menu (once you are logged into the application) click on the user name in the upper right corner of the web application window.

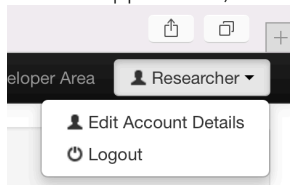


Figure 5: Click on the user name drop-down on the right to exposes the Edit Account Details menu or log-out of Connect.

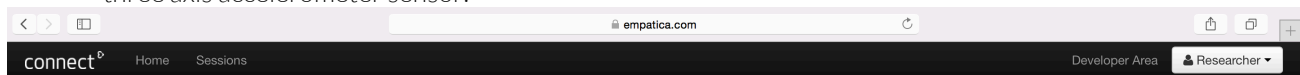
Edit Account Details

Visit the “Edit Account Details” page to change the Empatica Connect account password.

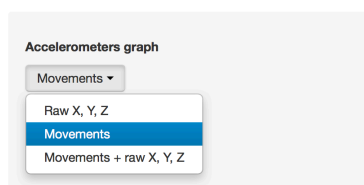
Connect Preferences

Connect preferences can be accessed on the second tab of the “Edit Account Details” page. The accelerometer graph in Empatica Connect session viewer can be configured using the following options:

7. **Movements** (default) – display the continuous motion activity summary (rendered as a purple line graph with the area-under the curve shaded).
8. **Raw X, Y, Z** – display the raw-output from the three-axis accelerometer sensor (line graphs rendered in red, green, and blue).
9. **Movements + Raw X, Y, Z** – display both the continuous motion activity summary and raw-output from the three axis accelerometer sensor.



Connect Preferences





Empatica Connect - developer tools

Developers who would like to integrate real-time Empatica device data in their mobile applications can request access to Empatica developer tools in Connect.

Developer Enrollment

Empatica manages developer access to devices. Empatica personnel individually review developer enrollment requests.

To enroll:

(1) Log into your Empatica Connect account at <https://www.empatica.com/connect>.

(2) Following the "developer area" link in the upper right corner of the web page:

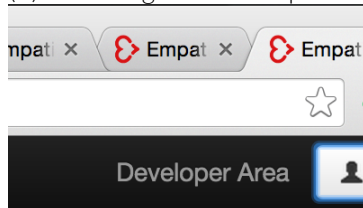


Figure 6: The Developer Area link is located in the upper right corner of the application window.

(3) Request developer access by following the dialog on the login page. Provide a clear and concise explanation of your application development plan.

How to become a developer

Please send us a request by writing a few words about your request and clicking on the button below.

We will examine it ASAP and let you know when the powers that be accept it.

Seeing that I would really like to [Become a Developer](#)

Figure 7: to request developer access enter a brief description of your project and submit for review.

NOTE: If a request has not been granted you may contact support@empatica.com to provide further information for the review process.

(4) Once authorization has been granted an email notification will be sent to the address associated with the Connect account indicating that right have been granted to download mobile SDKs and view developer documentation.

Your Devices: Device Registration and sharing

Developer applications are restricted for use among verified devices that have been associated with a developer's account though purchase verification or sharing.

Verifying Purchases

Enrolling as a developer enables you to activate device purchases for use in application development. Enter the purchase code sent to your institution during device delivery to verify the devices associated with that purchase. After verification you will be able to use registered devices with your application.



Your Purchases

[Purchase code from first purchase]

Share

[List of Device IDs from your purchases]

[Purchase code from second purchase]

Share

[List of Device IDs from your purchases]

Add purchased devices

Insert a purchase code to add devices to your profile:

Purchase code

Verify

Figure 8: Enter purchase codes for verification and view lists devices from your existing purchases.

Note: If you are missing a purchase code please send a request to support@empatica.com that includes a list of the serial numbers associated with your device, your contact information, and the identity of the purchasing institution.

Sharing Purchases

A device owner can use the “share” button above each purchase to add developer access to colleagues. Once shared, the device will be listed under the “Your Shared Devices” list.

Your Shared Devices

The following list includes all the devices you can communicate with using the Empatica API and your API Key.

[List of accessible device IDs from purchases and shared devices]

Your Purchases

[Purchase code from first purchase]

Share

[List of Device IDs from your purchases]

Empatica Connect - study management feature package

To support large and/or long-term studies, especially those that take place in the home environment research accounts can be upgraded to enable study management features. The features include upload-only credentials that can be used with Empatica Manager to associate data with a research study and ensure that study participants can upload data without gaining access to Empatica Connect. There are also several batch data download tools available with the study management feature package for Empatica Connect.

After enrollment in the study management feature package a “Studies” page will be added to the Empatica Connect application.

Creating a new Study

Pressing the “New Study” button on the “Study” page (empatica.com/connect/studies) will open a new study dialog.

**Study Name**

Enter a study name

Note: The “study name” will be used to identify batches of data associated with this study. See the section on “Download Formats” below.

Study Description

Enter a brief description of the study.

Study Overview Data

- **Name** – The name given to a study during creation or after editing
- **Created** – The date of study creation
- **Recorded Hours** – The total number of hours of session data associated with this study
- **Days** – A count of the number of days in which data has been uploaded
- **Hours/Day** – The average number of hours per day of data from the launch date of the study.
- **Devices** – The total number of unique devices that have uploaded sessions to the study from the start of the study to the current date or study end date.
- **Hours/Device** – The average number of session hours per active device from the start of the study to the current date or study end date.

Study Overview Actions (active studies)

- **View Study** – Click here to open the detail page for the study. See the section on Study Details below.
- **Download** – Click here to initiate a batch download. The first time a batch download is initiated all session data associated with the selected study at the time of the action will be packaged. Subsequent batch download packages will contain all data since the last batch download. After the package is compressed an email with a secure download link will be sent to the address associated with the Empatica account that can be used to retrieve the package. The format is described in the “data formats” section below.
- **Upload Credentials** – click here to reveal the unique upload ID and password that can be used to associate Empatica device data with this study. The credentials can be used with Empatica Manager or Empatica RealTime Applications. Any end users participating in the same study will share upload credentials. Empatica will not be able to differentiate data uploaded by different users; this remains the responsibility of the investigator.
- **Settings** – Click here to configure study name, description and add/remove participating devices.
- **End** – Click here to end the study releasing all device associations, enabling study archiving and ending upload credential support. This action also initiates the generation of a complete study archive (see the “Download” section for closed studies for details). **Note:** You will need to confirm ending a study, as this action cannot be reversed.



info@empatica.com

to me ▾

6:29 PM (11 minutes ago) ☆



Thank you for your patience, your Empatica study archive for Data Study on 2015-03-20 is now complete.

Click the following link to start the download: https://s3-us-west-1.amazonaws.com/zip.empatica.com/10305/7PyMTy0L2Z4MAieVscfgfTJgMvl/DataStudy_2015-03-20.zip

The archive is packaged as a ZIP directory with the following structure:

The archive name is composed of the study name and date using the following convention:

[study name]_[yymmdd]

Within the archive you will find one ZIP directory for each session. The session directory names include Empatica device serial number and the date-time from the start of the session in the following convention:

[Device Serial Number]_[yymmdd-HH:mm:ss]

For more information please review the documentation at support.empatica.com

Figure 9: Example email from a study archive containing batch data from the "Data Study" on March 20

Study Overview Actions (closed studies)

- **View Study** – After ending a study the view link still allows a researcher to open the detail page for the study. See the section on Study Details below.
- **Download** - Click here to request a download link to access a package (compressed directory) containing all data from this study. After the request is initiated an email will be sent to the Connect account email with a secure download link that can be used to retrieve the package. The format is described in the “data formats” section below.



Study Details

The study details page allows a researcher to view and manage individual session files uploaded using the Study credentials as well as daily summary statistics from devices registered to this study. The Study detail page is similar to the default Empatica Connect views and allows the researcher to view data filtered by recording day or in a list view.

All Sessions View

The “All Sessions” view displays the start date, start time, duration and device identifier for all sessions associated with the Empatica Connect account. The list is arranged with the most recent session start time at the top.

Daily View (default)

The “Daily View” filters the “All Sessions” view by date. A calendar is displayed to the left of the list view. Dates (in UTC) during which session recordings were started are emphasized with a red text background and the selected date filter is indicated with a blue text background.

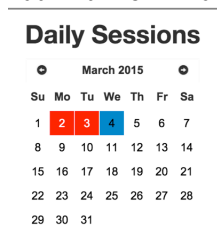


Figure 10: Daily Session calendar with recording dates highlighted in red and selected date indicated in blue.

In addition to the standard data management actions (see Session View Actions section above) the daily view has two additional features in the Study Management feature package:

- **Device Usage** – Click here to view a summary of data usage from enrolled devices on the selected date.
- **Daily Download** – Click here to request a download link to access a package (compressed directory) containing all data from this date that is associated with the selected study. Once compressed you will receive an email with a secure download link that can be used to retrieve the package. The format is described in the “data formats” section below. **Note:** The content of this package may vary across time zones due to UTC offset differences with file start-times.

Empatica Connect Download Formats:

Individual Session Download:

An individual session file is downloaded directly from the All Sessions or Daily Views. The file name follows the following convention: [Session start time in Unix time format] – [Sensor ID]

Daily Session Archive:

Daily Session packages can be initiated by clicking the download link on the Study Daily View page. After compression, an email will be sent to the address associated with the Empatica Connect account study containing a secure download link. The archive is packaged as a ZIP directory with the following structure:

- The archive name is composed of the study name and selected date using the following convention: [study name]_[yymmdd]
- Within the archive there is one ZIP directory for each session. The session directory names include Empatica device serial number and the date-time from the start of the session in the following convention: [Device Serial Number]_[yymmdd-HH:mm:ss]
- The archive also contains a manifest file named info.json that contains a record of the "archive_filename", "number_of_sessions_in_[the]_archive", "study_name", "download_date", and list of session files it contains.

**EMPATICA S.R.L.**

VIA STENDHAL 36 - 20144 MILANO (MI) IT
WWW.EMPATICA.COM
INFO@EMPATICA.COM
P.IVA 07462810966
REA MI-1960346

EMPATICA INC

HQ: 1 BROADWAY, 14TH FLOOR
CAMBRIDGE, MA 02142 - USA
WWW.EMPATICA.COM
INFO@EMPATICA.COM

Study Batch Session Archive:

Batch sessions can be initiated by clicking the download link on the study overview page. The first time a batch download is initiated all data associated with the selected study at the time of the action will be packaged.

Subsequent batch download packages will contain all data since the last batch download. After compression, an email will be sent to the address associated with the Empatica Connect account study containing a secure download link. The archive is packaged as a ZIP directory with the following structure:

- The archive name is composed of the study name using the following convention:

[study name]_[batch number] where the batch number corresponds to the number of multi-day archives for this study to date.

- Within the archive you will find one ZIP directory for each session. The session directory names include Empatica device serial number and the date-time from the start of the session in the following convention:

[Device Serial Number]_[yymmdd-HH:mm:ss]

- The archive also contains a manifest file named info.json that contains a record of the "archive_filename", "number_of_sessions_in_[the]_archive", "study_name", "download_date", and list of session files it contains.

Complete Study Session Archive:

After a study is closed the entire contents will be available as a bulk package. After compression, an email will be sent to the address associated with the Empatica Connect account study containing a secure download link. [insert description from email Study Name – date of archive]