A Biological Threat Reduction Program (BTRP)

Electronic Integrated Disease Surveillance System

(EIDSS)

AVR Data Filtration Technical Specification

Revision 1.0

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History of Changes

Revision	Date	Section	Changes description	Author
1.0	*March 2021*		*Initial draft*	*Uliana Shilovskaya*

Contents

1   Introduction

The mechanism for data filtration in EIDSS AVR module shall be developed based on the initial request from Ukraine PHC (ticket#12657 in HelpDesk).

In EIDSSv6 data filtration is applied to Catalogs, whereas in AVR users can see all non-filtered data.

It was requested to apply data filtration mechanism, same as in EIDSS Catalogs, to AVR module.

EIDSS Catalogs   EIDSS AVR
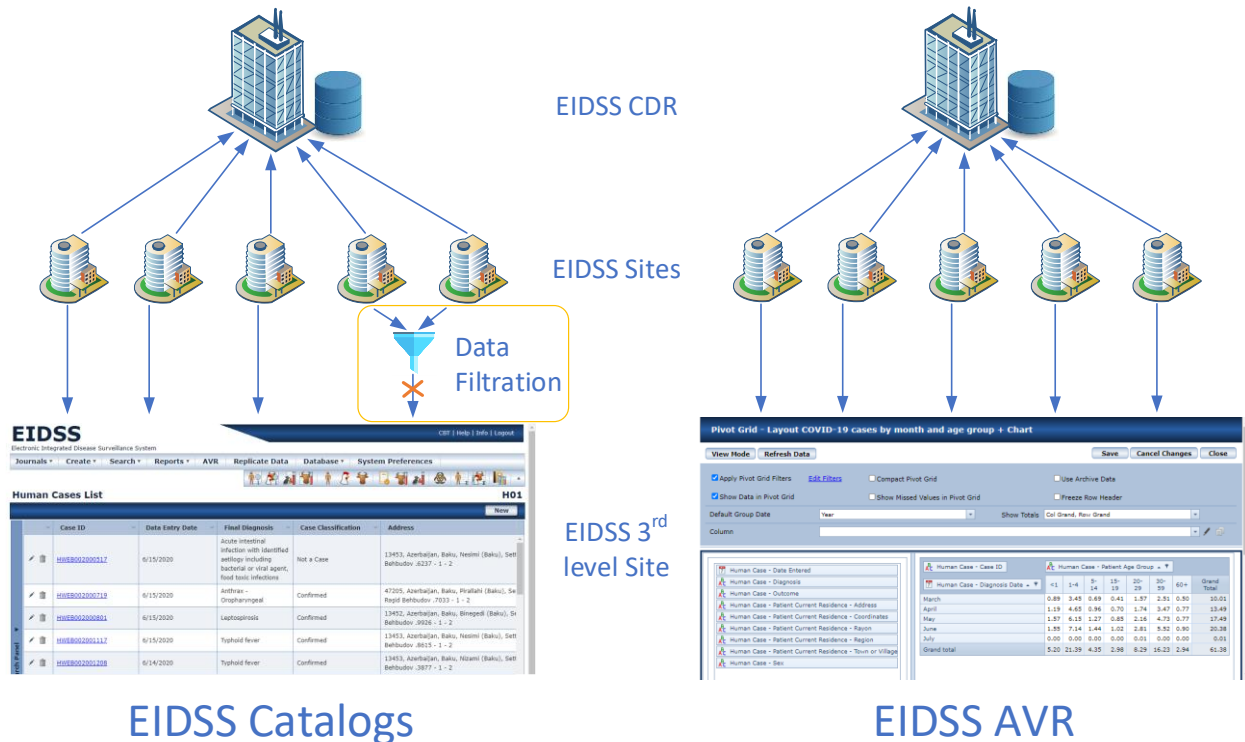
2   Overview of the AVR data filtration mechanism

In EIDSS data filtration mechanism in AVR shall be optional. It shall be configured in tst_GlobalSiteOptions table in database by the "FiltrationInAVR" setting (1/0). By default, it shall be set to "FiltrationInAVR"=0. For Ukraine "FiltrationInAVR" shall be set to 1.

If "FiltrationInAVR"=1, then standard filtration shall be applied to all search objects in the same way it is applied in system Journals. If configurable filtration rules (unidirectional, bidirectional) and/or border areas filtration rules are applied in the database, then configurable filtration rules and/or border areas filtration rules shall be applied to all search objects in AVR in the same way it is applied in system Journals.

AVR filtration mechanism shall be applied for the following root search objects in AVR in EIDSSv6 Query Builder:

- Active Surveillance Campaign
- Active Surveillance Session
- Basic Syndromic Surveillance Form
- Case/Vector Entity
- Combined Diseases
- Farm
- Human Aggregate Case Data
- Human Case
- ILI Aggregate Form
- Outbreak
- Vector Surveillance Session
- Vet Case

3 Data Filtration Mechanism Description

3.1 General Filtration Rules

There are following terms used in filtration description:

1) **Filtration record** is a record containing the following information: Entity/object **A** (e.g. Human Case, Vet Case, AS Session, VS Session, etc.) shall be available on Site **X**.
2) **Perform the filtration** means to calculate all necessary filtration records for all modified/created objects. Calculation of filtration records should be performed by means of the rules described below.
3) **Apply the filtration** means to filter set of data that is available on third-level site (Sentinel Station) in both desktop and web versions according to calculated filtration records and rules for connected objects described in the section Filtration Rules for Connected Objects.

CDR and second-level sites receive all the data regardless of where the data was entered in the system. Filtration rules do not affect set of data that is available on CDR and second-level sites.

Filtration rules affect set of data that is available on third-level site (Sentinel Station, TLVL) in both desktop and web versions, i.e. **filtration mechanism is applied to third-level sites only**.

There are four kinds of filtration rules:
1) **Core filtration rules**
   These rules are applied to specific EIDSS entities/objects listed in the section Core Filtration Rules. They describe how to calculate initial set of filtration records for specific EIDSS entities/objects that have been modified and/or created since the last calculation of filtration records.
2) **Filtration rule for connected objects**

These rules are applied to the objects, which should be considered as non-separable parts of objects, described in the section Core Filtration Rules, therefore they are not transferred individually, but sent to the sites, where the corresponding parent object is transferred. These rules are described in the section Filtration Rules for Connected Objects.

3) ***Not filtered or not distributed data***

There are objects that shall not be filtered (such as reference values, GIS data, organizations' list, etc.). There are also objects that shall not be distributed to the sites (AVR local queries/folders/layouts, WHO export data, etc.).

The lists of such objects are described in the section Not Filtered or Not Distributed Data. Such objects do not participate in filtration mechanism described below.

4) ***Configurable filtration***

In addition to the rules described in the sections Core Filtration Rules and Filtration Rules for Connected Objects, additional sites connections can be configured.

Namely, it shall be possible to configure the following rule for two arbitrary sites ***A*** and ***B***:

If any object described in sections Core Filtration Rules and Filtration Rules for Connected Objects is available on or transferred to the site ***A***, it shall be also transferred to the site ***B***.

Therefore, rules of configurable filtration shall be applied after rules described in the section Core Filtration Rules have already been applied to EIDSS entities/objects that have been modified and/or created since the last calculation of filtration records.

It shall be possible to apply both bidirectional (site ***A*** shares its data with site ***B***, and site ***B*** shares its data with site ***A***) and unidirectional (site ***A*** shares its data with site ***C***, and site ***C*** doesn't share its data with site ***A***) rules of configurable filtration.

See an example:

Let's configure the following filtration rules:

- Site ***A*** shares its data with site ***B***, and site ***B*** shares its data with site ***A***.

- Also, site ***A*** shares its data with site ***C***, and site ***C*** doesn't share its data with site ***A***.

Let's consider calculation of filtration records for *Case 1*, which shall be transferred to the site ***A*** according to core filtration rules:

▪ *Case 1* shall be transferred to the sites ***A***, ***B*** and ***C***.

Let's consider calculation of filtration records for *Case 2*, which shall be transferred to the site ***C*** according to core filtration rules:

▪ *Case 2* shall be transferred to site ***C***, but it shall not be transferred to both sites ***A*** and ***B***.

Let's consider calculation of filtration records for *Case 3*, which shall be transferred to the site ***B*** according to core filtration rules:

▪ *Case 3* shall be transferred to sites ***A***, ***B***, and ***C***.

Configurable filtration rules (sites' connections) shall be specified as a part of country-specific customization requirements if necessary. Usage of ***configurable filtration*** is optional for the country.

Details of applying these rules are described in the section *3.5 Configurable Filtration*.

5) **Border Areas Filtration**

In EIDSS version 6, a new kind of filtration rules will be introduced. It is called **Border Areas Filtration**.

Border Areas Filtration rules contain the following information for an arbitrary site **A**:

- Sites A_1, A_2, …, A_N belong to border areas for the rayon of the site **A**;
- Site **A** shall share its information with sites A_1, A_2, …, A_N, i.e. if any object described in sections Core Filtration Rules and Filtration Rules for Connected Objects is available on or transferred to the site **A** according to filtration rules described in the sections **Error! Reference source not found.**, *3.3* and *3.5*, it shall be also transferred to the sites A_1, A_2, …, A_N;
- If any object is available on or transferred to the site **B** according to rules of **Border Areas Filtration** only, configurable filtration rules shall not be applied to the site **B**.

  See an example:

    Let's consider calculation of filtration records for *Case 1*:

    - *Case 1* shall be transferred to sites **A** and **B** according to core filtration rules;
    - Site **A** shall share its data with site **C** according to configurable filtration, therefore *Case 1* shall be transferred to site **C**;
    - Sites A_1, A_2 and A_3 are specified as sites from border areas for site **A**; sites B_1 and B_2 are specified as sites from border areas for site **B**; sites C_1 and C_2 are specified as sites from border areas for site **C**. *Case 1* shall be transferred to the sites A_1, A_2, A_3, B_1, B_2, C_1, and C_2.
    - Site A_1 shall share its data with site **D**, and site C_1 shall share its data with site **F** according to configurable filtration. However, *Case 1* <u>shall not be transferred</u> to the sites **D** and **F**.

Rules of **Border Areas Filtration** shall be applied after rules described in the sections Core Filtration Rules and Configurable Filtration have already been applied to EIDSS entities/objects that have been modified and/or created since the last calculation of filtration records.

Rules of **Border Areas Filtration** (lists of sites from border areas for specific sites) shall be specified as a part of country-specific customization requirements if necessary. Usage of **Border Areas Filtration** is optional for the country.

Details of applying these rules are described in the section Border Areas Filtration.

Information about objects, for which filtration records were calculated, shall be replicated to the third-level sites or filtered (in listed forms) in web version for the users of third-level sites, according to filtration records connected to the objects and corresponding sites.

3.2   Core Filtration Rules

Entity	Filtration rule
Outbreak	Outbreak data is sent to all sites, which cases were used in this particular Outbreak. Case entity and Vector Surveillance Session are child entities of

Entity	Filtration rule
	the Outbreak. If an Outbreak groups cases and/or sessions from different rayons, the replication will bring data about the Outbreak to all sites of these rayons, but users in rayons will be able to see only such Outbreak data (cases/sessions), which is connected to this particular rayon. Outbreak data will be split according to filtration rules of included cases/sessions.

Human Case	• Human Case data is sent to all sites, which have cases connected to this particular Human Case by de-duplication of cases. The Survivor Human Case data is sent to the site of Superseded Human Case and to the site of the Survivor Human Case.
	• Human Case data is sent to all sites, which organizations are connected to this particular Human Case. Specific organizations list for the case includes:
	   o Organization, specified in the "Notification sent by: Facility" field
	   o Organization, specified in the "Notification received by: Facility" field
	   o Organization, specified in the "Organization conducting investigation" field
	   o Organization, specified in the "Facility where patient first sought care" field
	   o Organization, specified in the "Hospital name" field on the "Notification" tab
	   o Organization, specified in the "Collected By Institution" field for any sample
	   o Organization, specified in the "Sent To Organization" field for any sample
	   o Organization where case-connected samples were transferred out.
	• Human Case data is always distributed across the sites of the same administrative Rayon. All sites, where the value of the Rayon equals to one of the Specific Case Rayons, must receive Human Case data. Specific Case Rayons list for the case includes:
	   o Rayon of the site, where the case was created;
	   o Rayon of the case current residence address;
	   o Rayon of the case location of exposure, if corresponding field was filled in;
	• Human Case data is always distributed across the sites, where the connected Outbreak is sent, if the Human Case is the primary case for this Outbreak

Vet Case (Livestock Case, Avian Case)	• Vet Case data is sent to all sites, which organizations are connected to this particular Vet Case. Specific organizations list for the case includes:
	   o Organization of the employee, specified in the "Reported By" field
	   o Organization of the employee, specified in the "Investigator Name" field

Entity	Filtration rule
	○ Organization, specified in the "Collected By Institution" field for any sample ○ Organization, specified in the "Sent To Organization" field for any sample ○ Organization where case-connected samples were transferred out. - Vet Case data is always distributed across the sites of the same administrative Rayon. All sites, where the value of the Rayon equals to one of the Specific Case Rayons, must receive Vet Case data. Specific Case Rayons list for the case includes: ○ Rayon of the site, where the case was created; ○ Rayon of the farm address; - Vet Case data is always distributed across the sites, where the connected Outbreak is sent, if the Vet Case is the primary case for this Outbreak
Active Surveillance Session	- Active Surveillance Session data is always distributed across the sites of the same administrative Rayon. All sites, where the value of the Rayon equals to one of the Specific Session Rayons, must receive Active Surveillance Session data. Specific Session Rayons list for the case includes: ○ Rayon of the site, where the session was created; ○ Rayon of the session address; ○ Rayon of any farm address, linked to the session; - Active Surveillance Session data is always distributed across the sites where the Livestock Cases, linked to the Active Surveillance Session, is replicated. - Active Surveillance Session data is sent to all sites, which organizations are connected to this particular Active Surveillance Session. Specific organizations list for the case includes: ○ Organization, specified in the "Collected By Institution" field for any sample ○ Organization, specified in the "Sent To Organization" field for any sample ○ Organization where session-connected samples were transferred out.
Vector Surveillance Session	- Vector Surveillance Session data is always distributed across the sites of the specific administrative Rayon. All sites, where the value of the Rayon equals to one of the Specific Session Rayons, must receive Vector Surveillance Session data. Specific Session Rayons list for the session includes: ○ Rayon of the site, where the session was created; ○ Rayon of the session location, if corresponding field was filled in; ○ Rayon of any vector location, if corresponding field was filled in; ○ Rayon of the location of any vector surveillance session summary record, if corresponding field was filled in.

Entity	Filtration rule

	• Vector Surveillance Session data is sent to all sites of organizations, which are specific for the session. Specific organizations list for the session includes:
	     o Organization, specified in the "Collected By Institution" field for any vector/pool
	     o Organization, specified in the "Identified By Institution" field for any vector/pool
	     o Organization, specified in the "Collected By Institution" field for any sample
	     o Organization, specified in the "Sent To Organization" field for any sample
	     o Organization, specified in the "Tested By Institution" field for any laboratory test
	     o Organization, specified in the "Tested By Institution" field for any field test
	     o Vector Surveillance Session data is sent to all sites of organizations where session-connected Samples were transferred out.
	 • Vector Surveillance Session data is always distributed across the sites, where the connected Outbreak is sent, if the Vector Surveillance Session is the primary session for this Outbreak.

Basic Syndromic Surveillance Form	Standard filtration rules shall be applied to Basic Syndromic Surveillance Forms. The forms shall be replicated to all 1st and 2nd level sites. If a form is created on the 3rd level site this site shall receive all updates for this form.
Basic Syndromic Surveillance Aggregate Form	Standard filtration rules shall be applied to Basic Syndromic Surveillance Aggregate Forms. The forms shall be replicated to all 1st and 2nd level sites. If a form is created on the 3rd level site this site shall receive all updates for this form.
Transfer Out	Transfer Out data is sent to the site of the organization, specified in the "Transfer To" field. In case the "Filter Listed Records Only" setting in Country Global Settings equals Yes, then Filtration Records shall not be calculated for transfer out acts.
Person, Farm (connected to any Case or Session or Syndromic Surveillance Form)	Data about Person/Farm, connected to any Case or Session or Syndromic Surveillance Form, is transferred to the sites, where connected Case or Session or Syndromic Surveillance Form is transferred. In case the "Filter Listed Records Only" setting in Country Global Settings equals Yes, then Filtration Records shall not be calculated for persons and farms.
Geo Location (addresses and locations)	Data about a Geo Location, connected to Outbreak/Human Case/Vet Case/ VS Session or Person/Farm/Vector (connected to any Case or Session or Syndromic Surveillance Form), is transferred to the same sites as this entry. In case the "Filter Listed Records Only" setting in Country Global Settings equals Yes, then Filtration Records shall not be calculated for addresses and locations.

Entity	Filtration rule
Observation (FF Template instance)	Data about an Observation is transferred with its parent. The parent can be: • Human Aggregate Case • Vet Aggregate Case • Aggregate Action • Batch Test • Human Case • Test • Vet Case • Farm • Species • Animal • Vector In case the "Filter Listed Records Only" setting in Country Global Settings equals Yes, then Filtration Records shall not be calculated for observations.
Batch Test	Batch Test data is transferred to all sites, where all connected Tests are transferred. In case the "Filter Listed Records Only" setting in Country Global Settings equals Yes, then Filtration Records shall not be calculated for batches.

Aggregate Case/Action	• Aggregate Cases/Actions data is sent to all sites of organizations, which are specified for the aggregate case. Specific organizations list for the aggregate cases/actions includes:
	     o Organization, specified in the "Notification sent by: Organization" field
	     o Organization, specified in the "Notification received by: Organization" field
	     o Organization, specified in the "Entered by: Organization" field
	 • Aggregate Cases/Actions data is sent to all sites of the same rayon, as rayon, specified in field "General Info: Rayon" or rayon of the settlement, specified in field "General Info: Settlement" of the Aggregate Case.

Data Audit	Data Audit data is sent to all sites, where objects (Human Case, Veterinary Case, VS Session, AS Session, AS Campaign, Aggregate Case, Aggregate Action, Basic Syndromic Surveillance Form, Basic Syndromic Surveillance Aggregate Form, Person, Farm, Sample, Test, Batch, Transfer Out, FF Instance (Observation), Geo Location, etc.) connected to the data audit event are transferred.
Security Log	Security Log data is available on the site, where the security event occurred. Also, Security Log data shall be replicated to all 1st and 2nd level sites. Configurable filtration rules shall not be applied to Security Log.
Notification	Notification, connected to any object (case/session/aggregate case/aggregate action/Basic Syndromic surveillance form/Basic Syndromic surveillance aggregate form/campaign/outbreak/sample transfer out/test etc.), is transferred to the sites, where connected object is transferred. In case the "Filter Listed Records Only" setting in Country Global Settings equals Yes, then Filtration Records shall not be calculated for notifications.

3.3 Filtration Rules for Connected Objects

Connected objects are considered as non-separable parts of objects, described in Core Filtration Rules, therefore they are not transferred individually, but sent to the sites, where the corresponding parent object is transferred.

There are the following connected objects:

Connected object	Parent object
Accession In	Sample
FF value	Observation (FF Template instance)
Animal	Species
Antibiotic record	Human Case
Changed Diagnosis History	Human Case
Contact record	Human Case, Person
Herd	Farm
Sample	Human Case, Vet Case, AS Session, VS Session
AS Session Action	AS Session
AS Session Summary record	AS Session
Diseases and Species List in AS Session	AS Session
Outbreak Notes	Outbreak
Penside Test	Sample
Species	Herd
Test Amendment History	Test
Test	Sample
Test Validation and Interpretation	Test
Samples list in Transfer Out	Transfer Out
Vaccination record	Vet Case
Vector	VS Session
VS Session Summary record	VS Session
Vet Case Log	Vet Case

3.4 Not Filtered or Not Distributed Data

No filtration applied before the replication of the following entities:

- Organizations List;
- Employees List;
- List of Active Surveillance Campaigns;
- References and matrixes;
- Persons List;
- Farms List;
- Geo Location, which is an address of Organization or Person or Farm from actual lists;
- Published AVR queries/layout folders/layouts/views;
- GIS references (country/region/rayon/settlement);

- Freezers;
- Flexible Forms templates/sections/parameters/parameters types with values/rules;
- Aggregate Matrixes;
- Notifications, connected to any parent object, which is not filtered.

This data transferred fully to all sites of the system.

The data connected to the following entities is never distributed to other sites:

- GIS (Cartography);
- WHO data;
- AVR (excluding published queries/layout folders/layouts/views).

3.5   Configurable Filtration

Additional sites connections shall be specified for the 3rd level sites and these 3rd level sites shall be able to have additional sites connections with other any level sites. Namely, it shall be possible to configure the following rule for two arbitrary sites **A** and **B**:

*If any object described in sections Core Filtration Rules and Filtration Rules for Connected Objects is available on or transferred to the site **A**, it shall be also transferred to the site **B**.*

Therefore rules of configurable filtration shall be applied after rules described in the section Core Filtration Rules have already been applied to EIDSS entities/objects that have been modified and/or created since the last calculation of filtration records.

There is an exception to the rule of applying configurable filtration to all objects listed in the section Core Filtration Rules, namely: for Security Audit records, the additional site connections shall not play any role; these records are not distributed horizontally; they will be transmitted vertically to the parent site.

There are two kinds of configurable filtration rules:

- Rules of **bidirectional data transfer** between sites.
  During customization process, it is possible to specify groups of sites (usually neighbor sites of any level) that shall transfer all the data to each other. It is possible to combine not only third-level sites within one group of bidirectional data transfer.
  Site cannot be included in two different groups of bidirectional data transfer. In this case, sites from these groups shall be combined to one group.
  It is possible that the site is not included in any of the groups of bidirectional data transfer.
  See an example:
    - Site **A** shall share its data with the sites **B**, **C**, and **D**.
    - Site **B** shall share its data with the sites **A**, **C**, and **D**.
    - Site **C** shall share its data with the sites **A**, **B**, and **D**.
    - Site **D** shall share its data with the sites **A**, **B**, and **C**.
      Sites **A**, **B**, **C**, and **D** can be combined to one group of bidirectional data transfer.

- Rules of ***unidirectional data transfer*** between sites.

    During customization process, it is possible to specify connections between groups of sites connected by bidirectional data transfer rule and/or individual sites (usually for reportable sites), which affect data transfer in one direction (site/group ***A*** shares its data with site/group ***B***, but site/group ***B*** doesn't share its data with site/group ***A***).

    See an example:

    Site ***A*** is considered as reportable third-level site of the region ***R***, to which sites R_1, R_2, …, R_N belong, and sites R_3, R_4, …, R_N are combined to the group ***X*** of bidirectional data transfer.

    For this site, the following unidirectional rules can be configured:

    - Site R_1 shall share data with site ***A***.
    - Site R_2 shall share data with site ***A***.
    - Group ***X*** of sites R_3, R_4, …, R_N connected by means of bidirectional data transfer rule shall share data with site ***A***.

    See another example:

    Sites ***A*** and ***B*** are considered as reportable third-level sites of the region ***R***, to which sites R_1, R_2, …, R_N belong, and sites R_3, R_4, …, R_N are combined to the group ***X*** of bidirectional data transfer.

    Sites ***A*** and ***B*** shall be combined to the group ***Y*** of bidirectional data transfer.

    For the group ***Y*** of sites ***A*** and ***B***, the following unidirectional rules can be configured:

    - Site R_1 shall share data with sites' group ***Y***.
    - Site R_2 shall share data with sites' group ***Y***.
    - Group ***X*** of sites R_3, R_4, …, R_N shall share data with sites' group ***Y***.

Configurable filtration rules (both groups of sites connected by means of bidirectional data transfer and rules of unidirectional data transfer) shall be specified as a part of country-specific customization requirements if necessary. Usage of ***configurable filtration*** is optional for the country.

3.6   Border Areas Filtration

It shall be possible to configure specific filtration rules for the sites from border areas, namely: if the record (e.g. Case) is to be received/seen on Site ***A***, then it shall be also received/seen on the sites (***B***, ***C***, ***D***, etc.) that belong to the same branch (human or vet) and are located in border geographical areas.
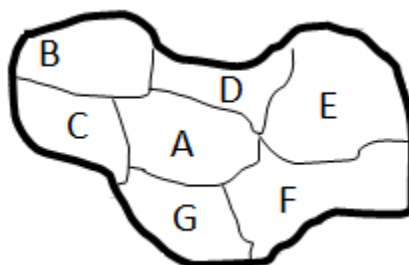
The first step, core filtration rules and both bidirectional and unidirectional configurable filtration rules are calculated to define if some record (e.g. Case) described in sections Core Filtration Rules is to be sent/seen on site ***A***. Then border filtration rules are applied to define to which border sites it shall be

sent as well. If any object is available on or transferred to the site **B** according to rules of **Border Areas Filtration** only (not by means of the other rules), then configurable filtration rules shall not be applied to filtration record containing information about selected object and site **B**.

See an example:

Let's consider calculation of filtration records for *Case 1*:

- o *Case 1* shall be transferred to sites **A** and **B** according to core filtration rules;
- o Site **A** shall share its data with site **C** according to configurable filtration, therefore *Case 1* shall be transferred to site **C**;
- o Sites A_1, A_2 and A_3 are specified as sites from border areas for site **A**; sites B_1 and B_2 are specified as sites from border areas for site **B**; sites C_1 and C_2 are specified as sites from border areas for site **C**. *Case 1* shall be transferred to the sites A_1, A_2, A_3, B_1, B_2, C_1, and C_2.
- o Site A_1 shall share its data with site **D**, and site C_1 shall share its data with site **F** according to configurable filtration. However, *Case 1* <u>shall not be transferred</u> to the sites **D** and **F**.

Rules of **Border Areas Filtration** shall be applied after rules described in the sections <u>Core Filtration Rules</u> and <u>Configurable Filtration</u> have already been applied to EIDSS entities/objects that have been modified and/or created since the last calculation of filtration records.

There is an exception to the rule of applying rules of **Border Areas Filtration** to all objects listed in the section <u>Core Filtration Rules</u>, namely: for Security Audit records, the rules of **Border Areas Filtration** shall not play any role; these records are not distributed horizontally; they will be transmitted vertically to the parent site.

The differences between bidirectional/unidirectional filtration rules and rules of border areas are as follows:

- Site sends data to the sites from border areas, but they do not send data to other sites by means of configurable filtration rules (i.e. rules of border areas will be applied after all other filtration rules are applied to the record);
- Each site has its own set of sites from border areas, to which it should send its data; groups of sites from border areas for two different sites can contain the same sites. (e.g. human/vet sites from border areas for site **B** are as follows: **A**, **C**, **D**; human/vet sites from border areas for site **C** are as follows: **A**, **B**, **G**; Site **A** belongs to border areas for both sites **B** and **C**).

Rules of **Border Areas Filtration** (lists of sites from border areas for specific sites) shall be specified as a part of country-specific customization requirements if necessary. Usage of **Border Areas Filtration** is optional for the country.