



**Abstract**

In November 2018, CTBTO staff came to Iraq to set up and install the capacity building system for our national data center. It includes analysis programs that have improved our analysis and allowed us to pinpoint the earthquakes that occurred in Iraq on the 25 November 2018. We, therefore, need to differentiate between earthquakes and events of human origin. The importance of implementing CBS is to enable us to continuously monitor and coordinate seismic activities in our region, receiving data using the International Monitoring System (IMS) data and IDC products for the region. verification of the treaty. By accessing and analyzing the seismic waveform Our earthquake detection in Iraq is an example of scientific applications related to non-proliferation. The proposed paper will focus on the role and comparison between the earthquake in Iraq in 2017 and 2018 and how CBS enhances IHS data processing capabilities.

**1- Background**

Capacity Building System (CBS) for Iraq National Data center was donated by Provisional Technical Secretariat (PTS). This implementation is requested all possible support in parallel with national efforts to strength launching phases. The NDC staff would be attend relevant training to have an appropriate skill for processing of Seismic, Infrasonic and Radionuclide data as well as interpretation criteria with preparedness issues.

**2- Donation of the CBS**

To address the challenges of limited infrastructure and inadequacy in analysis skills, the CTBTO under the EU Joint Action Project donated and installed a CBS in 2018. This is a deliberate strategy designed to provide the necessary support and assistance to the emerging NDCs to enable them come to a level where their contributions will be significant and of the same quality as that of their peers from the well-established NDCs.



Receiving CBS in February 2018

**Technical visit to Iraq**

**Stage 1: before Arrival to IQNDC**

- ❖ Communication with Iraq National Monitoring Authority for nonproliferation (INMA)
- ❖ Identify people (Administrative and Technical contact points for CBS)
- ❖ Based on the inputs provided, prepared and sent a hoc Agenda and reach agreement with the PPOC for its conduction

**Stage 2: upon arrival**

Upon arrival, the PTS technical visitors conduct a meeting to identify potential constraints and challenges based on local conditions and resources. [1]

**Stage 3: After departure**

The PTS technical experts provided a comprehensive report to INMA focusing on:

1. Success of installation process of CBS in IQ-NDC
2. Cooperation between the country and the CTBTO

**Evolution of Iraq NDC Equipment**

- ❖ As NDC requirement increase overtime, NDC gradually improve its equipment
- ❖ From 18-22 NOVEMBER 2018, two experts from CTBTO visited Iraq NDC to install Capacity Building System (CBS) equipment
- ❖ CBS equipment is donated to IQNDC under the CTBTO Capacity Building Program
- ❖ CBS equipment include server rack, computer server, workstation, printer, network switch and uninterruptible power supply (UPS)

**Impacts**

- ❖ Enhanced infrastructure capacity
- ❖ Improved NDC performance (support new operating system, more data storage)
- ❖ Better analysis accuracy and reliability

**Installation of the CBS**

**1 Unpacking the CBS equipment**

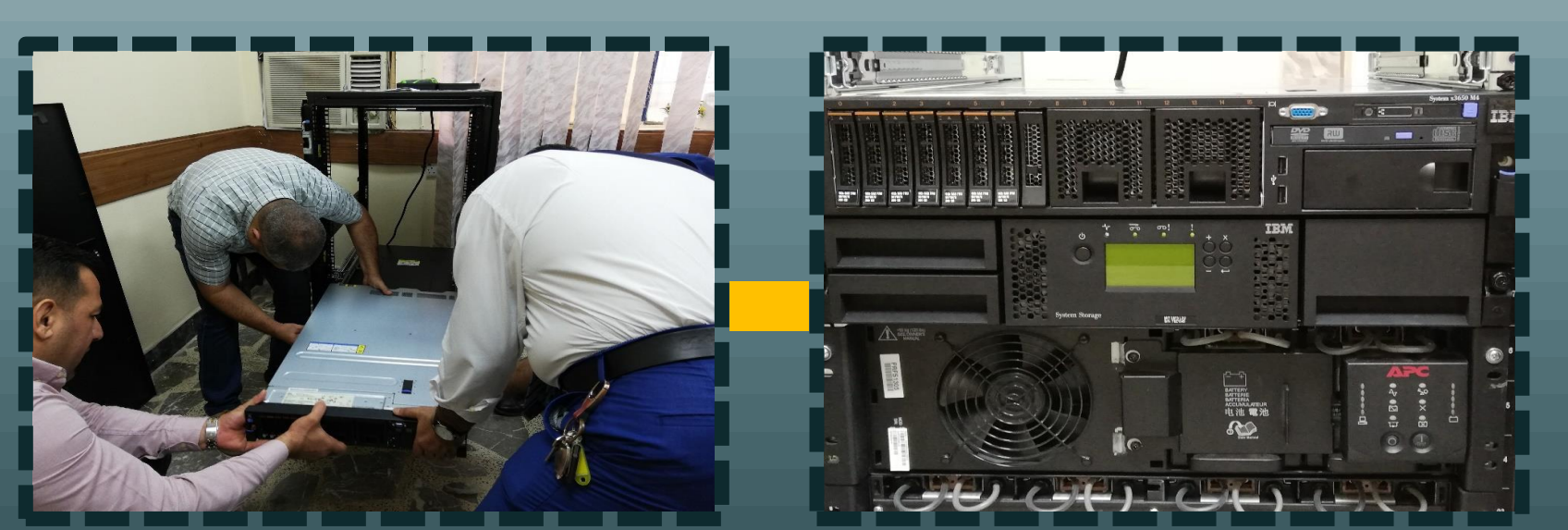


Unpacking the CBS equipment at the NDC room

**2 Starting the installation**



**3 Preparing the server**



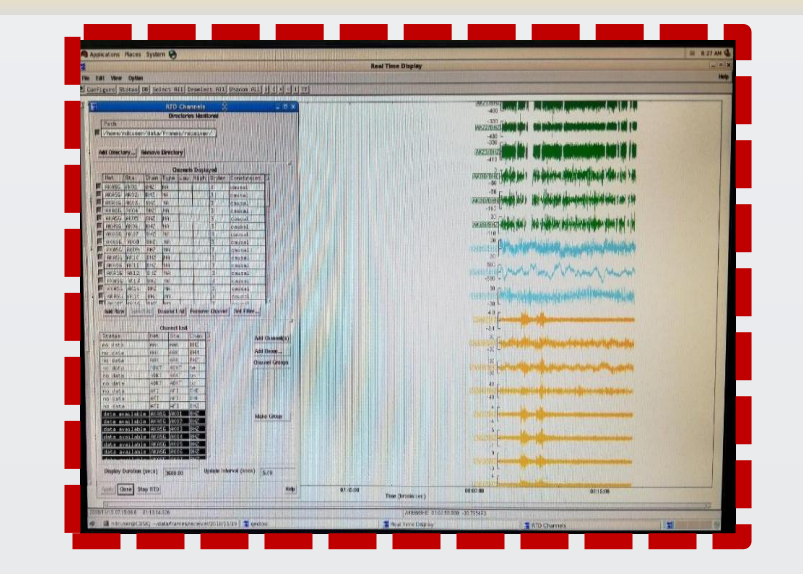
Installing the library and the server with help of IQNDC staff



Cabling of the equipment in the rack is completed

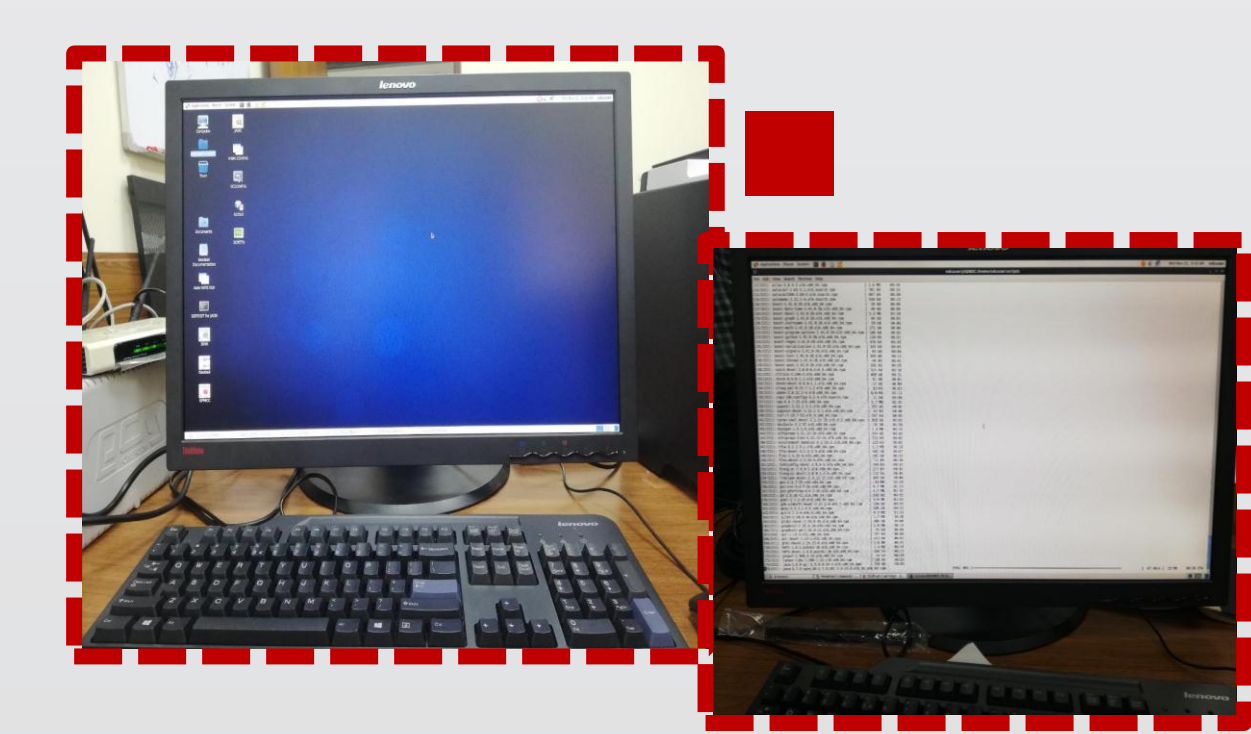
Server power on

**Receiving Real time data through the CBS**



IQNDC receives data from 7 IMS stations through the VPN

**NDC\_in\_a\_Box**



Install the last release of NDC\_in\_a\_box version 4.3 on the workstation provided with CBS equipment [2].

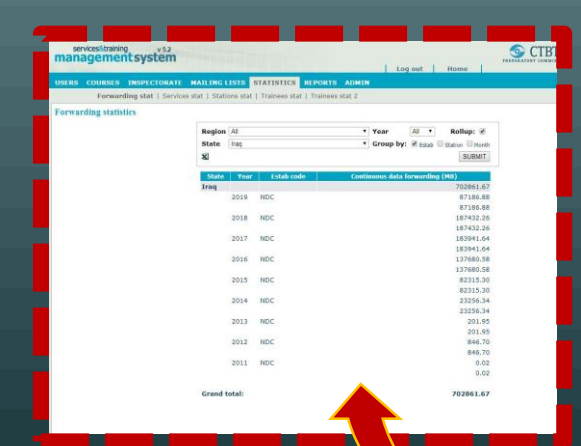
**Data analysis**

Seiscomp3 has been installed and configured to receive data from IMS and non-IMS stations (geofon network)



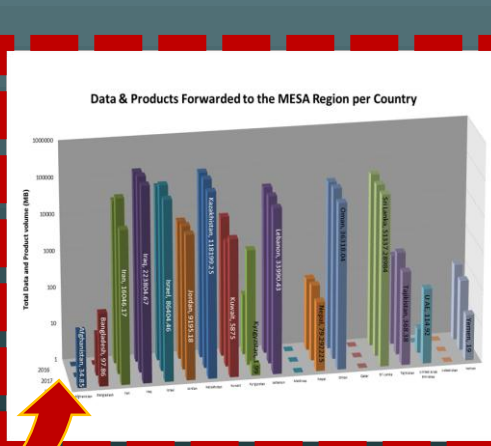
NDC Staff with CTBTO Experts

**Effects of CBS equipment Donation on Data Volume retrieval (in Gigabytes)**



Statistics for data forwarding to Iraq from Capacity Building and Training section

Data and products of MESA Region presented during WGB-52



**Data analysis (data from secure web portal)**  
**1- Using Geotool Analysis results Standard Event Lists (SEL2)**

Location	Date	Time
The boarder of Iraq and Iran	12\11\2017	18:18:21
latitude	Longitude	Magnitude
35.10	45.90	5.9

A Table showing the station names and the date of arrival time of the waves to each station

Phase Type	Arrival Time	Station Name
P	18:20:47	GYET
P	18:20:56	BRTR
P	18:24:02	GERES
P	18:24:45	FINES
P	18:24:35	MKAR
P	18:24:23	KEST
P	18:24:52	ZALV
P	18:25:19	ARCES
P	18:25:46	ESDC
P	18:26:40	SONM
P	18:27:41	DBIC
P	18:30:24	ILAR
P	18:31:28	ULM
P	18:30:32	YKA



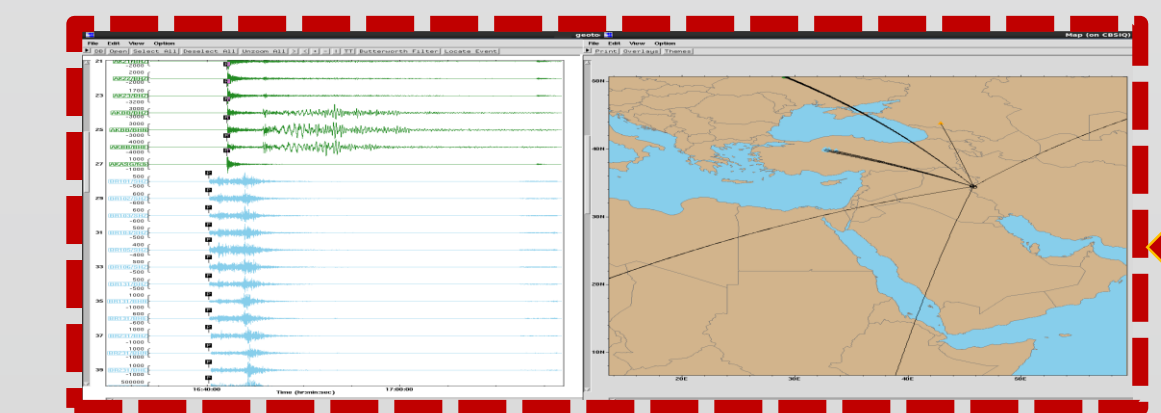
The Figure shows the event analysis

The location of the event

**Data analysis (using CBS)**

Location	Date	Time
The boarder of Iraq and Iran	25\11\2018	16:37:32
latitude	Longitude	Magnitude
34.460	45.774	5.5

Phase Type	Arrival Time	Station Name
Pn	16:39:55	KBZ
Pn	16:40:11	BRTR
P	16:42:05	AKASG
P	16:44:12	ZALV
P	16:44:36	KMBO
P	16:45:48	TORD



Data Analysis for Iraq- Iran Boarders in 25 November 2018

**Conclusion**

The difficulties encountered by the NDC the effective access and analysis of IMS data and IDC products have been well addressed by the provision of the CBS and make data from the IDC Very reliable.

**Acknowledgment**

Our immense appreciation is to both the CTBTO and the EU for the CBS equipment and other supports.

**References**

1. Remmy Phiri, Misrak Fisseha, Dale Roblin, Mario Villagran, Lucrezia Terzi, Jun Hee Lee, Martin Kalinowski, Lamine Seydi, Belkacem Djermouni, John Coyne and Lassina Zerbo, CTBT Science and Technology 2013 Conference, T2-P10. Building Capacity to enhance use of data and by States Parties.
2. Russol Al-dulaimy and Waseem Allan, CTBTO, "Report on capacity building installation", 18-22 Nov 2018.