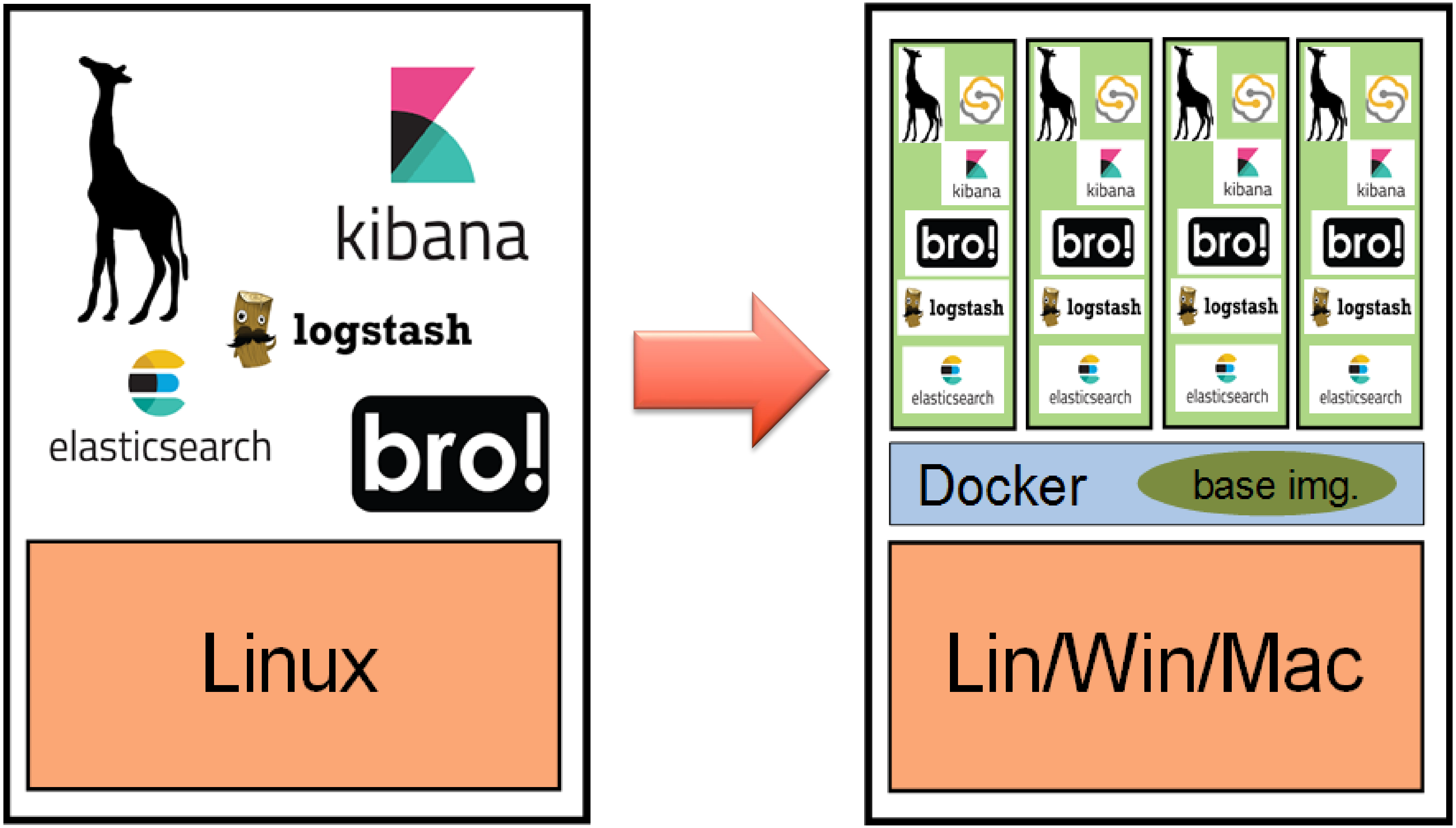
# Introducing CopAS

## CopAS tool

- fine-tuned production-ready framework running Elastic Platform developed in collaboration with Police CR (PCR)
- Bro, LogStash, ElasticSearch and Kibana
  - possible integration of other tools
- graphical user interface
- a set of pre-prepared dashboards and visualizations

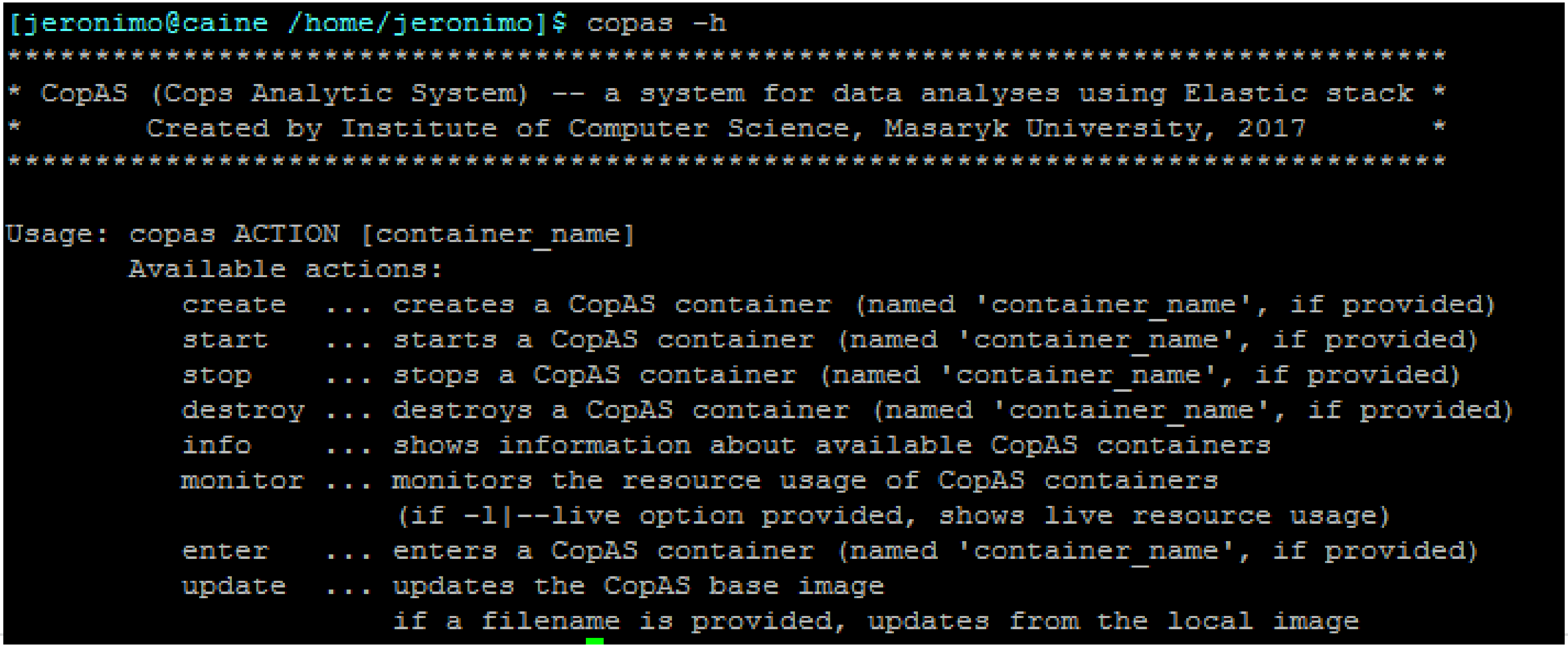
- main emphasis on user-friendliness and ease of deployment & use
  - employs Docker for easier deployment
  - runs on all systems with Docker available (Windows, Linux, MacOS, ...)
- allows for generic usage (not only intended for PCR purposes)

# Introducing CopAS



# CopAS – container management

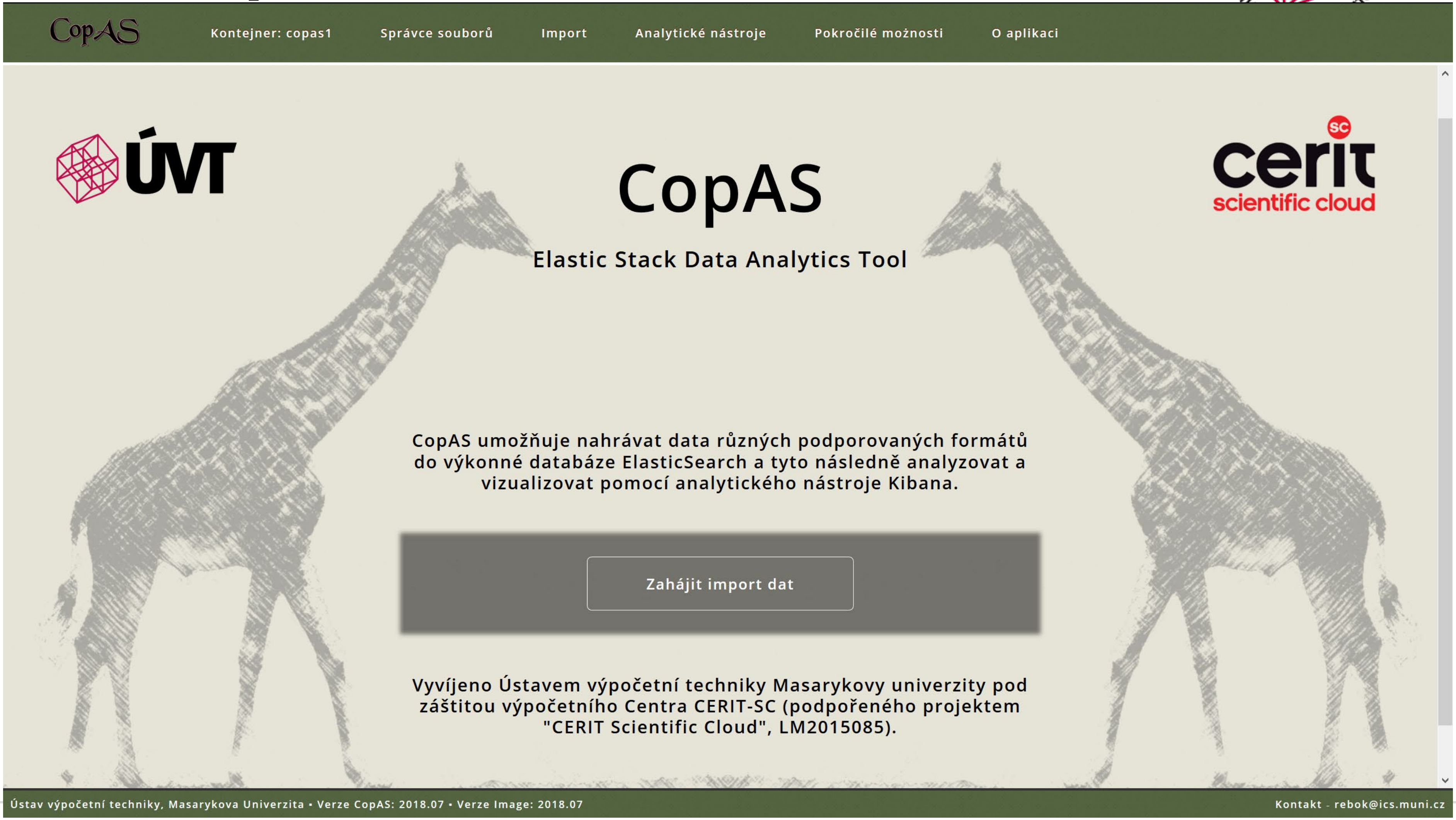
- `copas ACTION [container name]`
  - *a tool for CopAS container management*



```
[jeronimo@caine /home/jeronimo]$ copas -h
**********************************************************************************
* CopAS (Cops Analytic System) -- a system for data analyses using Elastic stack *
*       Created by Institute of Computer Science, Masaryk University, 2017       *
**********************************************************************************


Usage: copas ACTION [container_name]
       Available actions:
          create  ... creates a CopAS container (named 'container_name', if provided)
          start   ... starts a CopAS container (named 'container_name', if provided)
          stop    ... stops a CopAS container (named 'container_name', if provided)
          destroy ... destroys a CopAS container (named 'container_name', if provided)
          info    ... shows information about available CopAS containers
          monitor ... monitors the resource usage of CopAS containers
                      (if -l|--live option provided, shows live resource usage)
          enter   ... enters a CopAS container (named 'container_name', if provided)
          update  ... updates the CopAS base image
                      if a filename is provided, updates from the local image
```

# CopAS – user environment



CopAS

Elastic Stack Data Analytics Tool

CopAS umožňuje nahrávat data různých podporovaných formátů do výkonné databáze ElasticSearch a tyto následně analyzovat a vizualizovat pomocí analytického nástroje Kibana.

Vyvíjeno Ústavem výpočetní techniky Masarykovy univerzity pod záštitou výpočetního Centra CERIT-SC (podpořeného projektem "CERIT Scientific Cloud", LM2015085).

Ústav výpočetní techniky, Masarykova Univerzita • Verze CopAS: 2018.07 • Verze Image: 2018.07

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# Ministry of Defence Research project

## ANALYZA = Complex Analysis and Visualization of Large-scale Heterogeneous Data

- a research project submitted to the "*Security Research Program of the CR for 2015-2020*" of Ministry of Defence CR
  - solution period: 1.1.2017 – 31.12.2020
- project goals: to develop a distributed system supporting complex analyses of heterogeneous data of large amounts
  - especially digital artifacts collected during police investigations
- the goal is to develop a system usable in 2021+
  - stable and scalable technologies

# Basic Requirements I.

(ANALYZA = Complex Analysis and Visualization of Large-scale Heterogeneous Data)

## The proposed/developed distributed system has to:

- **deal with various heterogeneous data**
  - network logs, financial logs, multimedia and document data, telecommunication data, real-world findings, ownerships, etc.
    including large collections and/or larger data files
  - flexibility for future data types is a must
- **allow intra-domain as well as inter-domain analyses**
  - *„Is there a community, which the subject regularly communicates with, no matter which technology is he/she using?“*
  - inter-domain analyses performed in the same way as intra-domain ones
- **allow explorative (interactive) analyses**
  - analysts don‘t know in advance, what they are looking for
    (the crime suspect is not always known)
  - the system has to allow for various types of queries and analyses
  - including local indications of suspects, evidences and findings

# Basic Requirements II.

## The proposed/developed distributed system has to:

- **provide useful and scalable views**
  - including visualizations of complex relationships
  - generic visualizations (graphs, location-based and time-based views, etc.) vs. analysis-specific visualizations
- **support collaborative team work**
- **provide high level of security**
  - even analysts from the same PCR team do not always share their data
- **etc. etc.**

# Few Analyses Examples

(The ones that we implement as demonstration use-cases)

## Smart Community Identification

- community of entities, which somehow cooperate on a crime
- can be identified over various data types (network and telecommunication communication, financial „communication“, known meetings, ...)

## Suspicious Transactions Detections

- lookups using behaviour patterns
  - which can be used for different data types as well
- many research papers published detection methods of „money laundering“

## Complex Network Analyses

- based on entity behaviour patterns
- currently deeply investigated using graph databases (Dgraph)

# Few Analyses Examples

## Pictures/Photos Analyses

- photos with 2 or more people (meetings)
- photos catching particular person
- children porn photos
- photos from particular environment (room)
- etc.

## Location-based and/or Time-based entity behaviour

- based e.g. on GSM cell positions of travelling entities

## And many many others …

- PCR can provide lots of them
  - our demo use-cases are based on publicly available methods

# Conclusions

## Data analysis in cooperation with PCR

- **interesting and attractive collaboration**
  - parts of collaboration under NDA

    many parts running under established mutual trust
  - *personal motivation:* building safer society ☺
- **many open problems from various research areas**
  - including artificial intelligence, natural language processing, etc. etc.
  - colleagues/partners interested in such a collaboration still welcomed ☺

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