ParAd Installation Guide

https://github.com/dazeorgacm/ParAd

Tested April 12, 2019 on Ubuntu 18.04.1 LTS, x86-64 (Dell Inspiron 15, 5000 series).
Most of prerequisite software is installed from source code.

1. Download recent version of ParAd (source code) from **https://github.com/dazeorgacm/ParAd**

For instance: ParAd-1.2.3.tar.gz

2. Extract the archive (to you home directory)

```
>tar -zxvf ParAd-1.2.3.tar.gz
```

3. Enter ParAd directory and read README.md file

```
>cd ParAd-1.2.3
>cat  README.md | more
```

4. Install prerequisite software from the specified locations

Return to you home directory

```
>cd $HOME
```

4.1. Install compilers etc

```
>sudo apt install gcc
```

```
>sudo apt install gfortran
```

```
>sudo apt install g++
```

```
>sudo apt install make
```

```
>sudo apt install cmake
```

```
>sudo apt install m4
```

4.2. MPICH

4.2.1. Download MPICH source code from www.mpich.org

For instance: mpich-3.3.tar.gz

4.2.2. Extract the archive (to you home directory)

```
>tar -zxvf mpich-3.3.tar.gz
```

4.2.3. Enter MPICH directory

```
>cd mpich-3.3
```

4.2.4. Configure MPICH

```
>./configure
```

4.2.5. Build MPICH

```
>make
```

4.2.6. Install MPICH

```
>sudo make install
```

Installed by default to /usr/local

4.2.7. Return to your home directory

```
>cd $HOME
```

4.3. GraphBLAS – for sparse integer matrix multiplication

4.3.1. Download SuiteSparse from http://faculty.cse.tamu.edu/davis/suitesparse.html

For instance: SuiteSparse-5.4.0.tar.gz

4.3.2. Extract the archive (to you home directory)

```
>tar -zxvf SuiteSparse-5.4.0.tar.gz
```

4.3.3. Enter GraphBLAS directory

```
>cd SuiteSparse
>cd GraphBLAS/build
```

4.3.4. Configure GraphBLAS

```
> cmake ..
```

4.3.5. Build GraphBLAS

```
>make
```

4.3.6. Install GraphBLAS

```
>sudo make install
```

Installed by default to /usr/local

4.3.7. Return to your home directory

```
>cd $HOME
```

4.4. 4ti2 – for solving linear Diophantine system

4.4.1. Download 4ti2 from www.4ti2.de and https://4ti2.github.io/

For instance: 4ti2-1.6.9.tar.gz

4.4.2. Extract the archive (to you home directory)

>tar -zxvf 4ti2-1.6.9.tar.gz

4.4.3. Enter 4ti2 directory

```
>cd 4ti2-1.6.9
```

4.4.4. Configure 4ti2

```
>./configure
```

4.4.5. Build 4ti2

```
>make
>make check
```

4.4.6. Install 4ti2

```
>sudo make install-exec
```

Installed by default to /usr/local

4.4.7. Return to your home directory

```
>cd $HOME
```

4.5. METIS – for graph partitioning

4.5.1. Download METIS from http://glaros.dtc.umn.edu/gkhome/metis/metis/download

For instance: metis-5.1.0.tar.gz

4.5.2. Extract the archive (to you home directory)

>tar -zxvf metis-5.1.0.tar.gz

4.5.3. Enter METIS directory

```
>cd metis-5.1.0
```

4.5.4. Configure METIS

```
>make config
```

4.5.5. Build METIS

```
>make
```

4.5.6. Install METIS

```
>sudo make install
```

Installed by default to /usr/local

4.5.7. Return to your home directory

```
>cd $HOME
```

5. Buld ParAd

5.1. Enter ParAd directory

```
>cd ParAd-1.2.3
```

5.2. Build ParAd

```
>make
```

6. Test ParAd

6.1. Enter test directory

```
>cd test
```

If required add rights to execute tests

```
>chmod +x test_*
```

6.2. Run tests

```
>mkdir output
```

```
>./test_mpi
```

In case of success you will finally get

```
All the tests completed successfully!
```

To estimate speed-up the clan aggregation brings

```
>./test_agg_mpi
```

Note: copy ParAd to /usr/local/bin to install it for all users

```
>sudo cp ParAd /usr/local/bin
```

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