NetworKit
An Interactive Tool Suite for High-Performance Network Analysis
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NetworKit
- is an open-source software package for high-performance analysis of large complex networks
- uses shared-memory parallelism and scales from notebooks to compute servers
- combines kernels written in C++ with a convenient interactive interface written in Python.

Design Goals
- performance
- interface
- integration
- scalable algorithms, employing parallelism approximation
- performance-aware implementation
- modular design
- interactive usage via Python
- Python ecosystem for scientific computing & data analysis
- additional network analysis software (e.g. Gephi, NetworkX)

Analytics

Community Detection
Parallel Community Detection Heuristics
[Staudt, Meyerhenke, ICPP 2013]
- PLM: modularity-driven multi-level technique, based on sequential Louvain method [Blondel et al. 2008]
  - high modularity
  - fast, scales to billions of edges
- PLP: parallel label-propagation technique, based on [Raghavan et al. 2007]
  - fastest community detection heuristic
  - scales well with the number of processors
- EPP: ensemble technique, combining several weak classifiers into a strong one

Core Decomposition
k-cores result from iteratively peeling away nodes of degree k - O(m) time algorithm [Barabási, Jeong 2000]

Diameter
- exact calculation (BFS/Dijkstra) - O(m + n) time algorithm
- fast approximation with bounded error [Klostermeyer et al. 2000]

Graph Generators
- Barabási-Albert model
  - produces networks with powerlaw degree distribution
  - static and dynamic generator
- Chung-Lu model
  - replicates any given degree distribution
- R-MAT generator
  - popular high-performance graph generator
  - powerlaw degree distribution, small-world property and self-similarity
- PubWeb generator
  - geometric disk graph model
  - simulates P2P network
  - static and dynamic generator

Open Source
By publishing NetworKit under the permissive open-source MIT license, we encourage usage and contributions by a community of algorithm engineers and data analysts. We thank all previous contributors.
Get NetworKit: http://www.network-analysis.info

Future
- improved support for dynamic and attributed graphs
- dynamic network analysis algorithms
- specification, filtering and compression
- new generative models