

## عنوان مقاله:

An Invasive Weed Optimization-based Energy and Resource-efficient Workflow Scheduling Algorithm for the Cloud Environment

## محل انتشار:

بیستمین کنفرانس بین المللی فناوری اطلاعات، کامپیوتر و مخابرات (سال: 1402)

تعداد صفحات اصل مقاله: 20

## نویسندگان:

Ramin Sabzalizadeh - *Department of Computer Engineering, Tabriz Science and Research Branch, Islamic Azad University, Tabriz, Iran*

Saeid Barshandeh - *Department of Computer Science, School of Engineering, Afagh Higher Education Institute, Urmia, Iran*

Sudabeh Gholizadeh - *Department of Computer Science, School of Engineering, Afagh Higher Education Institute, Urmia, Iran*

## خلاصه مقاله:

Workflow Scheduling (WS) has many applications in science, medicine, and engineering. Numerous algorithms are proposed to solve WS in cloud environments. However, resource efficiency is not appropriately investigated in existing algorithms. Considering resources provisioned for workflows in an inefficient manner results in a huge excessive use of resources. Consequently, developing new methods or enhancing the existing ones is still a hot research field. In the recent approaches, the WS is formulated as an optimization problem, and metaheuristic algorithms are recruited to optimize it. The Invasive Weed Optimization (IWO) algorithm is employed in the current paper, and a new resource-efficient WS algorithm is provided for the Azure cloud environments. The IWO is discretized to apply to the WS problem in the proposed algorithm. Then, the discrete IWO is combined with the Heterogeneous Earliest Finish Time (HEFT) algorithm to map the cloud tasks to the available resources. Also, the concept of code distance is used in the spatial reproduction phase. Likewise, the resource allocation phase employs the Earliest Finish Time (EFT) and Earliest Start Time (EST) methods. Besides, Effective Reduction (ER) is recruited to reduce resource usage considering the makespan. The proposed algorithm is applied to various DAG-based networks, and the obtained results are compared with GA, Upward ranking, Downward ranking, and Level ranking methods in terms of makespan, Scheduling Length Rate, and Communication Cost Rate criteria. The experimental results demonstrate the superiority of the proposed algorithm over the competitors.

## کلمات کلیدی:

Task scheduling, invasive weed optimization algorithm, cloud computing, resource-efficient exploitation

## لینک ثابت مقاله در پایگاه سیویلیکا:

<https://civilica.com/doc/1769185>



