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Marek BORZESTOWSKI*
Maciej WASZCZYK**

MORAL KNOWLEDGE EXPERT SYSTEM. ON THE BORDERLINE BETWEEN BUSINESS ETHICS AND NEW TECHNOLOGIES

In the following article the authors would like to present a preliminary concept of building an Expert System in the Internet as far as moral knowledge is concerned, called Moral Knowledge Expert System. The idea is to apply the faculties of the worldwide Internet web as well as the concepts being developed in knowledge management with regards to moral problems present in economy. The system would include expert knowledge, acquisition of knowledge about actual moral choices and their consequences, and categorising and data processing in the knowledge database – an element of expert system. As a result, the system would enable a user to learn about consequences of moral choices before making them. The basic human freedom of choice would stay not interfered with due to such a polarization of the system so as not to force a choice but give material to consider only.

Knowledge Management, Decision Support System, the Internet, Business Ethics

1. INTRODUCTION

Knowledge management and expert system construction is not only a fashionable, but also necessary development path both for scientific research and business practice. The amalgamation of this new approach and traditional ethical knowledge appealed to the authors so much that they have therefore decided to present basic ideas concerning Expert System in the Internet in relation to moral knowledge, called here Moral Knowledge Expert System (MKES).

The article consists of three parts. Part one present short theoretical ground for building MKES, part two– the general overview of the system including the general description of processes. The third part explores some detail solutions including category choice outline; namely the first stage of database completion.

* Sokrates Inwestycje Sp. z o.o.
** Gdansk University of Technology, DLF Sp. z o.o.

2. DECISION SUPPORT AND ETHICS

The research in decision-making theories began during the Second World War. The idea was to find an algorithm of procedure for certain assumptions. The need for such a conduct was dictated by the following:

- the increase of data to be processed by decision makers,

- limited time resources for the decision-making.

The beginning of 1970s saw an implementation of DSS (Decision Support System) - an interactive computer system for managerial use as a system supporting decision making in unstructured, complex and fuzzy processes. It combines the intellect of many individuals with faculties of a computer in order to improve the velocity and quality of decisions made. The term Decision Support System concerns many particular techniques supporting decision-making and areas where it is in use as a standard. Modern computer systems are undergoing gradual evolution starting from uncomplicated transaction systems, through information systems, up to decision support systems, expert systems, neuron nets and knowledge management systems. The main business areas where these are applied are: accounts, finance, controlling, retailing, human resources management, customer relation management, e-retailing, and others. Computer technology development, particularly the Internet introduction creates new possibilities for further evolution of decision support systems.

Ethical issues, seemingly indirectly correlated with value building for shareholders, have not yet been a subject of interest for engineers designing decision support systems. However, the ever changing business environment and the galloping globalisation makes managers consider new goals, other than mere maximizing profits for owners. There are, among others, dilemmas like: unemployment, poverty, environmental issues, local communities' lives participation, corruption, which require a holistic outlook from businessmen. A new, more general view over their activity is needed; the economic prism does not suffice. Such an approach will ensure protection against new conflicts, where the poor and unemployed resist the elite that is controlling world economy. Obviously, each such a conflict bears negative consequences for the economic system. The authors of this article believe that it is possible to create adequate information tools to help make decisions in those areas with a help of computer systems, the Internet, expert knowledge and social expectations.

The complexity of modern life makes one refer not only to two-value logics of decision making, but also to *fuzzy logics* where logical value gets fuzzy into 'closer to true' and 'closer to false' [See also: 11]. The world is not black and white, and people more and more appreciate the existence of such situations where moral choice is not an easy one. This is particularly clear in the context of differentiating ethical relativists from ethical absolutists [See also: 6].

The authors will later refer to the utilitarianism, according to which decisions made bear consequences - the criterion of just and unjust choices, according to the

rule that whether an act is just or unjust depends on its complete consequences [9]. To simplify, we can assume that when faced with a dilemma where the decision depends only on few variables, a person most probably can foresee the consequences of such a choice.

However, every decision in today's world depends on many variables. Their analysis often transgresses intellectual abilities of man and is, therefore, able to project only a few of potential consequences of an act. Problem solving and decision making requires a coordination of actions and knowledge in a group. To be able to assemble many people's knowledge in one place without using information technologies is very difficult. One solution, therefore, is to build an open, universal communication platform: MKES can be one.

Another source of MKES as an idea is findings that the basic problem of prescriptive ethics is the fact that theoretical justification for moral choices remains within a narrow circle of specialists. The moral choice acts do not openly refer to ethical theories. They are an effect of the following:

- current events consideration,
- own experience,
- advice of other people either from close or distant circles.

In the past moral choices were made in reference to theories, yet not openly as they were, to a bigger or smaller extent, a basis for existing religions and ideologies. There were ethoses, and obeying them was synonymous to living in a law-abiding society.

Nowadays, the society more and more often and to a greater extent thinks in economic categories, rarely in ideological ones. In the era dominated by new technologies, era where freedom of conviction and conduct have left their mark, *homo economicus* is making moral choices without referring to either ethical theories, which he does not know, or to current ethoses, as their number, fragility and spreading create a specific mosaic. It is difficult for a layman, manager or businessman to decipher this mosaic. Hence the need for building a database that would enable a referral to group experience on the stage of consideration.

An attempt to find the theoretical grounds for such an approach proved difficult due to the fact that it refers to seemingly two different sources:

- Socrates 'knowledge search' about good and evil as a basis for virtue.
- utilitarianism that defines good as maximizing of the sum of intrinsic value or minimizing of the sum of intrinsic disvalue.

The authors claim that, theoretically, the difference between those two ethics is not as big as it appears to be. It is true that Socrates ethics refers to the virtue idea as a permanent state of the soul (mind) to perform good. However, Socrates left some area to utilitarian interpretation of his concept while building his definition of virtue as possible to learn.

Teaching virtues, Socrates claimed a contradiction between wrong acts and common sense, but also between wrong acts and their consequences.

The theory that a permanent state of the soul (mind) to perform good acts, which are based on knowledge about good, irrespectively of their frequency and/or intensity, is an undeniable input of Socrates to the western civilization. Another

words, a person who has sufficient amount of own and other people's experience is able to choose good, independently from the frequency (multiple bribe proposal) and/or intensity (high bribe proposal) and/or rationalization of the act by social habits (everyone takes bribes).

The sense of knowledge about good, therefore, lies in the ability to build an appropriate argumentation based on database MKES. A question arises here: what kind of information should such a database contain? Trying to answer that, one must find that database ought to include two kinds of information:

- information about acts,
- information about their realistic consequences.

In this context the rule of summing goods as consequences of acts is particularly important to connect acts and their consequences. The authors realise that the above-mentioned assumption is as questionable as the assumption that to know means to act well. This utilitarian concept is under constant discussion. According to G. E. Moore the summing of goods include both fuzzy and holistic elements. One can find them in the organic integrity rule according to which the entirety of valuable elements can be invaluable and the other way round [12]. It is assumed that finding a solution here goes beyond the current stage of designing MKES; the authors leave the questions for further research.

3. EXPERT SYSTEMS

Expert systems (ES) use knowledge assembled on computers for solving problems that require expert knowledge. An adequately designed expert system imitates the way of thinking of a specialist in a field. ES are used to promote unique knowledge to many users in order to support the decision making process.

Generally expert systems are equipped with [Figure 1]:

Knowledge database – which includes appropriate facts and rules vital to understand form and solve a problem. Knowledge, not simple facts are its elements.

Inference-engine – known as the system's brain, which is a computer programme responsible for the methods of inference based on information from the database as well as formulating answers. In the process expert system uses two-valued, many-valued or fuzzy logic.

Interface – a computer programme equipped in tools to facilitate the communication between system and users.

Apart from the above mentioned, ES can include additional components as: subsystem knowledge acquisition, explaining subsystem and a dialogue steering subsystem.

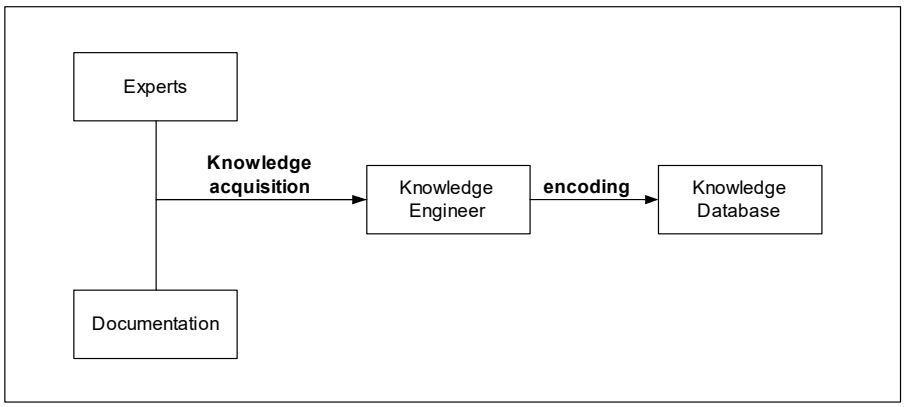

Figure 1. Direct method of knowledge acquisition [14].

As far as advisory expert systems are concerned, a key process is the acquisition of knowledge. Knowledge that is unstructured and often difficult to verbalise. Knowledge engineer's task is the acquisition of knowledge and its structuring and formalising through a dialogue with one or many specialists in a field [Figure 2].

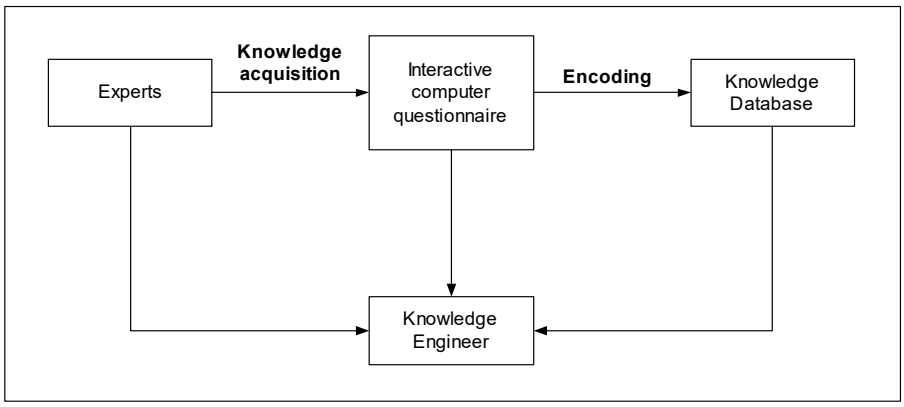

Figure 2. Computer assistant method of knowledge acquisition [14].

Knowledge engineering involves knowledge acquisition demonstration, verification, explanation and maintenance. Being both, time consuming and difficult to do, the process enables knowledge engineering to contact a limited number of experts. Successful knowledge acquisition depends on the personality of a knowledge engineer who should build positive relationships with experts.

The Internet enables constructing such a system where the knowledge engineer's role is taken by a "virtual knowledge engineer", a computer programme, ensuring knowledge acquisition from the experts without a face-to-face contact.

University of Calgary has already conducted such experiments where a system of knowledge acquisition has been designed and applied using WWW [15].

4. MKES – GENERAL CONDITIONS

MKES consists of [Figure 3]:

- collecting and data processing system (CDPS),
- senders (S),
- recipients (R),
- authorities (A).

Collecting and data processing system CDPS categorizes, stores and processes information that needs to be synthesised and displayed on interface of the MKES.

MKES works on the computer database with input and output via the Internet (WWW interface). Therefore the basic function of MKES is categorizing of information, namely collecting and storing it in appropriate categories; the next chapter explains it in more detail.

Senders (S) are to deliver information about moral decisions made and their consequences. To do so they use WWW interface, inserting data concerning real problems and moral dilemmas, their solutions and consequences to the system.

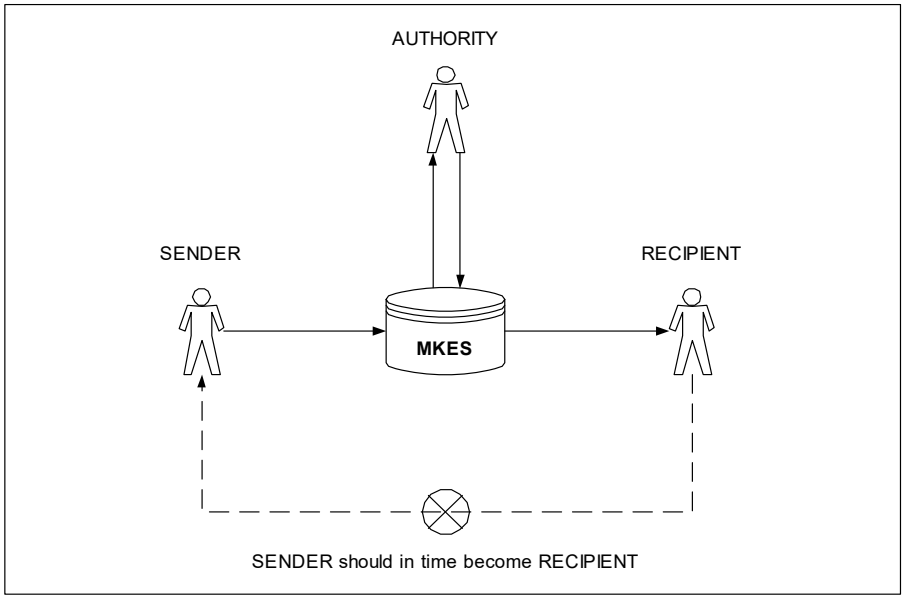

Figure 3. Moral Knowledge Expert System.

Recipients (R) are to ask opinion of MKES before making a moral decision. This element is maybe the most controversial from theoretical point of view as some philosophers claim that moral decisions should be result of consideration of

intrinsic value not of its results. It is not the case of utilitarian concept, as mentioned before. Intrinsic value, either resulting from moral law (duty), immanent to human in Immanuel Kant philosophy, or given to human in supernatural way in Christian personalism, or resulting from responsibility imperative according to responsibility rule, is not a subject of consideration in utilitarianism, which concentrates not on intrinsic value but on consequences of acts. Those acts must be good for many people, not only for one person driven by intrinsically good [See also: 8, p. 555]. Concluding, the authors believe that recipient R asking the system does not limit his free will. Recipient is to do one more important thing, namely to act as sender S after making moral decision and to complete database in his decision and its consequences. Feedback in the system is fulfilled and MKES becomes fully interactive.

Authorities, legible for commenting data, are to look after substantial correctness of results. The role is to administrate the system and ensure lack of wrong results. Imagine the situation where many senders S positively assess the consequences of the acts wrongly and the system displays the result: X number of experiences indicates that bribery in an auction results in good Y for a number Z of employees of a winning company. The authority should now comment: bribery in an auction results in lack of good for Y_1 for number Z_1 of employees of other losing companies and lack of good for Y_2 for number Z_2 users who must work with a given product, worse than others, but did not win the auction as it was fixed.

A good example is the first price auction to build a bridge across a river. As a result of a bribe company A, which used worse materials in a longer period of time, won the auction. It means that, in spite of gaining some profits by owners and employees of company A, at company B owners' expense. What is more, the users of the bridge had to take a diversion route via a bridge 20 km away and could not use the bridge comfortably longer than 1 year after the completion, because of numerous accidents and inconveniences caused by holes and ruts. The authority A should in this case comment and correct the result obtained from MKES having consulted the senders. Going back to general process in the system, hereby we present a simplified graph [Figure 4].

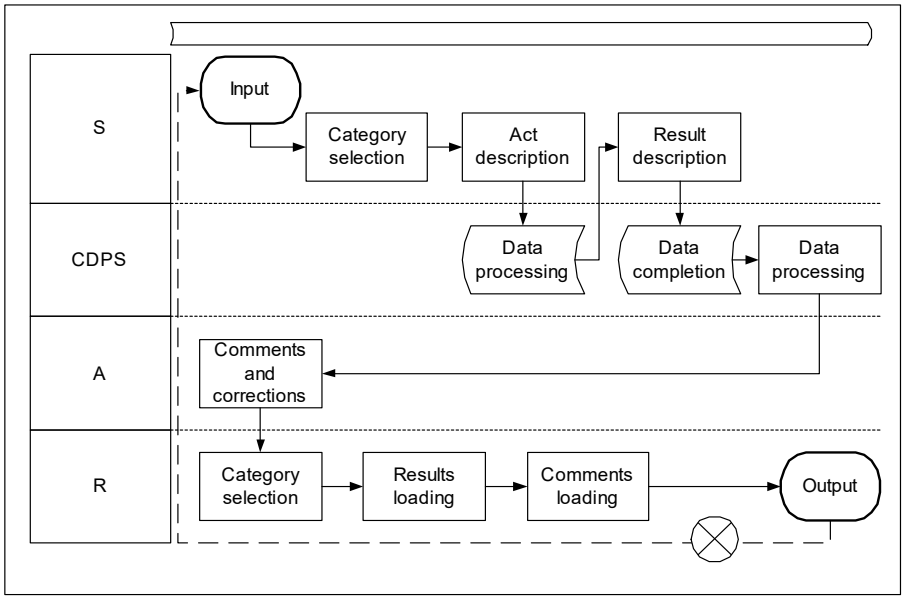

Figure 4. MKES process.

On the input to the system, UN selects a moral category. The process will be presented in the final part of this article. The selection of a category is to facilitate the elimination of those activities that do not have a moral character. The next step is to describe a moral act, and insert data into the database. Describing of consequences, as the following step, can happen later and is, therefore, highlighted as the next step. The system then processes the data, generating a synthetic report that is verified by authority A.

The process is complete when entering the system of R who, having selected a category, reads comments and can then become S straight after having shared his experiences, restarting the process.

Clearly, the key element of MKES functionality is category selection, thus its detailed description follows below.

5. DETAILED CONDITIONS OF MKES – CATEGORY SELECTION

Category selection process is shown below [Figure 5].

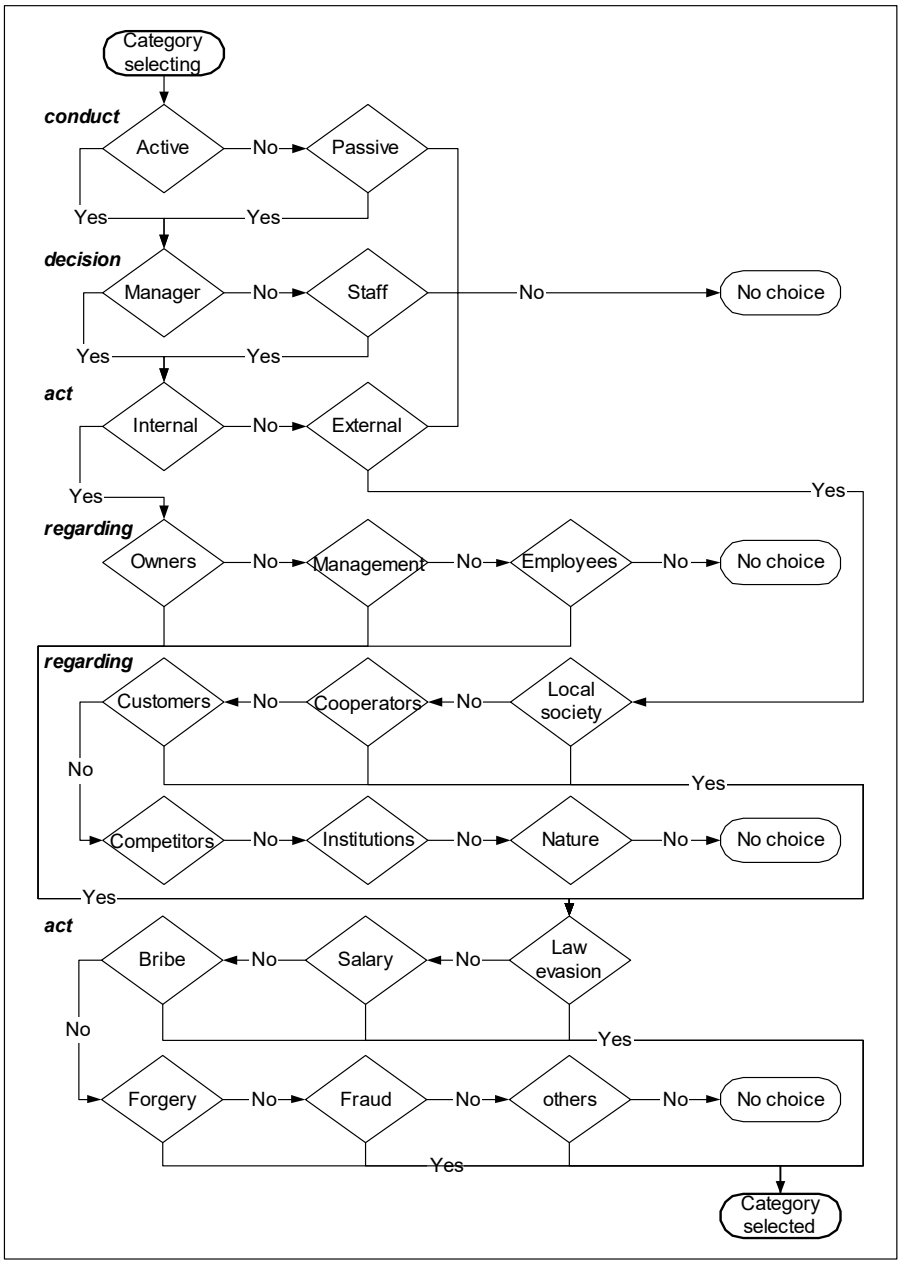

Figure 5. Category selection process.

The questions of CDPS for S or R in the MKES can be presented in many methods: as links showed on one side (a category map), or as consecutive pages with questions (example choice). The former is clearer; the latter ensures a more careful selection. Combining the two creates a form with opening areas and selection confirmation. [Figure 6].

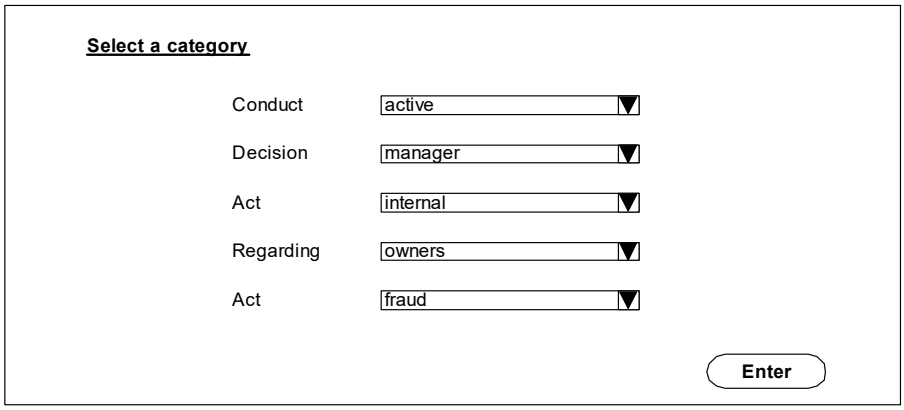

Figure 6. Category selection interface.

Generally speaking, category selection process means to define certain parameters. As the first one, the kind of conduct should be stated: **passive**, where one abstains from acting despite having the knowledge, for example about employees who discard dangerous waste – hazardous for the environment, but profitable for a company; and **active**, i.e. making a decision of transporting the waste to the forest rather than to a waste dump.

The next parameter is the selection of decision: **manager**, if it is a disposition; or **staff**, it is within the competence of an employee. The decision can also be of **internal** kind, regarding owners, management or employees. There can also be **decisions** of **external** kind if it concerns co-operators, competitors or local society.

Finally, an **act** must be selected: fraud, forgery, and others.

6. SUMMARY

In their article, the authors would like to present a proposal where, based on utilitarian theory, a MKES could be created, a system to facilitate moral decisions in economy, among others. The database could be designed with a help of the worldwide Internet web, and would be used to collect and distribute data concerning moral choices, their comments, and consequences. Users would be able to 'consult' the system about consequences of any moral choices from the past. The database would be equipped in information from all over the world about made moral choices and their consequences; it would be categorised and processed. The database should be moderated and professional ethicists and moral authorities could make the comments, thus it would be not only a moral, but also partly ethical knowledge database.

The problem of formal and material value of acts remains the same as it used to be in the era of ethoses since the dawn of culture to the second part of the twentieth century. In the information society of the end of the twentieth century, those

ethoses have almost seized to function, and using new technologies in moral knowledge management is a possible solution here.

It is vital to emphasise that the database would only be used in the decision making stage, not actual decision stage. The basic human freedom, therefore, would not be tampered with, but the decision making process could benefit as it could refer to other people's experiences and ethicists' justifications. Such ethical knowledge management could amplify ethicists' voice in the information society and economy.

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