MODELING APPROACH FOR BUSINESS IT ALIGNMENT

Karim Doumi, Salah Baïna and Karim Baïna

ENSIAS, Mohamed V - Souissi University, Soissi, Morocco

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Abstract: Nowadays, the business IT alignment has become a priority in most large organizations. It is a question of aligning the information system on the business strategies of the organization. This step is aimed at increasing the practical value of the information system and makes it a strategic asset for the organization. Many works showed the importance of documentation, the analysis and the evaluation of business IT alignment, but few proposed solutions applicable to the strategic and functional level. This paper aims has to fill this gap by proposing a simple approach with has two levels of modeling (1) the strategic level, to model through the approach of goals modeling and (2) the functional level based on the approach of enterprise architecture. This approach is illustrated by case study of a real project in a Moroccan public administration.

1 INTRODUCTION

The strategy of the enterprise is to set up the long-term commitments to reach the explicit objectives. It is a question of studying, via real cases, how an enterprise can position itself in an international competing. The alignment of this strategy with the evolution of information system requires an alignment allowing the perfect coherence of all the actions and the decisions with the strategic objectives of the enterprise. This alignment will transform strategic objectives into operational actions to align them in the information system.

Today, it is not quite enough to build powerful information systems. In order for the enterprise to be performing and be able to compete and evolve, its information systems and business processes must be permanently aligned and in perfect coherence with its strategy.

Many authors have shown the importance of alignment in the evolution of the enterprise (Luftman and Maclean, 2004; Luftman, 2000) and according to (Baïna et al., 2008; Chan et al., 1997; Croteau and Bergeron, 2001; Tallon and Kraemer, 2002), this alignment has a great influence on the performance of the organization and any rupture in the process of alignment causes a fall of the organization's performance.

If the interest of alignment is greatly recognized, its implementation remains very limited. According to (Luftman and Maclean, 2004; Luftman, 2000;

Baïna et al., 2008; Chan et al., 1997; Croteau and Bergeron, 2001; Tallon and Kraemer, 2002; Renner et al., 2003), few leaders consider that the strategy and the information systems are aligned. Thus, this implies that actors of the organization are not able to distinguish between alignment and non-alignment.

Also, the absence of methods of maintenance of alignment makes the task extremely difficult at the decisional level.

There exist a number of models of strategic alignment. A well known model is Henderson's and Venkatraman's Strategic Alignment Model which give a rather total vision of strategic alignment. However, this kind of model remains very related to the field of management.

According to (Khory and Simoff, 2004), a step of engineering is necessary to analyze the strategic alignment of the information system. This vision is also supported by the approaches of enterprise architecture (Bleistein, 2006) as well as the leaders of information system (Longépé, 2001).

In the literature several approaches have been developed to solve the problem of alignment:

•   Approach of Enterprise architecture (French): urbanization of Information System (Longépé, 2001). This approach provides a guide to manage the strategic alignment to define future Information system.

However, the method of this approach does not say how to ensure an evolution of enterprise strategy, its business processes and its information

system and how to measure and improve the alignment between these elements.

- Approach of modeling and construction of alignment oriented needs (Bleistein, 2006) : The approach of Bleistein is interesting in the sense that it takes into account the strategic level in the presentation of the alignment but is impractical and very complicated to master it. Is an approach to building alignment and not the evaluation and evolution of alignment.

- Approach of evaluation and evolution of strategic alignment (Luftman, 2000): The approach of Luftamn gives guidance for the construction of the alignment. The approach does not seek to change the alignment of the elements but to achieve a higher maturity level of alignment between strategic objectives and IT strategy.

- Approach of modeling and construction of alignment between the environment, processes and the systems (Wegmann et al., 2005): for example the SEAM method uses the same notations in different levels and thus between the different elements of alignment. The SEAM method does not take into account the particularity of each level of abstraction.

- Approach of evaluation of the degree of alignment of the business process and Information system (Etien, 2006 ; Etien and Salinesi, 2005). This approach allows to model and evolve the alignment between business process and information system but do not take into consideration the strategic level in the representation of the alignment.

- Approach of evaluation of the degree of alignment between the couple strategy of the enterprise and < Business process, information system> (Thevenet et al., 2009). The INSTALL method takes into consideration the strategic level in representing the strategic alignment but impractical because it uses formalizes card that does not include all elements of the strategic level.

- Approach oriented values (Gordijn and Akkermans, 2003). The e3-value framework particularly interested in the value stream, the creation, exchange and consumption of objects in network multi-actor that includes the company itself and its environment (customers, partners) . According to Bleistein missing a crucial point in the e3-value is the distinction between value analysis and business strategy. Moreover, the link between the creation of economic value and goals of low-level system is unclear. Also tools and guidance to change are not defined.

In all these approaches, the concept of alignment of information system is traditionally treated through the results obtained after alignment. Thus, according to (McKeen and Smith, 2003), alignment exists when the information system is consistent with the purposes and activities selected to position the enterprise in its market. (Etien, 2006) defines alignment as the set of linkages between elements of the model business processes and elements of the model of the information system support. (Reich and Benbasat, 1996) defined alignment as the degree to which the mission, goals and plans contained in the competitive strategy is shared and supported by the IT strategy. According to the report CIGREFF 2002 the term "alignment" expresses the idea of the consistency of the information system strategy with business strategy. This alignment requires constant maintenance throughout its life cycle.

In other words, the classical vision of alignment involves two main areas: the area of Business (competitive strategy and activities of the organization) and the field of IT (IT strategy and IS support) that it is to ensure consistency.

The issue of business IT alignment must necessarily pass through the life cycle of alignment: (1) identification of elements that will contribute to the construction of the alignment and (2) the evaluation, and (3) necessary actions to correct this alignment (figure 1).
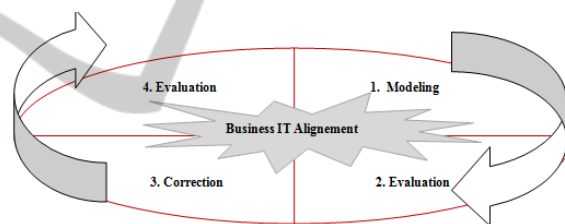

Figure 1: Cylce of Business IT alignment.

In this paper we propose a model driven approach to (1) represent and (2) evaluate the business IT alignment. This approach allows to construct the alignment from the elements belonging to different abstraction levels (strategic & operational).

The paper is organized as follows: Section 2.1 presents a brief introduction of our approach. Sections 2 and 3 present our approach in strategic and functional level. Finally, Section 4 presents primary conclusions of the work presented in this paper and gives short term perspectives for ongoing research work.

2 MODELING OF BUSINESS IT ALIGNMENT

2.1 Related Work

One of the most recurrent problems lately is the lack

of strategy in strategic alignment (Reich and Benbasat, 1996), and even when it is taken into account, it remains ambiguous and very difficult to adapt. Indeed in the industry can find a set of techniques dedicated to the strategy. Each has its own concepts, methods and tools (eg, BCG matrix, the method MACTOR, SWOT analysis, the McKinsey 7S, internal value chains ... etc).. These techniques are often used to plan and coordinate the business decision process with the Business Strategy. They are often used by business leaders and strategy consulting firms. They are thus based on measurements and performance values, but these approaches are rarely used in a process of alignment with the operational level.

At most research approaches alignment does not always specify explicitly which elements of the business that are involved in strategic alignment. For example, Bleistein et al. (Bleistein, 2006) in trying the method of using B-SCP requirements engineering for linking high-level requirements (strategic) with those of lower level, and focusing on the alignment of strategy business and information system components. Yu et al. (Yu, 1997) look at the reasons and contexts (including strategic goals) that lead to system requirements.

The approach e3 values interest in values exchange between the network actors. The approach e3-alignment focuses on the alignment within and between organizations with respect to: (1) business strategy, (2) values, (3) business processes, and (4) IS.

In all these approaches, there is little explicit links with the elements of the enterprise to align (strategic and functional level). These models use either intermediate or dependencies between the elements, or the decomposition of high level goals into low-level goals.

Approaches ACEM (Alignment and Evolution Correction Method) (Etien, 2006) and INSTALL (Intentional Strategic Alignment) (Thevenet et al., 2009), fit into the type methods that use an intermediate model to represent alignment. Note however that the first (ACEM) addresses the alignment of IT and business process but do not take into account the strategy.

Approaches of the dependence that propose to define dependencies between high-level goals (strategic) and operational goals. Approaches based on i * models (Bleistein, 2006), (Yu, 1997) and the approach of urbanization Longépé (Longépé, 2001) fall into this category.

Decomposition approaches propose to decompose high-level goals into lower level goals (operational). Among these approaches, we find

KAOS or approaches of Enterprise Architecture (eg Zachman).

2.2 Our Approach

The approach we propose for modeling strategic alignment is an approach oriented models. This approach ensures that the models of the strategy are linked with models of the functional level through a study of alignment between these 2 levels. Modeling in the two levels is traditionally expressed in different languages, and in separated documents. At the strategic level, one may find concepts like goal, task, actor, role and indicator. Whereas at the functional level, one may find object, operation, function, application etc.

The concept of alignment that we adopt in our approach is defined as the set of links (impact of element of model on an element of another model) between the strategic model and the IS model. Thus, the degree of alignment is measured by comparing: (i) the set of linkages between elements of the IS model and elements of strategic model and (ii) the aggregate maximum possible links between these models (figure 2).

For modeling the alignment, our approach allows:
- Represent elements of the fields of Business (enterprise strategy) and IT (information system) by the models.
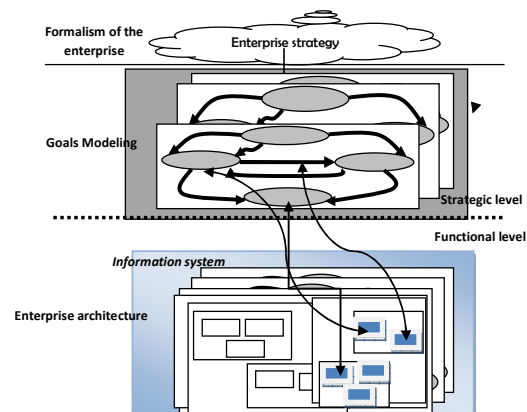- Measuring the degree of alignment by checking similarities between elements of these models.

Figure 2: Framework of our approach.

2.3 Strategic Study

In this paper we consider the use of a goal model approach that supports analysis of strategic business goals such as I* (Gordijn and Akkermans, 2003) or the Business Motivation Model (BMM) (Bleistein,

2006). The I* technique focuses on modeling strategic dependencies among business agents, goals, tasks and resources.

The I* model adopts an agent-oriented approach to model information system requirements. The intentional elements are the task and the soft goals, hard goals and can be related the ones to the others with relations of the type "means ends" and relations of the decompositions type of spots.

The following figure 3 illustrates the elements of formalism I* adapted:

Soft goals: are similar to (hard) goals except that the criteria for the goal's satisfaction are not clear-cut, it is judged to be sufficiently satisfied from the point of view of the actor. The means to satisfy such goals are described via contribution links from other elements.

Hard goals: Represents and intentional desire of an actor, the specifics of how the goal is to be satisfied is not described by the goal. This can be described through task decomposition

Task: The actor wants to accomplish some specific task, performed in a particular way. A description of the specifics of the task may be described by decomposing the task into further sub-elements.

Contribute to: A positive contribution strong enough to satisfy a soft goal.

Means end link: These links indicate a relationship between an end, and a means for attaining it. The "means" is expressed in the form of a task, since the notion of task embodies how to do something, with the "end" is expressed as a goal. In the graphical notation, the arrowhead points from the means to the end.

Target: target or indicator is information to help an actor, individual or collective, to drive action toward achieving a goal or to enable it to assess the result. It is that which makes it possible to follow the objectives defined at the strategic level related to a high level orientation.

Several authors used the formalism of I * for strategic modeling due to its flexibility and the possibility to be used in different contexts. In order to let this formalism become more adapted to our approach, we added another element "target». Indeed, once the objectives are clearly definite, it is necessary to associate the indicators (target) for the regular follow-up of the actions implemented at the functional level. In the figure 3, elements 1, 2,3,4,5 are fundamental elements of formalism I* and the element 6 (target) is the element added.

This indicator one finds it at the strategic level (for example in a score board) and operational level has through its execution.
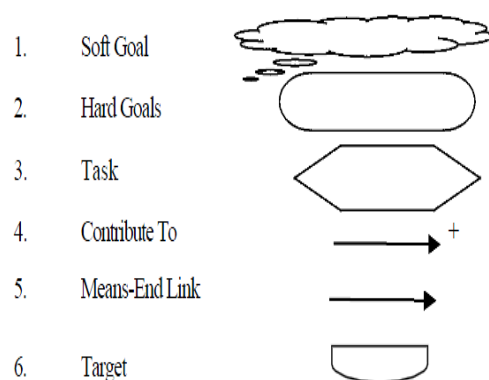

Figure 3: I* legend adapted.

For this reason one chose approaches based on models I * (Gordijn and Akkermans, 2003) and approaches of enterprise architecture (Bleistein, 2006) and which belong to the approaches which propose to define bonds of the dependence between the goals.

2.4 Functional Study

At the functional level we have been inspired by the approach of urbanization (enterprise architecture) for several reasons:

In the context of urbanization, the functional view is generally deducted from the business view.

This functional view is designed to meet the needs of the strategy. The link between the two views is realized by evaluating their alignment.

This architecture at the functional level use the metaphors to found the concept structures, in particular the metaphor of the city is used like base of information system (Longépé, 2001). Indeed Any functional architecture comprises several Business areas. A business area is broken up into several neighbourhoods (district in notation city). Each neighbourhood is composed of several blocks. This last belongs has only one and only one neighbourhood. A block should never be duplicated and 2 blocks should never have of exchange direct (figure 4).

The problems thus consist in making the information system most reactive possible (i.e. able to evolve quickly to answer the new requests) while preserving the informational inheritance of the enterprise. The urbanization of the information systems aims at bringing an answer to this need.
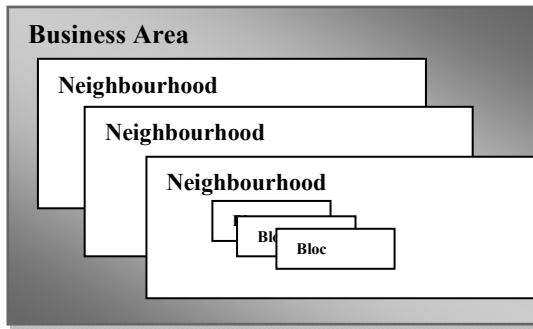
Figure 4: Structure of a business area.

2.5 Alignment Study

It is the most important step in our approach or one puts in correspondence the strategic indicator with bloc of plan of urbanization. For this our approach proposes a projection of the indicators of the strategic level with the blocks of the urbanization plan. This confrontation thus will enable us to align this last with the objectives of the organization.

In this level of the possible dysfunctions of alignment will be detected. For example it will be noted can be that such a function is covered by several application different or a strategic indicator is supported by no block (figure 5).

3 CASE STUDIES: PROJECT OF THE MINISTRY OF HIGHER EDUCATION (MOROCCO)

The project we have chosen is very important for the Moroccan government, which is part of a national program to improve the situation in higher education. The study of the alignment of this project will help actors to decide if information system is aligned with this project. The case study is inspired from a real project at Rabat University, Morocco.

3.1 Description of the Case

In the context of the reform of higher education in Morocco, a reorganization of the university cycles based on LMD System (License - Master - Doctorate) took place.

Also, important efforts were made to develop the technical and professional options in each University.

The objectives of studied project are:

- To improve the internal output of higher education and the employability of the award-winnings who arrive on the job market.
- To offer to the students good conditions of training and lodging.

Some of the awaited results are:
- Creation of almost 124,000 places at the University;
- Multiplication by 2 of the capacity of reception of university.
- Registration of the 2/3 of all students of higher education in technical, scientific and professional options.
- Creation of almost 10,000 places in the halls of residence.

Correspondence	Bloc1	Bloc	Bloc3	Bloc	Bloc
Indicator 1				X	
Indicator 2			X		
Indicator 3					
Indicator 4					X

Figure 5: Correspondence between the blocks and strategic indicators.

3.2 Strategic Study

In our project we have main strategic goals (1) "To improve the output interns and the employability of the award-winnings who arrive on the market" and (2) "To offer to the students' good conditions of training and lodging". Instead of customer the university aims to satisfy its users: students, teachers and administrative staff.

The internal axis process is organized around four strategic topics:
- To extend the capacity of reception
- To define the university components of tomorrow
- To accelerate the development of technical and vocational trainings
- To set up an orientation system and devices of council.

In order to apply our approach for strategic alignment to the university Mohamed 5, the first step consists in the translation of all objectives of the project into goal model formalism. (Figure 6)

3.3 Functional Study

At this level, all applications and databases of the university are listed. After analyzing the existing we identified three major areas: an area for the activities of education, area of management of the library and the archive and the last for the management of human resources. For example the area of education
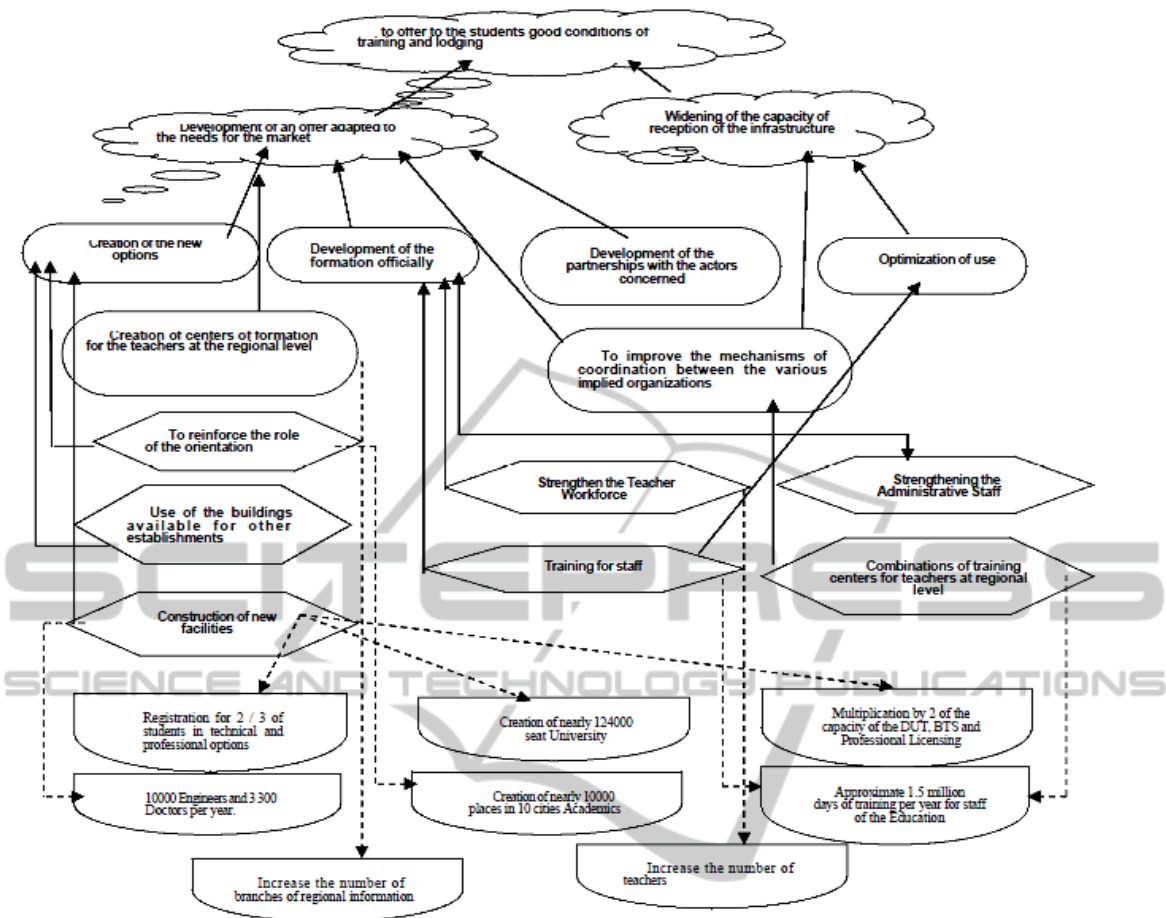
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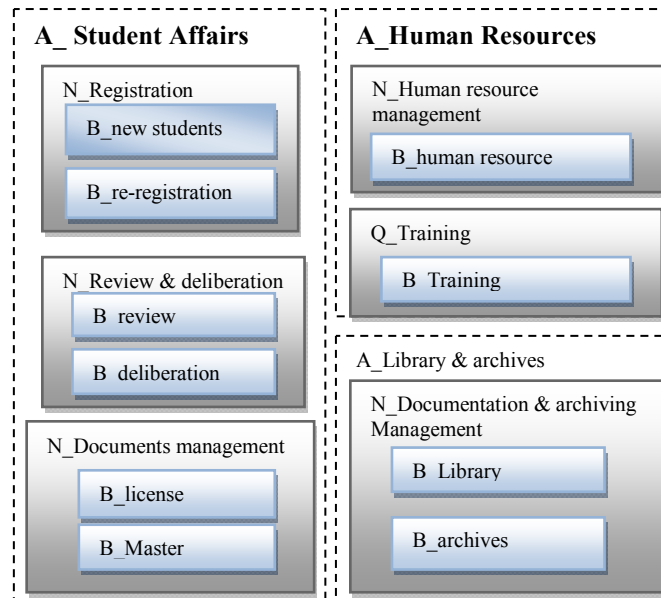Figure 6: modeling Strategic of the project with the formalism I *.

Figure 7: Cutting areas of the system of information.

we identified three Neighborhoods that correspond to three major information systems: information system for student registration, another for the management of reviews and deliberations and the last for the management of cycle master. In each area we identified a set of blocks that match a set of application. For example in the neighborhood "Reviews & Deliberations" we identified two blocks: one for the management of reviews and the other for deliberations. (Fig 7)

This step consists in reorganizing the information systems in order to make them modular (via the blocks). The block is owner of its data and treatments; it is in relation with different blocs. For example in the area of student affairs the neighborhood of the registration constitutes several blocks, The block of registration which is dedicated to the management of the procedure of the registration of the new students and which is in relation w the block of management of documents (license).

3.4 Alignment Study

In the order to link the strategic objectives as define in the figure 6 to the existing information system as depicted by figure 7. The aim of this step is to establish the relation between the indicators with the neighborhood and blocks in functional level. This step permits to verify that the university meets the objectives, and to reorganize these business processes to meet the expected indicators.

This confrontation will therefore enable us to align the elements of information systems with strategic objectives. At this level, some failures of alignment will be detected. We might find that to be such an indicator is covered by several different blocks or a strategic level indicator is not supported by any block of information system.

For example the indicator "Number of places in university cities" is not supported by any block, which shows that there is an alignment problem between the two levels of abstraction' functional and strategic.

After this step any corrections may be made to resolve the alignment problem. There are two distinct approaches: (1) adaptation of the objectives of the strategic level with the functional level "top down» or (2) adapting elements of the functional level so as to cover the strategic objectives "bottom up".

4 CONCLUSIONS AND DISCUSSION

In this paper we presented an approach to strategic alignment convenient and easy to apply. It is an approach with two levels of modeling (1) a strategic level model in a formalism for I * (2) a functional level, based on the approach to enterprise architecture. The main contribution is to show that a process of strategic alignment can be implemented in practice by adapting the model in two levels of abstraction.

Indicator	Target	Area	Bloc
Increase the number of students at the University	Creation of nearly 124000 seats in the university	Unsupported	Unsupported
% enrollment in technical and professional option.	Registration for 2 / 3 of the students in technical and professional options	A_ Student Affairs	B_new students
Capacity in technical options.	Multiplication by 2 of the capacity of the technical option	A_ Student Affairs	B_new students
Number of student in technical options.	10 000 Engineers and 3 300 Doctors per year.	A_ Student Affairs	B_new students
Number of places in university cities	Creation of nearly 10000 places in 10 Cities hosting university	unsupported	unsupported
Number of training days for university staff.	Approximate 1.5 m i l l i o n d a y s o f training per year for staff of the Education	A_Human Resources	B_human resource management

Figure 8: Table of correspondence of the strategic indicators with the block.

Our approach allows to build the alignment based on elements belonging to the two abstraction levels (strategic and functional). The correspondence between strategic indicators and the blocks of the information system has allowed us to assess the alignment.

Our goal then is to improve the quality assessment of alignment, to determine the degree of alignment and to locate the level of dysfunction. Also among our research objectives is to develop a procedure to correct the alignment. In this way to develop a procedure that affects the set of step of construction, evaluation and correction of strategic alignment.

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