

Proposal for the Urban Real Estate Property Tax Management Diagnosis in Brazil

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Key words: Urban Property Tax, Fiscal Cadastre, Diagnosis, Forecast.

SUMMARY

This study evidences the importance of a previous identification in relation to the existing inconsistencies in the urban real estate property tax management in Brazil through a proposal for a diagnosis to be implemented in the cities. Besides, this study is aimed at showing that the procedures must be adopted to verify the data and their quality, so that it can be used as parameter for a forecast of the actions to be developed in cadastre update projects, modernization of the tax management or the management restructuration, which must be based on devices which are able to minimize conceptual errors and which then may allow the use of an efficient and effective tax management system.

Palavras Chave: Tributação Imobiliária Urbana, Cadastro Fiscal, Diagnóstico, Prognóstico

RESUMO

Este trabalho evidencia a importância da prévia identificação das inconsistências existentes na gestão tributária imobiliária urbana no Brasil. Através de uma proposta de diagnóstico para ser executado nos municípios. Outrossim, intenta demonstrar que os procedimentos devem ser adotados para verificação da atualidade dos dados e sua qualidade, de modo a servir de parâmetro para um prognóstico das ações a serem desenvolvidas em projetos de atualização cadastral, modernização da gestão tributária ou de reestruturação da gestão, que devem estar baseados em mecanismos que propiciem a minimização de erros conceituais e permitam a utilização de um sistema de gestão tributária eficaz e eficiente.

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1 INTRODUCTION

By constitutional decision in Brazil, the municipalities are responsible for managing the tax on urban real properties. Thus, each city is responsible for determining the implementation of the Urban Building and Territorial Property Tax (Imposto sobre a Propriedade Predial e Territorial Urbana – IPTU). The tax management system involves pertinent legislation, the fiscal cadastre, and a generic floor plan.

However, the tax management in Brazil suffers from a lack of legislation norms which could determine the existence of an urban territorial cadastre necessary for the fiscal cadastre's elaboration. The fiscal cadastre is an official inventory of parcels and betterment which provide the necessary information to determine the tax (Whittal; Barry, 2004). This discrepancy of legislation uniformity causes cadastre conceptual misunderstandings and contributes to the dissemination of inefficient cadastrals which are unable to present correct data of the respective territory. Additionally, the growth of cities due to both birth rate increases and migratory movements cause pressure in the land market, which leads to irregular occupation, construction of new houses, and other related issues. These issues, combined with a lack of urban inspection and control techniques generates a cadastral deficit. Cadastral deficit represents the proportion between the legal city (all the real properties which are in the cadastre) and the real city (all the existing real properties including the clandestine and irregular ones).

Another point which deserves attention is related to the registers in the fiscal cadastre. The authors were able to diagnose error in the data of several cities. The main cadastral inconsistencies found were: incorrect data, incomplete data, and outdated data.

In Brazil, the basis of calculation for IPTU is the venal value, which is determined by mass valuation. The basic unitary value of the square meter of lands and buildings will correspond to that value fixed in the Plants of Generic Values (Plantas de Valores Genéricos – PVG), elaborated through statistical processes and field work. According to ABNT (2003), PVG consists of a graphical representation or a generic listing of values of a square meter of a land or real estate property on the same given date. It represents the special distribution of real estate properties' prices in each region of the city.

The tax management system includes the data input, the process, and the production of information used to estimate the real estate tax ((Whittal; Barry, 2004). Nonetheless, the inefficiency of a such system has been observed in most cities. The information is incoherent, repeated, and used in inadequate software programs.

This article aims to propose procedures for the diagnosis in the urban real estate property tax management system in Brazil. It will serve to verify the main inconsistencies so that it can serve as parameter for the production of a forecast of actions aimed at the development of an efficient and effective tax management system.

2 PROCEDURES FOR CARRYING OUT THE DIAGNOSIS

When a city council decides to update the cadastral data, modernize the tax management system, or even carry out a restructuring, the diagnosis is paramount. The diagnosis is the phase dedicated to the recognition of all components of the system responsible for the tax management used by the local administration.

Thus, this phase of recognition of the organizational environment of the city council public administration involves a complex process that is carried out through data collection in the field, compilation, and finally, analysis of existing information in the laboratory (figure 01).

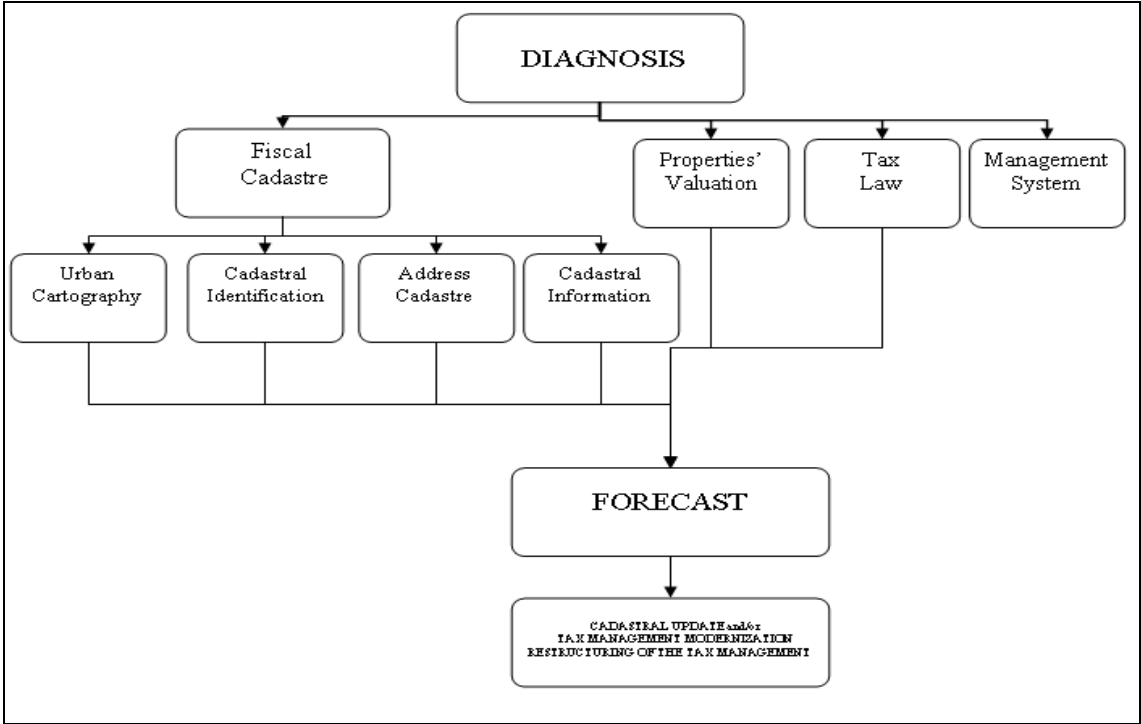


Figure 01: Diagnosis Model

First, a survey on the city tax law is carried out. Additionally, surveys are taken on the procedures of internal tax management, the recognition of the methodology used to determine the venal value of the properties (fiscal region, homogeneous zone or block-face), the quantification of human resources involved, and the administrative structure, among others.

Afterwards, field sampling is carried out in order to verify the existing information in the fiscal cadastre, as well as the properties' valuation. The technical staff responsible for the diagnosis must establish a sampling plan to give dimension to the number of samples that

statistically represent all the real estate properties in the city. The field work involves a photographic register of the properties, the completion of a cadastral information report (Boletim de Informações Cadastrais – BIC), research on the real estate market, and the collection of information on the location and measurements of constructions.

In the laboratory, data from the fieldwork is compared to data from the real estate property tax management system, taking into account all of the items for the proposal for a diagnosis (figure 01). In this step, all of the cadastral inconsistencies are checked, indentifying the information quality and accuracy, and whether the venal values from the cadastre represent market venal values.

The technical staff responsible for the elaboration of a diagnosis in the urban real estate property tax management must be composed of at least the following specialized professionals: Urban Cartography Technician, Urban Real Estate Tax Technician, Real Estate Technician, Geographic Information Systems Technician, Information Technology Technician.

After the compilation, data collection in the field, and analysis, the technical staff has to elaborate a forecast of the actions needed to correct the problems that were detected.

The diagnosis will be presented in detail in relation to each item involved in the tax management system.

2.1 Fiscal Cadastre

2.1.1 Verifying the Urban Cartography

For the development of an infrastructure of spatial data which might serve as basis for the development of a tax management using a system of geographical information, the existence of an urban cartographic basis with geometrical and positional reliability is essential, as well as compatible scales for the purpose of cadastres.

An urban cartographic basis must be standardized, organized in files and directories, and divided into categories and attributes, with the same scale, the same geodesic reference, and the same coordinate system and cartographic representation.

It is also fundamental to verify the thematic quality with regards to the cadastral cartographic basis, investigating whether the categories and attributes are sufficient for the proposed objective of the management system.

In this sense, this part of the diagnosis should answer the following questions:

1. Is there a digital urban cartographic basis in the city?
2. What is the scale of representation?
3. What coordinate system is adopted?

4. Is the coordinate system referenced in the Brazilian geodesic system?
5. What is the date of the cartographic basis?
6. What method of elaboration was used for the cartographic basis: topographic, geodesic, or photogrammetric?
7. What is the positional, geometric and thematic quality of the cartographic basis?
8. How is the cartographic basis organized? Does it contain directories, categories and attributes?
9. Is the cartographic basis prepared for the GIS environment? (Geographic information system),
10. Is there a geodesic reference frame in the city?

2.1.2. Cadastral Identification

For IPTU tax in Brazil, it is necessary to have knowledge of the information on the property and its correct location, and the cadastral information has to be related to its geographic location in order to facilitate its localization. Each property must correspond to the uniform code to allow integration with other sources of information, as well as assuring the non-duplicity of parcels. In this phase of diagnosis, it is really imperative to verify the codification used by the city council in the cadastral identification of the parcels and betterments of each urban real estate property.

In a country such as Brazil in which a territorial cadastre has not been consolidated in the urban areas, it is important for the fiscal cadastre to have an identification using sequential numbers, that is, the real estate property is identified in the system by a chronological order of cadastral input, to eliminate spatial logics in the identification of parcels.

The minimum requirements for codification of a parcel establishing spatial logics should, according to Erba (2007):

- Present an easy comprehension, that is, the number must correspond to a spatial location;
- Have an easy nomenclature, in order to facilitate recollection;
- Be easy to manipulate by the public and administrators;
- Have a permanent number. Additionally, each owner must have their own number, as a car plate. If, perhaps, the number needs to be replaced by any reason, the system should predict the property's history, identifying its origin number and its new number. In order for this to happen, it is necessary to take into account the other registers (taxes, environmental registers, administrative registers, and registers of property) which use cadastral information;
- Have the capacity to update the unifications of parcels, keeping its cadastral logics;
- Have a perfect correspondence between the register and the land. Unicity is paramount, that is, a parcel needs to have only one codification. The same code should serve different users in the cadastral information in order to facilitate the implementation of Multipurpose Cadastre;

The cadastral identification of a property serves as a basis for all the structure of a management system. In addition, it assures that the system will not have duplicity in terms of registers of parcels.

2.1.3 Verification of Address Cadastre

The address cadastre is the basis for the planning and order of the city's development. It must present the attributes related to the location of the property, as well as the availability of equipments and services of infra-structure and other elements that influence the property real estate valorization. It can also be viewed as means to control public property. The address cadastre must provide information of all the legislation related to its official domination, spatial location, codification, its beginning and its end, as well as cadastre of services and infra-structure of urban equipment (Silva et al, 2004 e De Cesare, 2007). It must allow for the search for a stretch of addresses, so that it is possible to determine the types of urban services and infra-structure available in a specific place.

In this phase of the diagnosis, the following questions should be answered:

1. Is there an Address Cadastral Report?
2. Does the cadastral information on address point to the real location of the property?
3. Is there information about the urban services (collection of solid waste, etc)?
4. Is there information on urban equipments?
5. How is the information on the address cadastre organized? Is there a codification?
6. Is there information on the price for each square meter per block-face?
7. Is there information about the legislation on the address?

2.1.4. Analysis of Cadastral Information

In order to determine IPTU tax, it is necessary that the fiscal cadastre provides information on the property (which generates the tax) and the taxpayer (passive subject). Moreover, the notification of the tax invoicing as well as its probable fiscal execution require the accurate addressing of the real estate property and the attributes related to the taxpayer, such as name, TRN (Taxpayer Registration Number, equivalent to Brazilian CPF, which means Cadastro de Pessoa Física), and mailing address. On the other hand, aiming at determining the basis of calculation, whatever the property valuation is, an adequate fiscal cadastre must provide the characteristics of the land, such as: area of the land, topography, pedology and the localization in the street section, information on the existing constructions, such as area, year of construction, conservation status of each constructive typology, physical age, utilization, among others. Attributes related to the property's location, as well as the availability of equipment and infra-structure services and other elements which may influence its real estate valorization must also be included. (De Cesare, 2007) e (Pelegrina et al, 2008).

The cadastral information report is considered to be the main cadastral document, so that its function is to register the technical and cadastral information of each of the elements from the field research (ROCHA et al, 2006).

In this phase, a detailed analysis on the Cadastral Information Report must be carried out, in order to verify the following items:

1. Is the cadastral information enough to identify the taxpayer (passive subject)?
2. Is the cadastral information capable of showing the main characteristics of the city's lands?
3. Is the cadastral information capable of showing the main characteristics of the betterments?
4. Is there repetition of information?
5. Is there unnecessary information?
6. Is there sufficient information?

2.2 Analysis of the properties' valuation

Ministry of Cities of the Brazilian Government developed a document that establishes guidelines for the implementation of an urban multipurpose territorial cadastre. In Chapter VII which is about the properties' valuation, it is recommended to: (Ministério das Cidades, 2007):

The final result of the valuation must characterize the real status of the properties' values in the market. The task of valuating properties and the necessity to maintain these values belongs to the city council. In order to maintain the basis of calculation for IPTU and other real estate taxes, it is recommended to have valuation cycle of 4 (four) years, maximum. The level of assessment is defined as the average of the quotients of the valuated values, as they appear on the fiscal cadastre, in relation to the market price for each type of property. The occurrence of valuation level for each type of property inferior to 70% (seventy per cent) or above 100% (one hundred per cent) indicates the necessity of an update in the values.

An ideal generic floor plan is the one which has as basic principle the currency, where the generic values of the land and the betterments really characterize the market dynamism. Thus, they must be revised periodically so that the amount of tax on the property may reflect the current market situation (Möller, 1995).

In this step, comparisons between samples collected in field work and the venal values present in the tax management system must be carried out to determine whether or not the values represent the current market value.

2.3 Analysis of tax law

It is necessary to verify the currency of tax law in order to identify possible inconsistencies which might lead to fiscal inconsistencies.

Outdated or irregular tax laws are common. For this, it is necessary to revise them in order to regulate the fiscal cadastre and taxes.

2.4 Tax Management System

The tax management system is a set of computational tools which help the real estate tax management. It consists of software and hardware that function to process the cadastral information. Its basic characteristics are to: collect, transmit, store, recover, manipulate, and visualize the information.

In this phase, the following items need to be verified:

1. Is there a municipal technology system of corporative information?
2. What are the infra-structure technology information conditions, hardware, software and nets of the city like?
3. Is there connectivity and interoperability among the different corporative systems?
4. What is the systems' security level like?
5. Does the tax management system use Geographic Information?
6. Does the tax management system have a schedule of verification of inconsistencies in the cadastral data?

3 EXAMPLE OF APPLICATION OF THE PROPOSED DIAGNOSIS

In order to demonstrate the application of the proposal that was used, data from Brazilian scholars was used, as well as publications that tackle the same issue.

3.1 Fiscal Cadastre

3.1.1 Verifying the Urban Cartography

When verifying the urban cartography, data from the City Hall of Canoas, State of Rio Grande do Sul, Brazil, was used. The initial gathering of information on the cartographic basis available was carried out in the department of Municipal Technical Cadastre (Cadastro Técnico Municipal – CTM), in the Department of Housing and Urban Development.

It was verified that the existing cartographic basis was the result of aerophotogrametric restitution from 1999. Its update was carried out by the technicians of the City Hall by means of isolated topography works or new parcels projects. That update was not systematical, had no set standards, and was carried out in two distinct bases with different software, which resulted in repetition of information.

The existing cartographic bases were not prepared to be used in GIS environments and they were also disconnected from the tax management system.

Moreover, it was observed that a geodesic reference net was lacking in the city.

3.1.2 Problems Regarding Cadastral Information

With regards to the property identification in the fiscal cadastre, data from the city of Blumenau, State of Santa Catarina, was used in accordance with the description by Silva et al, (2004):

The cadastral number which corresponds to a sequential number (1 to n) that has no relationship with space... which leads to problems in the tax management and wrong statistics on the data of the territory.

In this sense, it was possible to demonstrate a limitation in the process of identification of the properties in the cadastre from the City Hall, which was aimed at the real estate tax.

The cadastre had a sequencing number, that is, the property was identified in the system by a chronological numerical order in terms of system input. There was not a spatial logic of identification of the parcels. In order to exemplify this flaw, it is possible to notice on the same block a parcel under the number 0120, and another right beside this one under the number 011480.

As a result, the identification of a parcel was difficult once there was no logic in the spatial identification.

3.1.3 Verifying Address Cadastre

In the application of the diagnosis regarding the address cadastre and stretches of addresses, data from the cities of Blumenau and Canoas was analyzed.

In Blumenau, according to Silva et al (2004), in the department responsible for the technical cadastre, there were two address cadastrals managed by distinct systems.

In Canoas, the Department of Housing and Urban Development used a map of addresses from photometric restitution that presented information on the addresses obtained through reambulation. It was an address map without any other attribute or codification and it contained no information about the stretches. On the other hand, the Treasury Department had in its real estate tax management system data of the addresses, a code for each address sequentially without any geographic reference. This cadastre shows several inconsistencies, such as incomplete data, repetition of information, incorrect data and outdated information.

3.1.4 Analysis of the Cadastral Information

In the beginning of the 1970s, the federal government created a program for the fiscal cadastral development of the Brazilian cities through the agreement between SEPTRO (Serviço Federal de Processamento – Federal Processing Service) and the Treasury Department. A project named CIATA (Convênio de Incentivo ao Aperfeiçoamento Técnico-

Administrativo das Municipalidades – Incentive Agreement for Technical-Administrative Improvement of the Municipalities) was created. The goal was to improve the fiscal cadastres and generate an increase in the revenue. Its main legacy was the publishing of a Manual of Real Estate Cadastre, which worked as a basis for implementing the cadastre in most cities in Brazil. The project was very important for the cadastral development at the time and it influenced many cities that still use its procedures today.

However, the cadastral information present in the item 10 of BCI proposed by the project CIATA in its manual is outdated (Table 01).

Table 01: Cadastral Information project CIATA

INFORMATION ON THE CONSTRUCTION				
35. Characterization House/Duplex Apartment <i>Telheiro</i> (shed covered with tiles) Shed Factory Store Special	36. Siding No siding Plaster/Grout Oil Painting Wood Ceramics Special	37. Floor Hard-pack floor Cement Ceramics/Mosaic Wood board Parquet Block Plastic Material Special	38. Cover Inexistent Wood Parget Cement slab Plate	39. Roof Straw/Zinc/Chips <i>Fibrocimento</i> (a hardened mixture of asbestos fibers, Portland cement and water Tile Cement slab Special
40. Sanitary Inst. Inexistent External Internal – simple Internal – complete More than one – internal	41. Position Isolated Semidetached Superposed Conjugated	42. Construction Type Bricklaying Loam/mud house Hovel/Hut/Shack Wood	43. Structure Concrete Brick Wood Metallic	44. Construction Status New/Excellent Good Average Bad
45. Wiring Inexistent Apparent Built-in	46. Construction Position Front Back	47. Façade Aligned Backward	48. Property Situation Closed/Available Closed/Abandoned Taken	

The first thing that was verified was the existence of unnecessary information, which is not representative for the definition of the property's venal value.

In order to exemplify distortions from the proposed BCI, two properties will be valued: construction A (figure 02) and construction B (figure 03), both located on the same block-face, that is, the price of a square meter from the generic floor plan is the same.



Figure 02: Construction A



Figure 3: Construction B

In the table 02, it is possible to observe that in the cadastral data collection carried out by BIC of CIATA, both properties were registered equally. If both of them are on the same block-face, their venal value will be the same, which is in fact a fiscal inconsistency.

In the photo of the property in the situation A, it is possible to observe a wooden house that is more modest in comparison to the property in the figure B, which is also a wooden house, but with a superior constructive standard.

Table 02: Cadastral information gathering according to CIATA

Information on the Construction		
Situation	A	B
Characterization	Wood	Wood
Siding	Wood	Wood
Covering	Tile	Tile
Position	Isolated	Isolated
Type of Construction	Wood	Wood
Structure	Wood	Wood
Conservation Status	Good	Good
Wiring	Built-in	Built-in
Construction Position	Front	Front
Façade	Shrunk	Shrunk
Property Status	Occupied	Occupied

3.2 Analysis of the Properties' Valuations

In order to exemplify the analysis of the properties' mass valuations, information described by Heofacker (2004) will be used. The generic floor plan (mass valuation), of the city of Criciúma, State of Santa Catarina, Brazil, was outdated and not compatible with the market reality. Its update used to be made using the inflation index. However, the real estate market prices take into account other items, generating, then, distortions.

3.3 Analysis of tax law

With regards to the tax law of Canoas, the following problems were detected:

- In the property's valuation, the criterion used is limited to identifying if the property has residential purposes or not;
- In the description of the constructive typology, it is only identified the material used in the construction's structure and in the cover's structure, which is not enough to value the betterments;
- The generic floor plan presents three (03) valorization zones, not presenting real estate market prices.

Similar inconsistencies were found in Criciúma, as described by Heofacker (2004):

The way the tax was calculated was too simplified, taking into consideration fiscal zone, the land's area, constructed area, and the construction level or standard, influencing the determination of the €property's venal value, which is far beyond the fiscal law's objective.

3.4 Analysis of the tax management system

Regarding the tax management system, information from Canoas will be used, where the following problems were identified:

- The tax management system was not based on geographic information;
- The existing technology was not sufficiently developed;
- The information was not made available for the different users;
- There were not connectivity and interoperability between the different systems;
- There was not a schedule for the verification of cadastral inconsistencies.

3.5 Forecast

By the end of the diagnosis' phase, the forecast should be carried out in order to develop actions to correct or minimize the problems found. These proposed actions may be: cadastral update and/or tax management modernization, or restructuring of the tax management.

The cadastral update is about the verification of the cadastral data through field work. It can be carried out through two different methods: massive update (update of all cadastral universe) or directed update. The directed update may be carried out through three different ways: from a specific sector in the city, through temporal comparison, or through existing information in the city.

The tax management modernization can be made through the acquisition of new hardware and software equipments and also through the technical improvement of the staff, without modifying, then, the administrative structure and the methodology for valuating the properties.

Finally, the most complex is the tax management restructuring, which represents profound changes in all the system responsible for the real estate tax. According to the model proposed by Erba (2007), the restructuring is divided into: technological and infra-structural, and operative restructuring.

Technological and infra-structural restructuring: provides a strategy for the follow-up of the evolution in relation to the systems and equipments, through a comprehensive planning of information technology.

Operative restructuring: foresees changes in the data and the institution management. In order to be successful, two major areas must be served: the personal and the procedural areas. Sometimes, changing the cadastral law is not necessary, and in some cases, just the creation of new internal procedure codes is sufficient. Nonetheless, if the reform is radical and profound, the law must definitely be modified, or the creation of laws and complementary enactments might be a pre-requisite for the implementation.

4. FINAL REMARKS

According to the reasons exposed, it is possible to conclude that a proposal for a diagnosis of the tax management showed that it is capable of identifying the main inconsistencies found in the real estate tax system in Brazil. The steps proposed are sufficient for the analysis of each item that composes the tax management in the local administrations, according to the instances shown in this study.

However, it is necessary to alert to the fact that, in projects of cadastral update, modernization of tax management or the tax management restructuring, a diagnosis phase must be part of it, so that it can be used as parameter for actions to be developed.

Yet, it is important to highlight that, during the cadastral restructuring process, it is necessary to improve human resources in three steps, namely: firstly, the understanding of the basic cadastral and valuation concepts; secondly, understanding the new procedures and equipments; and thirdly, the technology transference. These procedures are not common in these types of project in Brazil, when carried out by private companies. In this sense, it is necessary to elaborate public bids in order to hire professional to invest in qualification services, training, and technology transference.

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BIOGRAPHICAL NOTES

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