

An Analysis of Unit Plan Design Method for Flexible Housings

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ABSTRACT: This study describes the each architect unit plan compared and categorized by the type of analysis. It is obvious that the sharing requirements and separation of the spaces will considerably vary. It will be discussed in the perspective of clustered spaces modifiable.

Keywords: Flexible Housing, Unit Plan, Design Method, Sustainable Housing, Urban Renaissance

1. INTRODUCTION

The basic concept is a set of post-war housing. family-type of mass housing supply was set. After the war overlapping house shortage in the high economic growth, a standard set of quality housing for generations to bulk supply was needed. In the 1950s, ushering government, and '60s, '70s, the private sector to follow it. Specifically speaking, a suburban area, set nLDK style houses will be supplied in bulk. Labor's place in the city center, a residential suburb is a place for a 20th-century vision of the city-her husband is working in the city, guarding the house in the suburbs of the full-time housewives, to suggest that there healthy children- were present and deeply rooted.

Since the 1970s, but was gradually began to change. The rapid growth is over and began the low birth rate. The society for women to advance industrialization by the beginning of the 1990s, IT has opened the possibility of starting at home, housing only a vibration began to present itself.

Reduce the population bubble collapsed due to the city, even the possibility to build houses that are standard for generations, a form of housing in the suburbs of dedicated convulsed from the roots. The small set of housing since the 1990s, the family type of nLDK trying to jump over a number of proposals came out. Designer's Mansion in guerilla style movement is called, had included such a proposal many times.

By now, the housing is connected to continuous corridor generally with closed box to keep the privacy. In addition, this closed box is made on basis of nLDK, it allows husband to work and housekeeper to keep the house that is, it is the useful space type for nuclear family. However, as long as the two households where two persons lived or single households not nuclear families increased according to social changes, people who have various life styles increased. In such condition, we tried to make a new housing model can feel open flexible not a closed box set.

So, the Japanese Shinonome Canal Court project (CODAN), represents an interesting experimentation of solutions for the spaces of relation and the flexibility of

lodging. This project is a multifaceted, networked collective residential complex. It is the most appropriate for the variety of flexible unit plan. The CODAN somehow contains the solutions to the flexibility degree are emphasising. It is not a case that the Shinonome Canal Court project invents an even more evolved contemporary housing with the extremely active model.

2. THE FLEXIBLE SYSTEM

2.1 Needs of Flexible Housing

Modern society is to change lifestyle as well as getting increasingly diverse. Grant for the identities of residents to express and experience in residential design needs to be reflected.

People feel there is dependent on the environment, rather than randomly or regulation affecting want to win an indoor space in the presence of the principal act is enjoying the freedom to choose the important human motivation.

Residents of the housing need of emphasis, flexible (Flow) from the center of stock (Stock) centered on the management transition. In fact, such as flexible housing and tenant participation, residents of various attempts have been made to accommodate the housing needs, sustainable long-life housing is a spotlight.

Bearing wall structure, the structure of the purchase of construction equipment, poor housing and other parts of the modular housing supply of technical problems or uniform policy, institutional issues such as ownership of rental housing to solve the problem in Japan early Mass Housing as the basis for criticism Institutional and technical issues, new alternatives to solve the present problem Generals, and built-in structure, one of which is to separate the SI System.

2.2 The SI System

Skeleton & Infill (SI) System housing to accommodate the residents of the housing need to improve performance and enhance variability, the long-term housing and residence life to keep a stable high-performance variable attempts to realize that Japan's way of housing supply.

Skeleton housing or housing, also called SI usually one in this paper defines SI as housing. S and I in SI Housing is a constant and variable how to distinguish between sincerity and perspective, it is generally separated by the decision makers.

First, if they are separated by volatility and Skeleton is inexorable, Infill is affected by the variability can be distinguishable. Depending on the public use or ownership, according to the durability of long-life, short-life attributes of arbitrary decisions based upon the residents of the entire Skeleton if you will, separated according to the design, repair unit that is part of the individual person's Infill will change the design or says a part.

SI system in terms of technical characteristics of the moment, the existing infill housing is also part of life as part of the skeleton with aging. On the other hand, clearly part of the SI system is separate from the public and private partially replaced it is easy to repair.

3. CHARACTERISTIC OF CODAN

3.1 OVERVIEW

The semi-governmental Urban Development Corporation [UDC], Japan's main provider of social housing, has been redeveloping a 16.4 hectare site of a former Mitsubishi steel factory in Shinonome into a residential quarter with a projected 6000 housing units after its completion in 2012.

Six residential blocks have been designed by six groups of architects: Riken Yamamoto & Field Shop, Toyo Ito & Associates, Yama Architects & Partners, Kengo Kuma & Associates, ADH Architects and Workstation and the three architects Makoto Motokura, Keisuke Yamamoto e Keiji Hori(see Table I).

Central motive of the mixed private-public housings scheme is an unparalleled open cooperative planning process along with an elaborate system of public spaces on various scales(e.g. Fig. 1). It is the most flexible in terms of the configuration space is very remarkable to realize various units plan.

In other words, only a minimum area of 47 m² area ranging from the best range of 114 m² do vary, and the space by applying a Bay combination of horizontally integrated, vertically integrated, left vertically integrated, and the integration of many different types configuration space and elevation designed to be capable of.

Table I: Construction Outline

A Block : Riken Yamamoto & Field Shop	
Land Area	9,220 m ²
Construction Area	6,300 m ²
Total Floor Area	47,600 m ²
Units	410
B Block : Toyo Ito & Associates	
Land Area	7,070 m ²
Construction Area	4,930 m ²
Total Floor Area	34,600 m ²
Units	290
C Block : Yama Architects & Partners	
Land Area	8,630 m ²
Construction Area	5,760 m ²
Total Floor Area	30,900 m ²
Units	385
D Block : Kengo Kuma & Associates	
Land Area	7,660 m ²
Construction Area	5,070 m ²
Total Floor Area	38,700 m ²
Units	325
E Block : ADH Architects and Workstation	
Land Area	7,740 m ²
Construction Area	5,340 m ²
Total Floor Area	31,400 m ²
Units	320
E Block : Makoto Motokura, Keisuke Yamamoto e Keiji Hori	
Land Area	7,770 m ²
Construction Area	5,430 m ²
Total Floor Area	42,200 m ²
Units	330

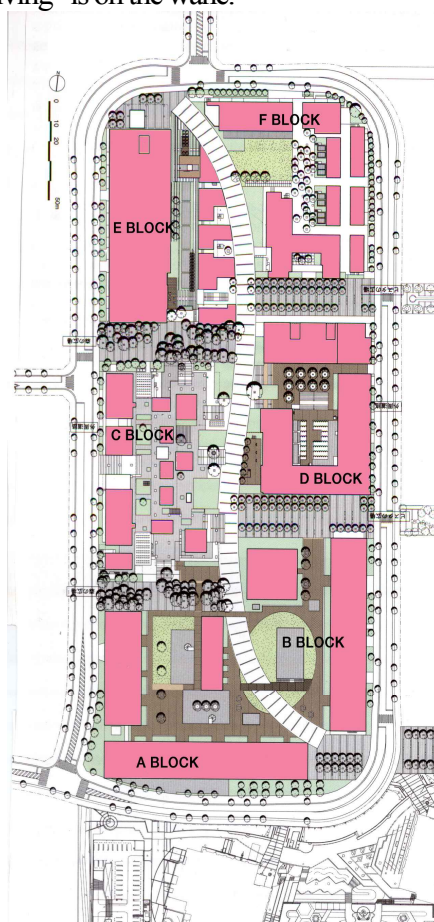
3.2 Concept of CODAN

3.2.1 Street Space

It was not the targeted residing space in the first place but a public area which was made inevitably.

The FAR over 300% of real place is not almost existed; therefore, the whole lower floor was made as a public place for the residents.

As a result, a street space with an ample three-dimensional was born. “A Street Space” here means another living space. It is a public space as well as a place with a sense of privacy, which is different from a rented room and can be occupied completely. Except that the life in the room is extremely private and since that is in the outside, there might be lots of interesting things. And it is “a place of movement” where you can read, work, watch TV, eat, chat and other normal activities. “Living in the city” is a key word, from which a distinction between “a place of living” and “a way of living” is on the wane.

**Figure 1:** Site Plan of Canal Court CODAN

A simple structure of a village has the “S” shape avenue (e.g. Fig. 2) from which there are six connected straight squares. These are excursion type square and are also all called “connector” and there a road space of CODAN on which gardens of each block is contacted and realization of a

continuous three-dimensional excursive space without a deadlock is a basic standard in mind.



Figure 2: S-Shape Avenue

Six squares of floor are connected to PC plate and 600mm width of slit is empty at intervals of three meters space and exposed to the ground. That is a pattern of a narrow wooden veranda and is also a drain, a plant pot, a small biotop and the extra land which could be used for a flower garden. This is an accumulation of small details and includes a urban ecology and possibilities for the future, this forms a basic plane of CODAN street space.

3. 2. 2 SEQUENCES

The biggest landscape would be the TATSUMI canal (e.g. Fig. 3) which crosses right in front. And in this road space, the most important thing is appeasement and temptation and with a series of numerous small spaces and can steal a glance at “from a place to a next”.

A resident can freely wander over there and can find a place one wants. All the places are comparatively existed, a lure, for example; a place to look up and look down, a place to wide canal and to narrow road, from a bright and dry road place to a humid dark-green forest.



Figure 3: Sequence of Canal Court CODAN

4. ANALYSIS OF DESIGN METHODS

4.1 CONSPECTUS

Urban residents need a street where they can get supports from the region. It provides a convenient life environment, such as a court yard space with commercial facilities, life supporting facilities and small offices in addition to a shopping street, a so-called “L” shape mass considered with ventilation and lighting, and a semi-fence type arrangement consists of an

independent house, and a low-rise part following “S” shape street.

The three-dimensional road with a distinctive hierarchy of private, semi-public securing a secret and private of the main house creates accidental meetings in the public place. And the main house consists of a Basic unit with a free space which is differ from the so-called a nuclear family LDK possible for processing for basic main house space and a Annex unit with two exits for different purpose and therefore it supports for various life style and life stage.

4. 1. 1 Mass Design: *Feel the Wind and Light*

There are fourteen floors high-rise building to the outside road, four floors low-rise building towards avenue “S” shape and a two-floors roof deck, a kind of reed shape garden facing South-North within the two buildings.

The tunnel shape opening here and there at the high-rise building is a design with an impact on the façade of the building and has the nick name of “Air pocket” and as the name implies it is a device to send wind and light to the center of the high-rise building. There are four large air pockets on the four floors and one is placed at a place looking down at the front side of TATSUMI canal and the other one placed closest to TOYOSU along HARUMI and the rest are placed at East and West each; therefore, the residents can enjoy two different scenes of the urban center and waterfront.

High level building is similar to central aisle typed one as an agonic type and there is ‘light well’ in the center of agonic type aisle continuously. Common aisle allows the person to go out between the light well and unit. The light well and air pocket bring the light and wind from horizontal and perpendicular directions, so can avoid the residential environments apart from external natural environment, which is easy to be happened in a huge mass.

4. 1. 2 HO +SOHO Unit

One of advantages of CODAN complex is that it is located in the station not much far from GINJA subway station. It is estimated that the family who choose the metro land has different factors from the people who choose single

house in the outskirts. Therefore, we designed the residential site to match with urban family types including common family residential site. It is why we think that we cannot solve the problems from urban residential sites without family types like single, couple, and DINKS which never have been in the center of housing plan. When design, of course, we considered the plane type targeting for standard households (nuclear families), but we never let the proposal targeting for small size families (none nuclear families) through.

The high level building consists of HO(Home office) along the corridors. The HO is home office site literally, at the same time, is made of places that can be used as storages or spare rooms. By now, the 3LDK is assigned to small number of families by reducing one room but the 'n-1 LDK' is designed to provide a good settlement site. In contrast, the SOHO unit which is a small sized mix space is located on the lower level building and it is monotonous arrangement by putting the triplex unit into.

4.2 Details of Examples

4.2.1 A Block

A Block is located in the south of CODAN complex. It is composed of 350% FAR, 400ea number of houses, 2ea central corridor types, 1ea single corridor typed high level building, store and low leveled part entering into parking lot. It is characterized by 'common terrace' considering volume of mass, 'F-room' having additional home office, 'bright central corridor' and 'wet area' (e.g. Fig. 4).

The common terrace is located in each floor of the common space. The common terrace going through 2 floors is surrounded by F-room of 8th parlor and a 1/4 of overall parlors sit opposite the common terrace. The F-room is in the space having SOHO or showroom, up bringing spacer or hobby room (e.g. Fig. 5). In addition, the compartment between middle corridors is made of glass. The middle corridors are located in the high space where we can obtain lighting and airing through common terrace or private one. By arranging the F-room to the corridor, the corridor of parlor is opened. The wet area and kitchen is mainly located on

the external block to obtain large scaled rectangular F-room (e.g. Fig. 6). The border of compartment is freely and the wet area can be space such as sun room with glass effect, and dry laundry as well. The central corridor is opened against out door while the unit is against central corridor.

4.2.2 B Block

For B Block program, to meet these requirements, the courtyard space of 2nd floors leveled intelligence base is made in cooperation with a designer of A block as a part of constructing 290 ea aggregate houses including 35,000 m² parking lot or commercial facilities on the site of 7,100 m². The large scaled courtyard across two blocks is playing a role of buffer zone function between main buildings, and making a comfortable housing environment.

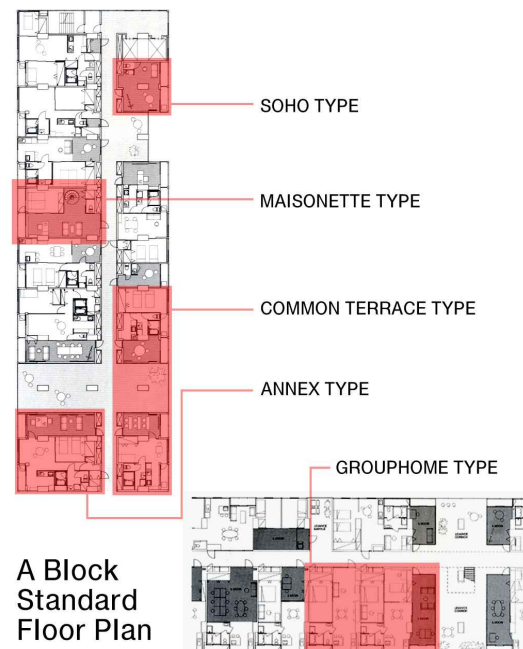


Figure 4: Standard Floor Plan of A Block

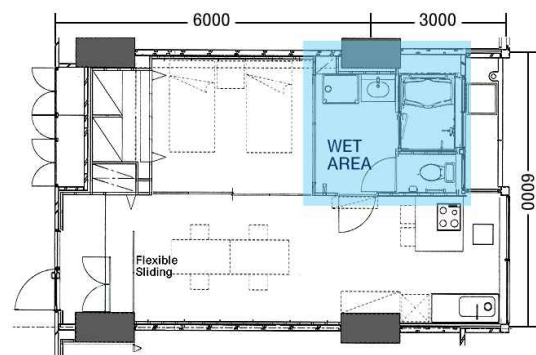


Figure 5: a Case of SOHO type

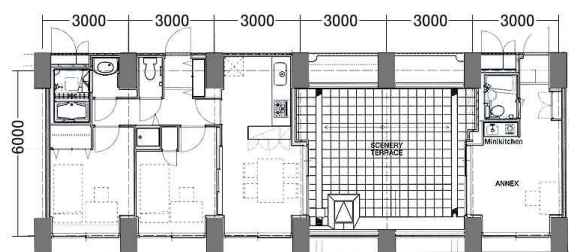


Figure 6: a Case of ANNEX type

The main building is separately assigned by two masses having entirely different system (e.g. Fig. 7). With this assignment, we simplified each system by dividing various main room types into two main buildings to ensure the effective lighting site. A mass along with road side is separated as each room in the basis of 3m span interval structures, it makes the variety of main rooms by unit by changes of number of each room. And other mass located in the north is considered for use in the future by using rahmen structure of 6m grid. SOHO type unit without available compartment is planned by using a wide structural span.

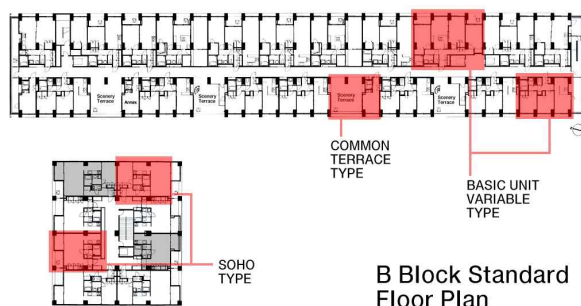


Figure 7: Standard Floor Plan of B Block

4.2.3 C Block

Half opening type is the theme of C Block. The U type arrangement neither the courtyard nor parallel can be called as 'semi-open' (e.g. Fig. 8). The external environment will flow into because of U type open gate. U type is not active (object) but passive (non-object).

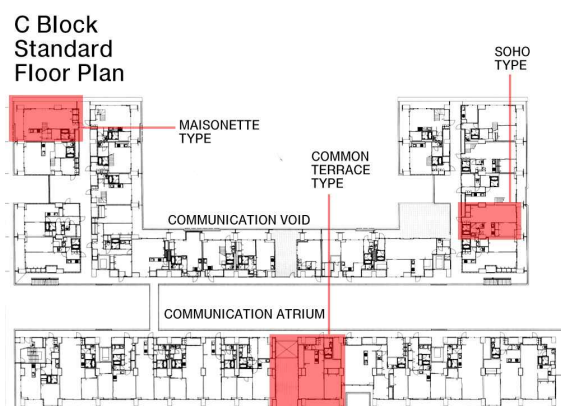


Figure 8: Standard Floor Plan of C Block

It would like to find out the solution for construction or urban problems by adapting whether it is an active or passive rather than is opened or closed. For the courtyard, basic unit (basic residential site) and annex (one room or small sized office) sit opposite between these holes to make mutual complementary relations.

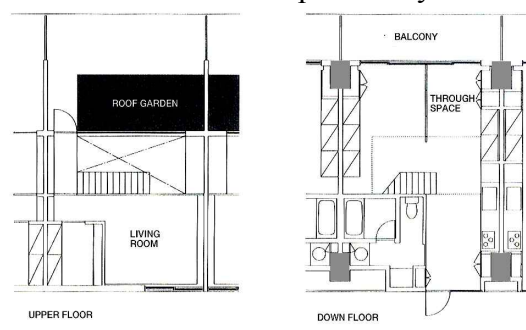


Figure 9: a Case of Maisonette type

The interior composition of basic unit is based on U type, and passive urban lifestyle become image in the center of holes, which are cylinder and garden type. In the opening part of these holes, several filters including glass filter are prepared to control the environmental input to insider. The lower floor part is made to be able to meet the ground space extended as step type. We intended to the ground type not the type cut off by object.

4.2.4 D Block

D Block is located in the center of 6 compartments. It is premised the fact that have to include urban space structure, moderation as a sightseeing, new life aid and capacity. The plate growing up 1ea floor from the center of main

building horizontally which 4ea floors are in one space is linked with square space having each scale or playground for children. The multi level street is optional and urban environment is also considered (e.g. Fig. 10).

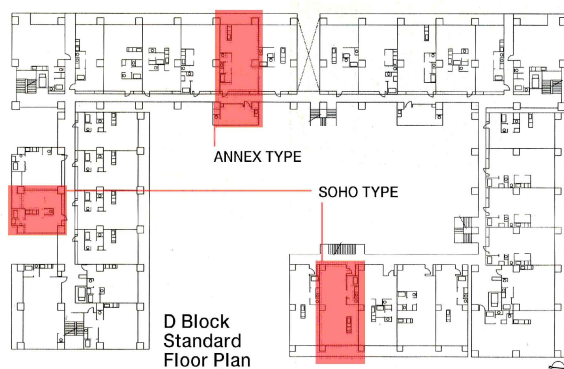


Figure 10: Standard Floor Plan of D Block

The courtyard unit is separated by the compartment made of material which one room can be separated. It is made to allow people to live freely in response of style or stage. The opening part to corridor is planned to ensure the open ability, but residents shall control privacy by themselves. The translucent screen made of double skin or flexible space of 1, 2 floors reflects the lifestyle of residents and the horizontal shape smoothly and it will be made to establish unique order in a long time.

4.2.5 E Block

E Block is located in the western north of complex, and its one site is in the direction of TOYOSU. The main building is spread out along with road, but it is surrounded by S tree lined street. Each inter block of main building is opposite to the courtyard different direction or characteristics.

This arrangement is made by main room unit plan to use the width of front widely. The front width is intended to ensure the effects on lighting or ventilation, at the same time, privacy by using the characterized that the opposite of corridor is much longer, and to make the open unit. It is based on single corridor to allow that the opening part of corridor is more wider, and the inside of unit has both directions. The area between external and internal spaces will be

used as multi-purpose space to control the same line or privacy (e.g. Fig. 11).



Figure 11: Standard Floor Plan of E Block

To realize in the public housing and HO annexed residing housing, to join the one rooms with ease and to partition toward the inside, there is an air pocket, which combines annex room and air hole for wind, is installed at the main variation made toward front space and as such the façade is completed. The surrounded courtyard facing canal and is a place of knotted and is considered connected using with life supporting facilities and the HO type main house.

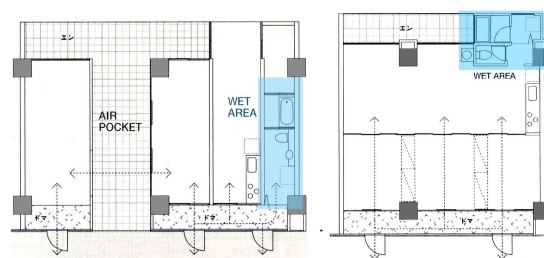


Figure 12: a Case of Common Terrace type

4.2.6 F Block

The Multi-level streets of F Block middle-rise main house forms an excursion like a city central street and a space with a location. And the major features of this is a see-through elevator, a small square, short stairs, an space device like connecting bridge and S shape crank type. Installed with a yellowish green four sides, a size with a 1/8th of the section at the "S" avenue, and a sluggish continued 2- story level garden is made.

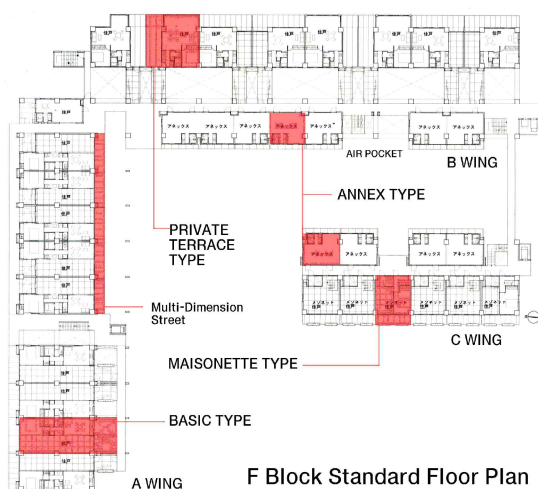


Figure 13: Standard Floor Plan of F Block

5. CONCLUSION

Analysing show that combination diversity requires a strategic planning of more than a mixture of various unit plans. The findings of this study show that the common feature of each calling for a solution for future housing of Korea.

Codan was a complex announcement tenants Roundup as soon as competition was fierce.

The SI system for urban based maintenance allows the introduction of life support facilities, generation of new style by HO(home office), trial for extension of residential space to make use of Annex, planning the space where people live together and making 'human contact'.

By introducing design methods of Japan to Korea and uniting the techniques of variability, quality improvement of residential space will be realized.

Table II: Summary of Analysis

	Building Themes	Design Concept	Plan Combination
A Block	Common Spaces Glass Corridor Wall	F-Rooms Free Border of Compartment Bright Central Corridor	Soho Type Maisonette Type Group-home Type
B Block	Large Scaled Courtyard Wide Structural Span	Different System Buildings Soho type is 6m Grid	Common Terrace Type Soho Type Basic Unit Type
C Block	Semi-Open Mass Passive Mass Style	See-Through Plan Mutual Relations	Common Terrace Type Soho Type Annex Type
D Block	Multi-Level Streets Flexible Spaces Responsible Styles	Horizontal Plates Separated Courtyard	Soho Type Annex Type
E Block	Air Pockets Privacy by Corridor Place of Knotted	Widely Front Plan Multi-purpose Spaces	Soho Type Maisonette Type Annex Type
F Block	See-Through Elevator Air Pockets Green Slide Court	Connecting Bridge Multi-Dimension Streets Shortcut Stairs	Maisonette Type Private Terrace Type Soho Type

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