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SPATIAL EXPANSION OF CALCUTTA/KOLKATA,  
WEST BENGAL, INDIA



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**ABSTRACT:**

The spatial changes of Kolkata from the early 17th Century to the present (2011) has been in a phase of evolution. It has obtained more attention due to the amalgamating of the total area from three villages and a port to form Calcutta to 25 wards and finally to 141 wards. An area from 52.4sq.km to 187.33sq.km in the present decade and the conversion of Calcutta to Kolkata with the inclusion of KMC (Kolkata Municipal Corporation) has been quite significant. In this study, the spread of the city of Calcutta to its present size of 141 wards has been mapped with the help of 21st Century GIS Professional software and the maps studied from the ancient History of Calcutta to the recent available ones which are also drawn by NATMO (National Atlas and Thematic Mapping Organization) and KMC (Kolkata Municipal Corporation). The expansion of Calcutta validated that built-up area expansion and the upgrading trends of the development of the city have been very prominent from 17th century to 2011. The study and the maps drawn clearly mention the

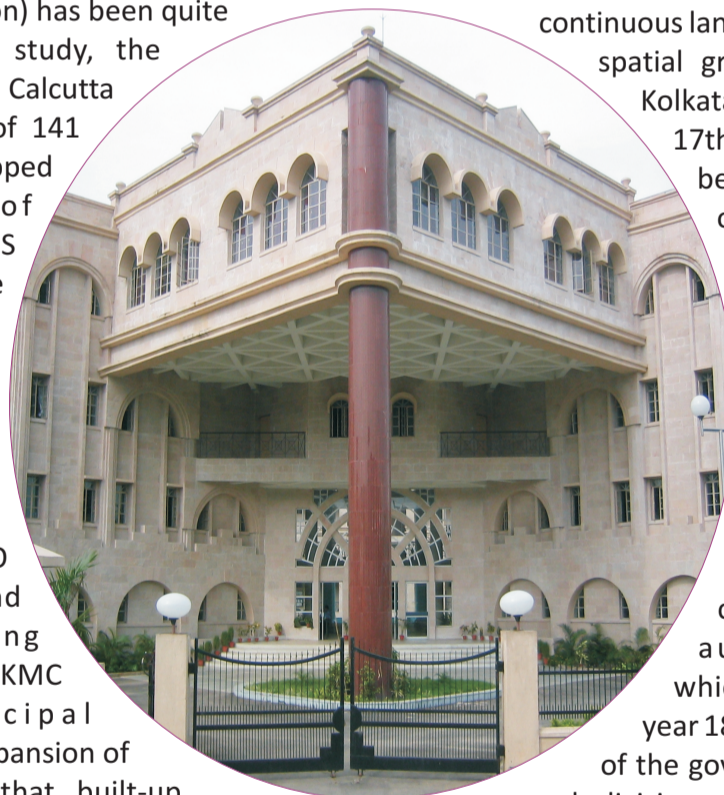
expansion of the city to its present form due to the increase of population in Kolkata.

**KEY WORDS:** spatial changes of Kolkata, phase of evolution, GIS Professional software.

**INTRODUCTION:**

'Spatial Expansion' has been a word associated with the present areal growth which is ultimately consuming the neighboring areas and slowly amalgamating into a huge body of continuous land and settlement. The spatial growth of the city of Kolkata from the ancient 17th century to 2011 has been a significant area of study. The 20th century urbanization and growth in Kolkata have led the governing body to divide and subdivide the huge expanding land area into 141 wards. The KMC (Kolkata Municipal Corporation), an autonomous body, which emerged in the year 1876, formed the basis of the governing body of these sub-divisions.

An average population of 14 million, according to the 2011 census has led to its expansion in due course. Calcutta spread into 3



main towns of Gobindapur, Sutanuti and Kalikata during the 17th century when Job Charnock in 1690 of the British East India Company first set his foot on the city. The city of Kolkata on the eastern banks of the River Hoogly (a tributary of Ganges) had been ever since an important seat of commercialization. The primary logic behind map making and scientific surveys in colonial India was initiated by the Topographical Surveys. The Survey of India started with accurate map making to detect the changes in area for a span of 500 years from the 17th century to the 2014. The increase of population pressure in these areas and for the better management, the entire area was fragmented into smaller governed bodies-Wards. Presently Kolkata has 141 wards. The basics to the people of these wards are supervised by KMC (Kolkata Municipal Corporation). The larger expanse of area and the sub-divided smaller units are mapped in the study for convenience.

#### REVIEW OF LITERATURE

- Sustainable Residential Development in Urban Areas, *Guidelines for Planning Authorities (Cities, Towns & Villages) Govt. of Ireland 2009*, enumerated that the quality of development has a long-term impact in evolving to a closely knit residential community. The quality of homes, places where people live, raise families should have cost effective transport and community facilities. A sound basis on sustainable living should be practiced for a proper development.
- An Urban Planning, Design and Economic Development Plan, *A New Plan for the Mobile, Alabama, March 2009*, by EDSA stated a future vision of the ability to grow and expand as a strengthened role for the economic development connecting various regions for an overall prosperity.
- Ghosh Benoy, August 13 (1960), in *"The Colonial Beginnings of Calcutta Urbanization without Industrialization"* assessed the industrial age with a correlation between urbanization and industrialization. The size of population has been linked directly with agriculture and forestry. The 19th century in Calcutta witnessed one of the largest influx of people and the outbursts of various employment opportunities leading to the spread of the area along the banks of the Hugli accommodating more people with improved infrastructural facilities.
- Shapiro Janet, (2001) in *"Overview of Planning"* stated that, planning is a complex process which requires strategies and actions with proper techniques involved. Monitoring is required for planning and the overall purpose should be made clear before the expansion of a city. Spatial expansion should be dealt with proper understanding as it will initiate various developmental goals in the global, national and local levels.
- Chaoyi Chang, (2013) in *"Understanding Spatial and Temporal Patterns of Urban Expansion in Western China during the Post-Reform Era"* documented the impacts of ongoing urban transition, and has focused on rates and patterns of development in coastal cities in the late 1970s and early 1980s in China's western region.
- In the article from City Planning Department (2009) City of Helsinki, *'From City to City-Region City of Helsinki Strategic Spatial Plan'*, explains the development of the dynamic metropolitan cityscape and its slow evolution using strategic planning leading to suburban renaissance

#### OBJECTIVES

The objectives of the current study are-

1. Detection of the total area covered under KMC.
2. Calculating the Change in area of Calcutta from the 17th century to 2011 using the 21stCenturyGIS Professional Software.
3. Analyzing the trend of further sub-dividing of the Wards in the recent years.

### STUDY AREA

Kolkata, (187.33sq.km) the capital of West Bengal has been chosen as the study area which extends between 22° 34' 0'' N to 88° 22' 0'' E. Kolkata from the early 17th century had been a nucleus of urbanization, with the passage of time it just spread its wings all over the eastern bank of River Hoogly in the lower Ganges delta spreading to an area of 187.33km<sup>2</sup> forming a huge urban agglomeration.

### METHODOLOGY

Maps are prepared in this study used for analyzing the spatial area and amalgamation of the three villages, Gobindapur, Sutanuti and Kalikata to form the present Kolkata. The maps of 17th, 18th and the 19th century has been derived from the History of Kolkata and digitized. The raster maps has been scanned and the tools for digitization were used with the Total area boundary denoted through a polygon layer, roads and settlements through line and point layers respectively. The map making software used for this study was 21stCentury GIS Professional.

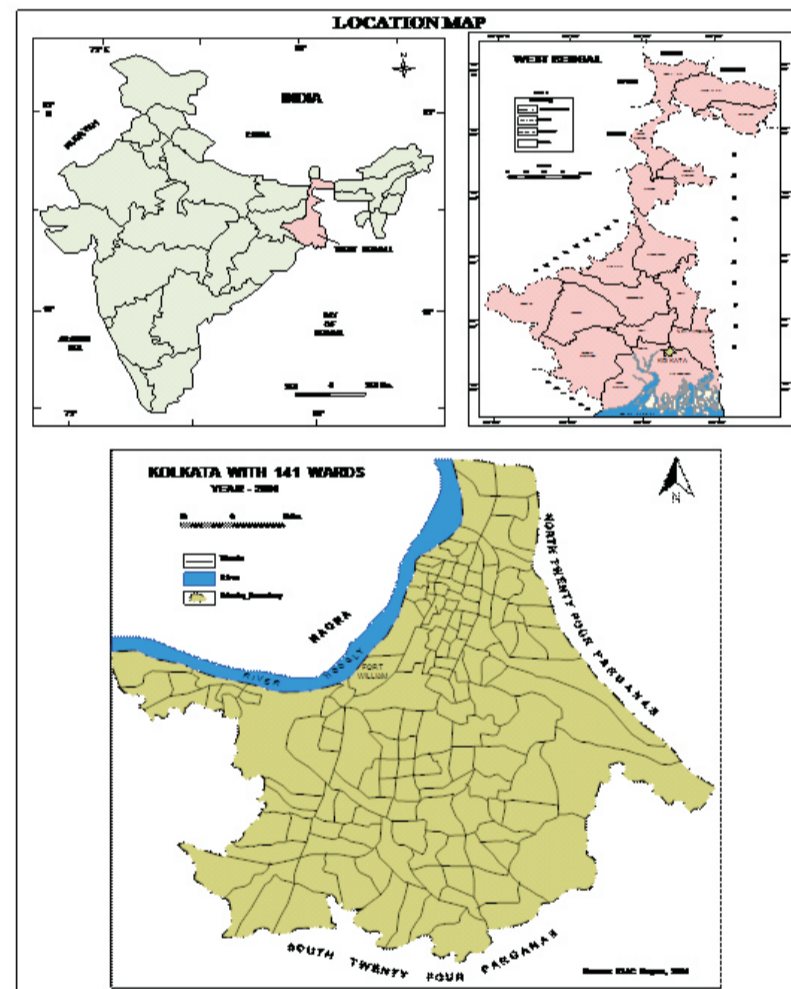


Fig 1: Location of the study area- Kolkata, West Bengal.

The location map shows the position of the study area, Kolkata. The map of India showing the different states in which West Bengal is marked in pink color and the map of Kolkata under KMC (Kolkata

Municipal Corporation) with 141 wards is drawn below.

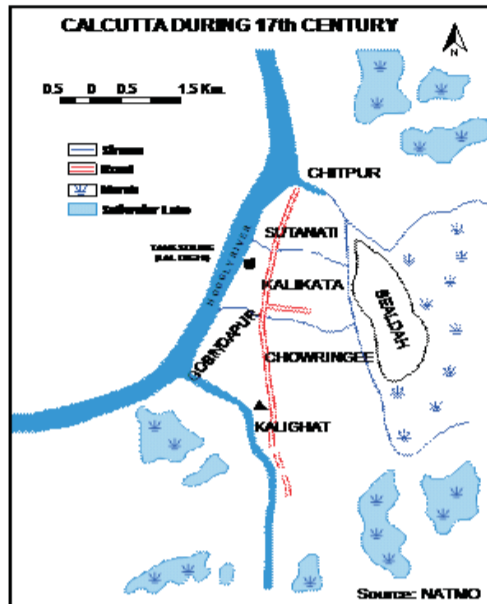


Fig 2: Calcutta during 17<sup>th</sup> Century

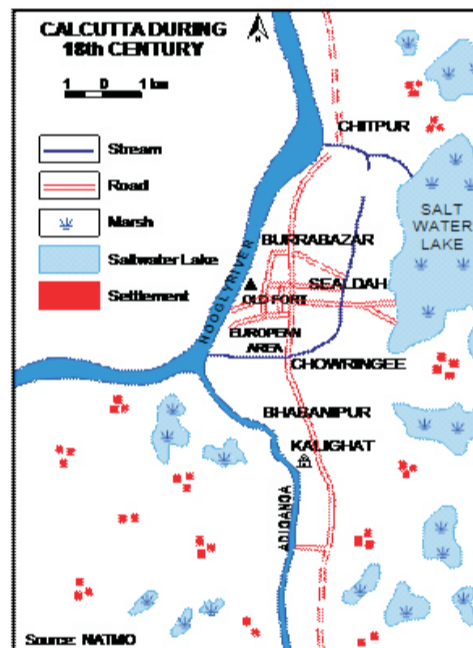
The figure alongside is the map of Calcutta during the 17th century when it was first discovered by Job Charnock as a port city for carrying out trade during the British Rule. The main villages were Gobindapur, Kalikata and Sutanuti. The maps were derived from the National Atlas and Thematic Mapping Organization.

Fig 2: Calcutta during 17<sup>th</sup> Century

Fig 3: Calcutta during 18<sup>th</sup> Century

On the right hand side is the map of Calcutta during the 18th Century. The map has been derived from NATMO (National Atlas and Thematic Mapping Organization).

The map shows the Hooghly River which is the tributary of the Ganges and a few roads being developed along with the major centers are identified in the map. There are a few salt water lakes around the city which are still not completely developed.



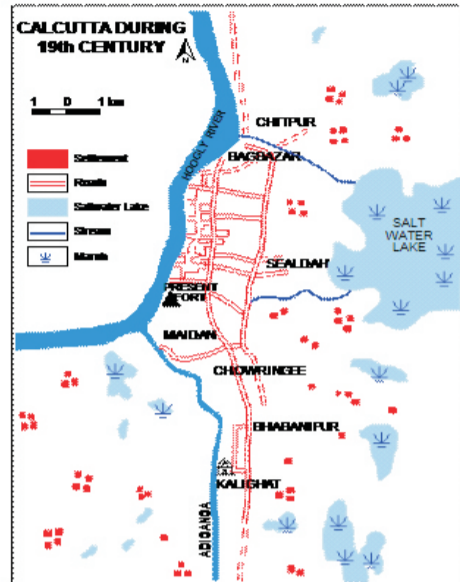


Fig 4: Calcutta during 19<sup>th</sup> Century

The map on the left shows the emergence of the new roads and settlements. The slow progress of Calcutta has been mapped in the given image alongside. Calcutta on the banks of the Hooghly has been an important centre to the people from ages since the East India Company had set its foot on the port of Calcutta. The map has its source from NATMO and slowly after this period the area started to be governed by the body called Calcutta Corporation.

Fig 5: Map of Calcutta in 1850

The map drawn alongside is the map of Calcutta in the year 1850. The total area of Calcutta was divided into three distinct towns of the Indian Town, Intermediate Town and the European Town. The development of new roads had led to the expansion and growth of Calcutta. Slowly the growth of population gave rise to a municipal corporation in 1901.

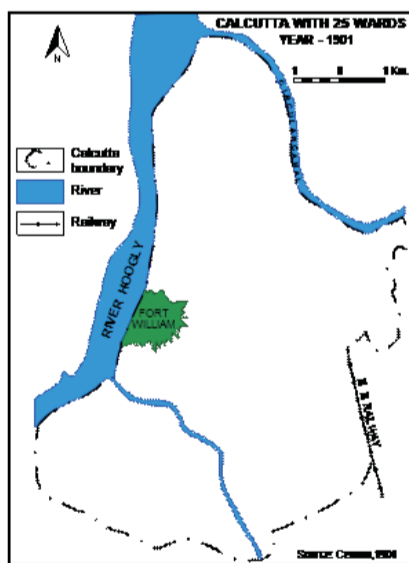
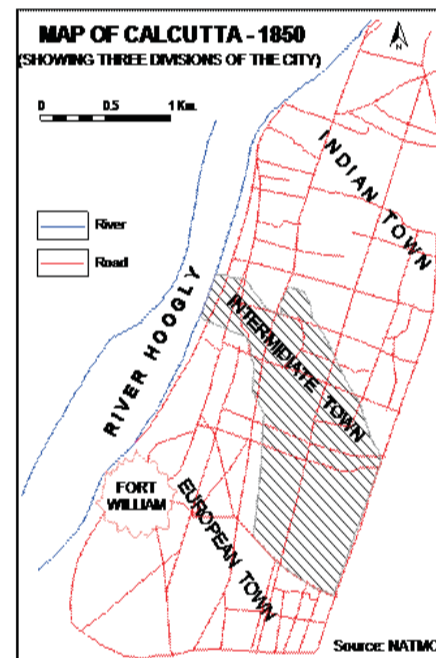


Fig 6: Calcutta with 25 wards in 1901

The map of Calcutta during 1901 was with the area of 52.4072sq.km. The boundary of Calcutta with 25 wards has been depicted and the canals of the River Hooghly with a newly constructed Rail network. The map shows the area under Calcutta Municipal Corporation and the map derived from the Census of 1901.

SPATIAL EXPANSION OF CALCUTTA/KOLKATA, WEST BENGAL, INDIA

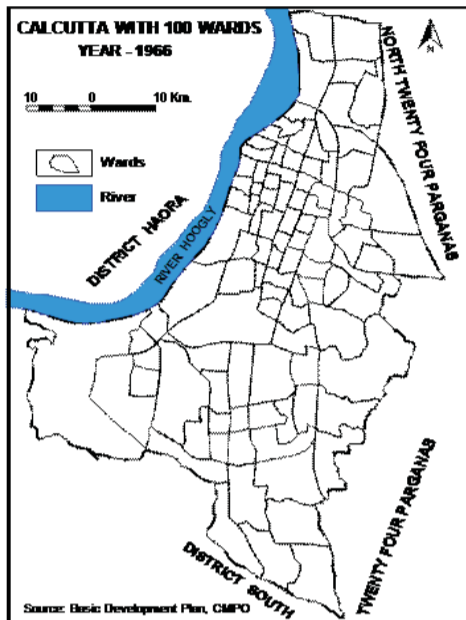


Fig 7: Calcutta with 100 wards in 1966

The map of Calcutta with 100 wards and an area of 111.78sq.km has been drawn. The exponential expansion studied can be seen through the spread of the area and the developments made due to population growth. The basic development plan was done by the Calcutta Corporation keeping in mind the expanse of area along the banks of the River Hooghly.

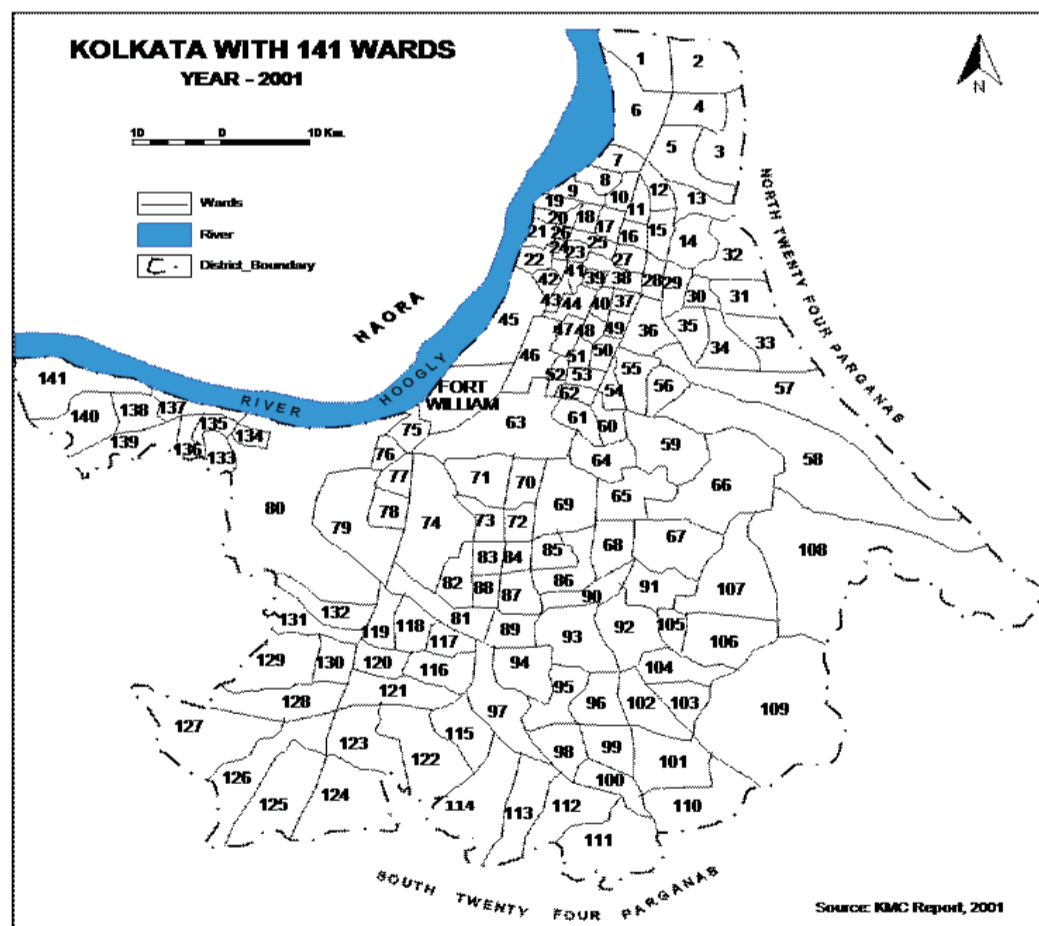


Fig 8: Kolkata with 141 wards in 2001



## SPATIAL EXPANSION OF CALCUTTA/KOLKATA, WEST BENGAL, INDIA

The above given figure shows Kolkata in the present form with 141 wards. From the Kolkata Municipal Report of 2001, the area mapped covers 187.33sq.km. The ward numbers are denoted to show the present form of Kolkata from 2001 to 2014. Through the software 21stCenturyGIS, ward boundary of Kolkata has been mapped with a polygon feature and the small sub-divisions or wards through line feature. With the expanse and growth of population the canals which had emerged from the River Hoogly has eventually disappeared. The area has increased from 100 wards in 1966 to 141 wards in 2014.

### GRAPH SHOWING THE INCREASING AREA OF KOLKATA:

Graph: 1

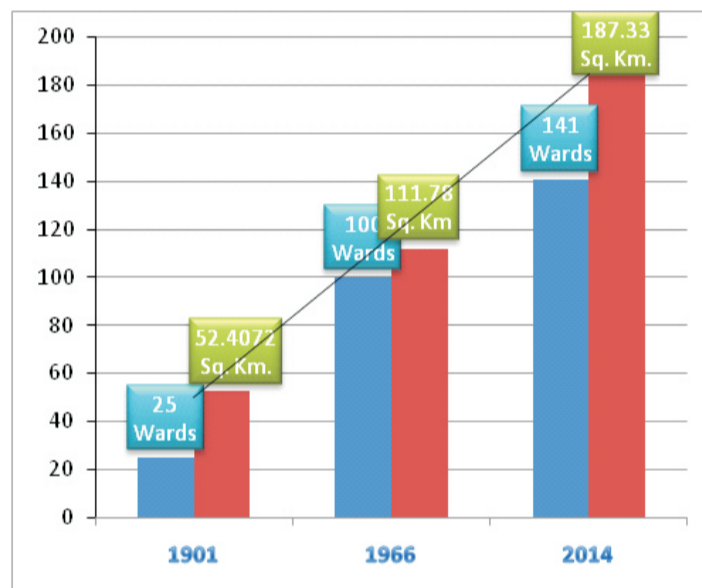


Chart: 1

Wards and the area from 1901-2014

Years	No. of Wards	Area (sq. km)
1901	25	52.4072
1966	100	111.78
2014	141	187.33

### ANALYSIS OF THE GRAPH:

The above drawn graph explains that, Calcutta in the year 1901 was divided into 25 wards with the area of 52.4072sq.km. Later in 1966 the area was further subdivided for better governance into 100 wards covering an area of 111.78sq.km. In the year 2011 Kolkata had expanded and grown in size covering an area of 187.33sq.km.

### RESULT AND DISCUSSION

The above study concluded the increase of the total area of the urban agglomeration from the times of the discovery of Calcutta by Job Charnock in 17th century to the present 2014. The amalgamation of the area from 25 wards to 100 and later to 141 wards explains the pressure of population and the trend of that KMC is expanding in size.

From the drawn maps it can be explained that the trend of increasing the number of wards is towards the South 24 Parganas. In the later years the KMC will try to subdivide wards for better governance and to tackle the population pressure on land due to urbanization.

The KMC is planning to include some more areas which are under Kolkata Metropolitan Development Authority within the next few years.

### CONCLUSION

The maps of Calcutta have been studied in details and the present map of KMC with the ward boundary has been drawn for calculating the total area under KMC presently in 2014. The area of erstwhile Calcutta in the year 1901, under the British rule was divided into 25 wards with the area of 52.4072sq.km. Later in 1966 the area was further subdivided for better governance into 100 wards covering an area of 111.78sq.km. In the year 2011 Kolkata had expanded and grown in size covering an area of 187.33sq.km with better residential communities and a closely knit better evolved transport system.

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