

EVALUATION OF DEFINITIVE VILLAGE BOUNDARY SEGMENTS IN COMPARISON TO COMPLETE VILLAGE BOUNDARY SEGMENTS FROM THE RESULTS OF COMPLETE SYSTEMATIC LAND REGISTRATION (PTSL) (A Case Study in Tumpakkepuh Village, Bakung District, Blitar Regency)

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Abstract. *The Complete Systematic Land Registration Program (PTSL) aims to provide legal certainty of land ownership through accurate measurement and mapping. One derivative data from PTSL activities is the geometry of village boundaries formed after all plots in the village/sub-district have been measured (complete village). Until 2024, the declaration of complete villages in Blitar Regency was only carried out in Tumpakkepuh Village, which had its definitive village boundaries determined cartometrically in 2018. Evaluation of village boundaries is needed to ensure compliance with the latest PTSL mapping results and support spatial data integration by the One Map Policy. This study evaluates the geometry/spatiality of definitive village boundaries against complete village boundaries in Tumpakkepuh Village, Bakung District, Blitar Regency. The aspects analyzed include differences in segment positions and segment shifts. This study is based on a Geographic Information System using the dissolve and union tools. The results of the geometric evaluation showed that none of the analyzed village boundary line segments overlapped completely or were in the same position. From 7 sample points of segment shifts, it is known that 4 segments shifted out to Pasiraman Village and Lorejo Village and 3 segments entered the complete village boundaries of the Tumpakkepuh Village area. The differences in village boundaries need to be followed up by the Blitar Regency Government by aligning the data through a revision of the determination of definitive village boundaries by adding the plot aspect to the methodology for compiling definitive village boundaries.*
Keywords: *definitive boundaries; PTSL; tumpakkepuh village*

INTRODUCTION

Village boundaries are crucial for optimizing governance and authority in managing village areas (Bashit et al., 2019). Village boundaries are a critical concern in local governance and power management. Clear and well-defined village boundaries are essential in preventing conflicts between residents or neighboring villages and serve as a solid legal foundation for government administration (Mahendra and Murlianti, 2019; Rochgiyanti et al., 2024). To address these challenges, the Indonesian Government has implemented the One Map Policy, as outlined in Government Regulation Number 9 of 2016, to resolve the problem of overlapping spatial data, including administrative boundary disputes that often lead to conflicts and hinder development planning (Kurniawan and Kurniawan, 2023; Nurhidayah, 2022). A key element of the One Map Policy is establishing and reinforcing accurate, consistent, and synergistic village boundaries, ensuring alignment and coherence across policies (Kurniawan and Kurniawan, 2023).

In support of the One Map Policy, the Complete Systematic Land Registration (PTSL) program was introduced to expedite the national land certification process. The PTSL program is outlined in the Regulation of the Minister of Agrarian Affairs and Spatial Planning/Head of the National Land Agency Number 6 of 2018. Initially launched in 2017 with a target of certifying 5 million land plots, the target was subsequently increased to 7 million plots in 2018, 9 million plots in 2019, and 10 million plots in 2020. The program is set to be completed by the end of 2024, with an overall target of certifying 126 million land plots (Arnowo, 2019; Mujiburohman, 2018). The primary output of the PTSL program is land certificates, which encompass both legal and physical aspects. The legal aspect includes textual data such as the identity of the rights holder, the type of rights, and other relevant annotations related to the subject or object of the land. Meanwhile, the physical aspect includes data on the land plot's location, boundaries, and area, contributing to land administration infrastructure (Sudarsono and Nugraha, 2008).

One of the results of this program is a complete village map. A complete village map must meet the requirements and be valid both spatially and textually and meet the legal requirements in the form of land book validation and PTSL document scans and physical requirements in the form of plot validation and maximum delineation area (Ministry of Agrarian Affairs and Spatial Planning/Head of the National Land Agency, 2023). A complete village has the benefit of being a source of information on complete land ownership and control in all villages, making it easier for the Regional Government to develop planning, increase taxes through PBB, BPHTH, PPh, and reduce land dispute conflicts (Rahmawati, 2022).

Until 2024, the complete village declaration by the Land Office in Blitar Regency only existed in Tumpakkepuh Village, Bakung District (Blitar Regency Land Office, 2024). On August 18, 2020, with the submission report number 402/200.35.05/VIII/2020, Tumpakkepuh Village, Bakung District, Blitar Regency was submitted by the Blitar Regency Land Office for a complete village declaration and has been approved by the Ministry of Agrarian Affairs and Spatial Planning/National Land Agency in 2020. The existence of a complete village declaration can be interpreted as all villages having their plots mapped so that they will form natural village boundaries according to the outermost boundaries of the village, both plots and geographical elements such as roads/rivers.

Table 1. Spatial Information of Land Plots in Tumpakkepuh Village Resulting from the PTSL Program

Category	Total (Plots)
Right of Ownership	2.250
Right of Use	1
Waqf Right	5
Forestry Area	1
Land Plots without Registered Land Rights	306
Total Number of Land plots	2.563

Source: Blitar Regency Land Office, 2020

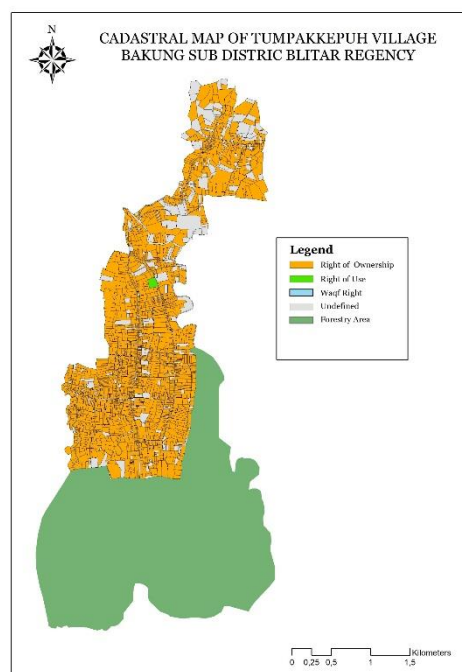


Figure 1. Map of Land Plots in Tumpakkepuh Village Resulting from the PTSL Program

Source: Blitar Regency Land Office, 2020

However, in the field, differences are often found between the previously determined definitive village boundaries and the results of the PTSL program. Tumpakkepuh Village's definitive village boundaries have been determined through Regent Regulation of Blitar Regency No 85 of 2018 concerning the Determination and Confirmation of the Boundaries of Tumpakkepuh Village, Bakung District, Blitar Regency. This

difference can be caused by different survey methods and technological limitations when determining definitive boundaries.

The PTSL program uses the GNSS (Global Navigation Satellite Systems) relative positioning method to measure land areas. This method has a high level of accuracy because it can determine the position of points with sub-meter to centimeter precision. This method is ideal for producing accurate and consistent spatial data, especially in the context of PTSL, which requires legal certainty over land boundaries (Larsson, 1991; Kusmiarto, 2017; Wahyuntari, 2020). Meanwhile, definitive village boundaries use the cartometric method, namely the method of drawing village boundaries using geospatial information data in the form of High-Resolution Satellite Imagery (CTSRT), which allows boundary identification without having to go to the field, thus accelerating the process of confirming village boundaries and reducing higher costs if conducting direct field surveys. (Minister of Home Affairs of the Republic of Indonesia, 2016). Its accuracy is lower than GNSS because the resolution and quality of the maps or images and subjectivity in the digitization or interpretation process influence it. Land area measurements using GNSS are more accurate and precise than more practical cartometric measurements (Aditya et al., 2020).

Evaluation of definitive village boundaries has broad implications for village development. Clarity of boundaries allows village governments to plan development more efficiently, manage natural resources, and attract investment (Wahyuntari, 2020). Inconsistencies in village boundaries can trigger land ownership conflicts and problems with Land Registration administration. Therefore, it is important to evaluate the definitive village boundary segments with the village boundaries resulting from PTSL to ensure data alignment and prevent potential conflicts in the future and as a form of data integration between institutions in realizing the One Map Policy as mandated by Presidential Regulation Number 9 of 2016.

This study aims to evaluate the geometric/spatial boundaries of Tumpakkepuh Village as determined through the Regent Regulation (definitive village boundaries) against the complete village boundaries resulting from the Complete Systematic Land Registration (PTSL) program. The aspects analyzed include segment differences, segment position differences, the magnitude of the shift in segment differences, and identifying land areas of complete village boundaries outside the definitive village boundaries. The results of this study are expected to be helpful for the Blitar Regency Government to align data through revisions to the determination of definitive village boundaries by adding plot aspects to the methodology for compiling definitive village boundaries.

METHODOLOGY

This research is located in Tumpakkepuh Village, Bakung District, Blitar Regency which is located between coordinates 8° 15' 7.55"- 8° 19' 2.82"S and 112° 6' 6.48"- 112° 7' 33.6"E with the north bordering Pasiran Village (Wonotirto District), the west bordering Lorejo Village and Sidomulyo Village, the south bordering the Indian Ocean and the east bordering Pasiraman Village and Kaligrenjeng Village (Wonotirto District). Visualization of the research location can be seen in Figure 2.

This study's data are the definitive village boundary map and the village boundary map resulting from PTSL. The definitive boundary map is sourced from Regent Regulation Number 85 of 2018 concerning the Determination and Confirmation of the Boundaries of Tumpakkepuh Village, Bakung District, Blitar Regency. Meanwhile, the village boundary map resulting from PTSL is sourced from the PTSL program organized by the Blitar Regency Land Office in 2020.

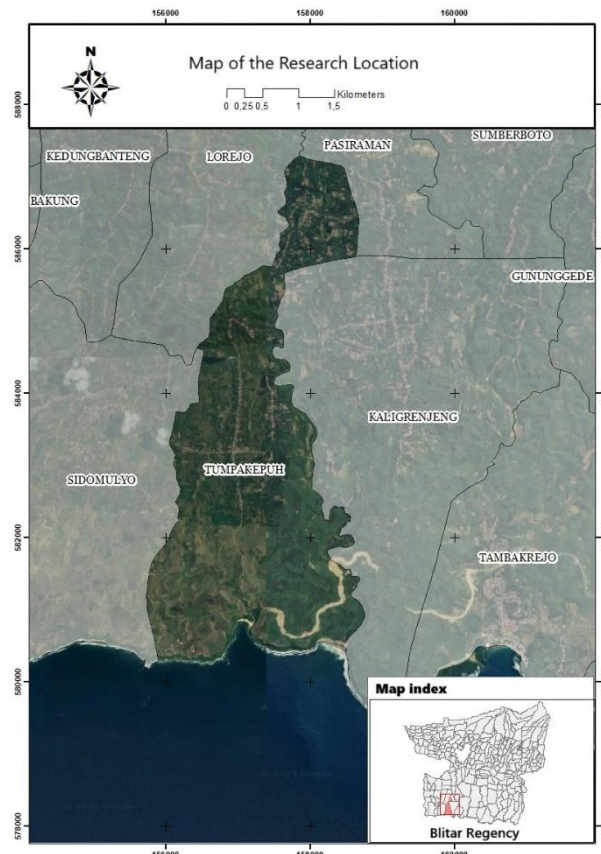


Figure 2. Map of the Research Location
Source: Geospatial Information Agency, 2018

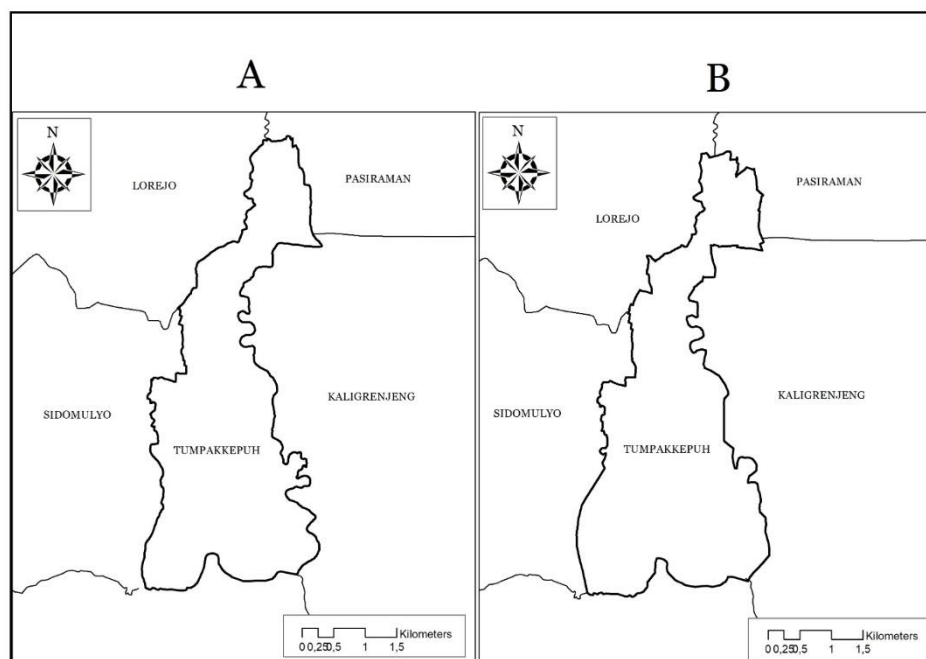


Figure 3. A) Definitive Village Boundary Map (Source: Regent Regulation Number 85 of 2018) and B) Complete Village Boundary from the PTSL Program (Source: Blitar Regency Land Office, 2020)

The tools used for analysis in this study are dissolved and union (overlay). Dissolve is a process used to combine features with exact attributes into one feature. This process often simplifies geographic data by removing unnecessary boundaries between the features. Union is a process that combines two or more polygon

features into a new layer that covers all areas of the combined features. Each feature of the layers involved will retain its attributes, and the result is a new polygon that covers a combination of all existing areas (Bostad, 2016).

The analysis was conducted exclusively within areas classified as "Other Land Uses" (*Area Penggunaan Lain/APL*), which are located outside designated forest zones. As a result, not all segments of the administrative boundaries were included in the assessment. This selective analysis led to geometric differences in the delineation of village boundaries when compared to official datasets that cover the entire area, including forested regions. Consequently, the spatial discrepancy observed is primarily due to the limited scope of the analyzed area rather than errors in the digitization process. The village boundary segment to be analyzed starts from the coordinates X = 621413, Y = 9082340, the initial coordinates, to the coordinates X = 622971, Y = 9083820, the final coordinates. The village boundary segment is visualized in Figure 4.

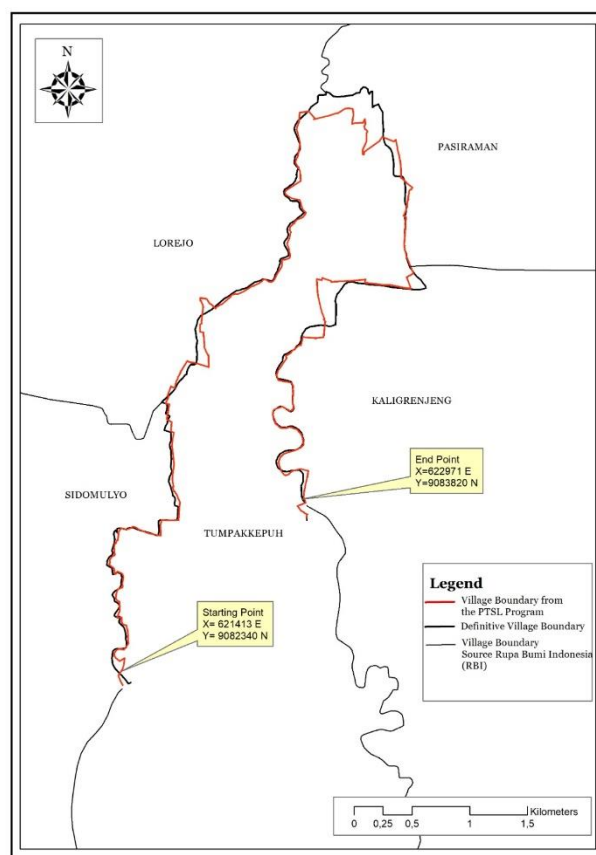


Figure 4. Segments Analyzed in the Research

RESULT AND DISCUSSION

Position Difference

The length of the definitive village boundary segment is 13,932.141 meters, while the length of the complete village boundary segment is 14,684.667 meters. There is a difference of 752.526 meters between the definitive village boundary segment and the complete village. The village boundary segment (complete village) is longer than the definitive village boundary.

Identification of differences in the position of village boundary segments using the overlay method or union tools. The definitive village boundary is overlaid with the complete village boundary. From the overlay process, it can be seen that there is a gap area. The gap area is an area that does not overlap or stand-alone. If there is no gap, it can be interpreted that there is no difference in the position of the village boundary segment, and if there is a difference, there is a difference in position.

Table 2. Results of the Village Boundary Overlay Analysis

Point	Description	Value	Coordinates (X, Y)
1	Number of Polygons	69	-
2	Total Area	448.292,591 m ² /44,829 Ha	-
3	Largest Polygon Area	141.747,348 m ² /14,174 Ha	623370, 9087352
4	Smallest Polygon Area	0.039201 m ²	621415, 9082402
5	Mean	6.592,53754 m ²	-
6	Standard Deviation	19.978,85 m ²	-

The gap formed is 448,292.591 m² or 44.829 Ha. The gap forms 69 new entities in the form of new areas/polygons. The largest area formed is 141,747.348 m² or 14.174 Ha, at the centroid coordinates X = 623370, Y = 9087352. The smallest area formed is 0.039201 m², at the centroid coordinates X = 621415, Y = 9082402. From the length of the analyzed segment lines, there are no overlapping segments or segments in the same position; the overlap is only at the intersection point between segments with the same position.

This gap appears as an area that does not have an intersection between the two village boundaries, indicating a mismatch or difference in determining the position of the village boundary segment. Most of the gaps formed are in the form of new polygons, each with a different area and position, reflecting a mismatch in the placement of village boundaries in the two data used. In this case, the gap can be an important indicator in detecting differences in measurement or errors in village boundary mapping that may need to be adjusted or verified further.

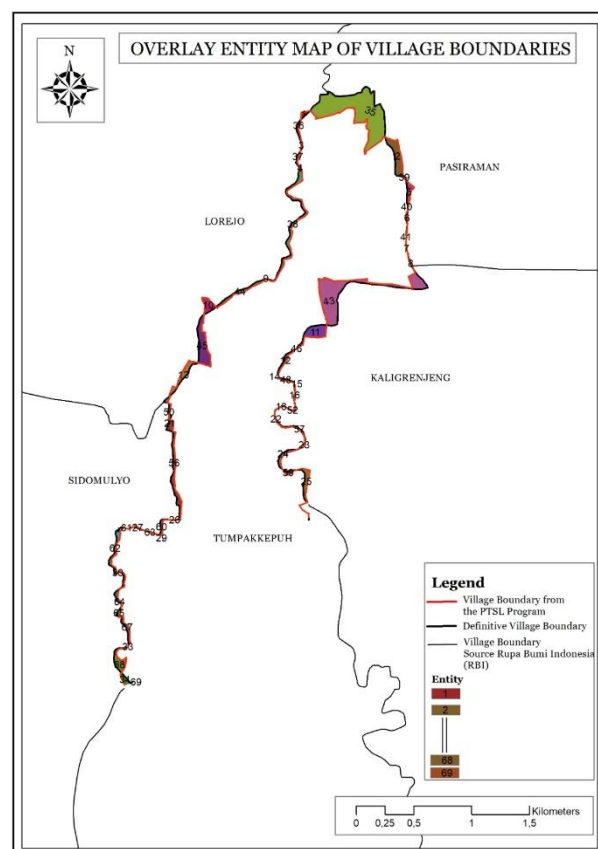


Figure 5. Distribution of New Entities/Polygon Gaps from the Overlay of Definitive Village Boundaries and PTSL Village Boundaries

The overlay process also provides valuable information about newly formed entities. With the presence of 69 new entities resulting from the overlay, we can more precisely map areas that require further attention, both in terms of administration and more accurate mapping. The gaps formed with varying sizes indicate that

this discrepancy occurs not only at one point or small area but is spread across several locations. This indicates that the problem of differences in the position of village boundary segments is more complex and may be caused by various factors, such as differences in mapping technology. The definitive village boundaries use the cartometric method, while the village boundaries resulting from PTSL use the GNSS method with relative positioning in their preparation. In addition, differences in data interpretation by the parties involved in the mapping are also among the factors contributing to the differences in village boundaries. Therefore, solving this problem requires a more in-depth approach, such as field verification.

Boundary Segment Shift

The segment shift analysis is limited to only 7 points with significantly visually different segment differences. The measurement results represent the 2 furthest and perpendicular points between village boundaries. The sample points for the analysis can be seen in Figure 6.

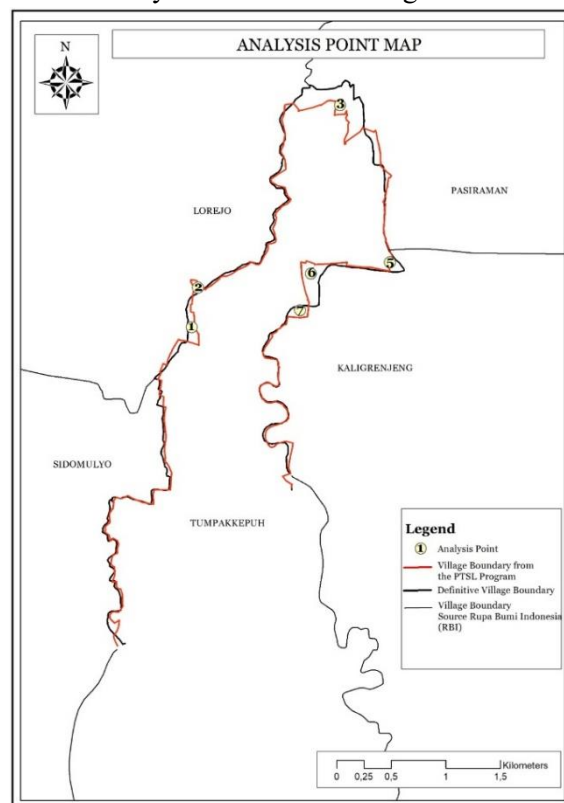


Figure 6. Sample Points for Measuring Boundary Segment Differences

The furthest segment difference is at sample point 3, as far as 454.630 meters towards the exit of Tumpakkepuh Village and into the Pasiraman Village and Lorejo Village areas. From the sample point, it can be seen that sample point 4 has the closest segment shift, which is 88.598 meters towards Tumpakkepuh Village. Outward shift can be interpreted as the definitive village boundary segment moving away from the complete village boundary segment. In contrast, the inward shift means jutting into the definitive village boundary segment towards the complete village boundary segment. The existence of a village boundary segment that shifts inward indicates that there are plots or land areas, either partially or entirely, outside the definitive village boundary.

Table 3. Results of the Village Boundary Shift Analysis

Point	Lenght (m)	Direction
1	101,771	Out
2	141,707	In
3	454,630	Out
4	88,598	In
5	192,037	Out
6	239,288	Out
7	169,715	In

Sample points that show shifts outward and into other administrative areas, such as Pasiraman Village and Lorejo Village, can still be considered part of Tumpakkepuh Village, even if they are legally separate. This statement is supported by legal documents showing that the land plots in this segment are registered under the jurisdiction of Tumpakkepuh Village. Data from the National Land Agency (BPN), including the results of the PTSL (Complete Systematic Land Registration) program, show that the affected land plots are within the legal administrative area of Tumpakkepuh Village.

In land registration/PTSL, there is a set of required documents known as the warkah. The warkah contains both object and subject data, which serve as the basis for land registration. Generally, the process of issuing a land certificate involves two main stages: the physical (measurement) stage and the legal (juridical) verification stage. The results of the land measurement and juridical documentation will be publicly announced physical data for 3 to 7 days, and juridical data for 14 days. If no objections are raised during the announcement period, the land certificate will be issued, including the administrative status of the parcel's location (ATR/BPN, 2023).

CONCLUSION AND SUGGESTIONS

The evaluation of definitive village boundaries against complete village boundaries in Tumpakkepuh Village found differences in position and segment shifts. No village boundary line segments analyzed overlapped completely or were in the same position. Overlapping only occurred at intersection points between segments that had the same position. From 7 sample points of segment shifts, it is known that 4 segments have shifted out into the Pasiraman Village and Lorejo Village areas, and 3 segments have entered the complete boundary or entered the Tumpakkepuh Village area.

The determination of the Tumpakkepuh village boundaries needs to be reviewed/revised by considering the aspects of the plot/land area so that the goal of one map data can be achieved through data and institutional integration. Local community participation needs to be involved in re-evaluating village boundaries to ensure social legitimacy and minimize potential conflicts.

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