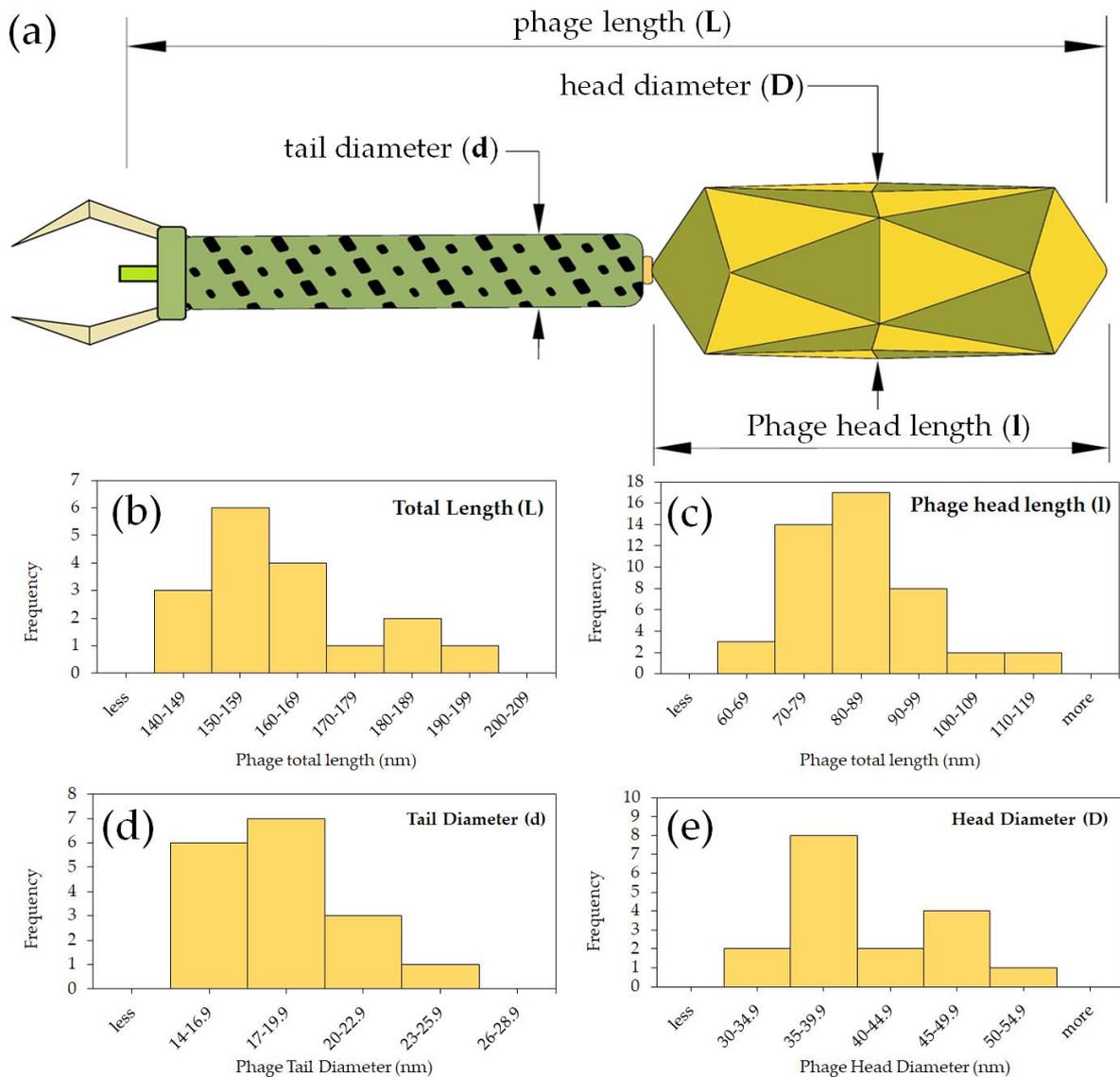


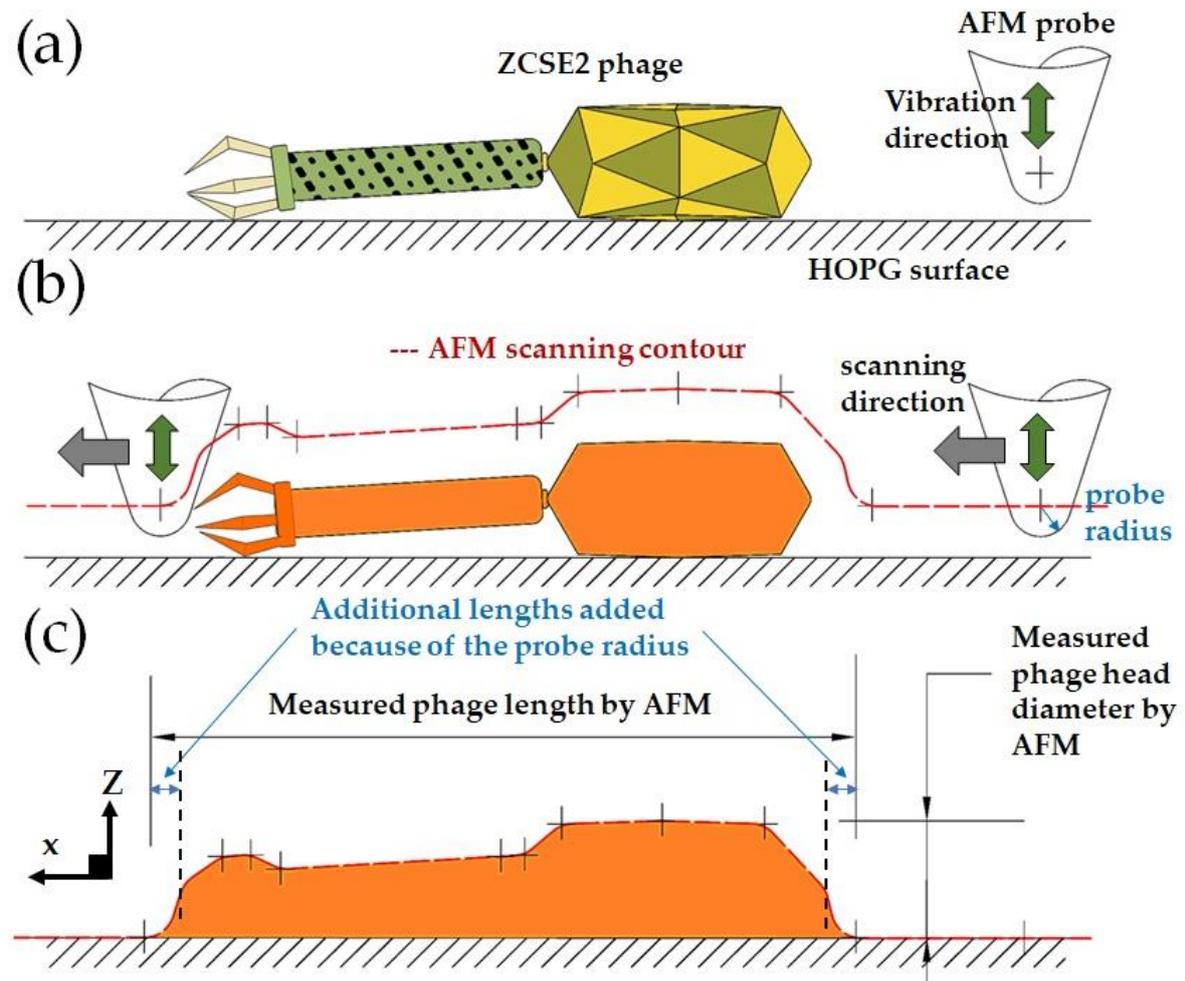
1 **Supplementary Figures**



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3 Figure S1. Phage dimensions distribution as measured during screening the sample by TEM in
 4 parallel illumination; (a) illustration figure shows the main dimension symbols and how they are
 5 measured; histogram of the (b) total phage length; (c) phage head length; (d) phage tail diameter; (e)
 6 phage head diameter.

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9 Figure S2. Illustration figure shows how the AFM scans a ZCSE2 bacteriophage placed on an
 10 atomically flat surface; First, (a) the ZCSE phage is drop casted on flat HOPG surface and the AFM
 11 probe is prepared to do the scan; (b) Then the AFM tip is used to trace the outer contour of the
 12 bacteriophage in the direction of scanning with a non-contact mode; (c) The vibration changes of the
 13 AFM cantilever is traced and processed to provide the outer contour of the phage profile; The AFM
 14 contour gives an accurate measurement of the phage head diameter because it sets flat relative to the
 15 HOPG flat surface; The phage length is usually measured larger than the real value because it is
 16 affected experimentally by the probe geometry.

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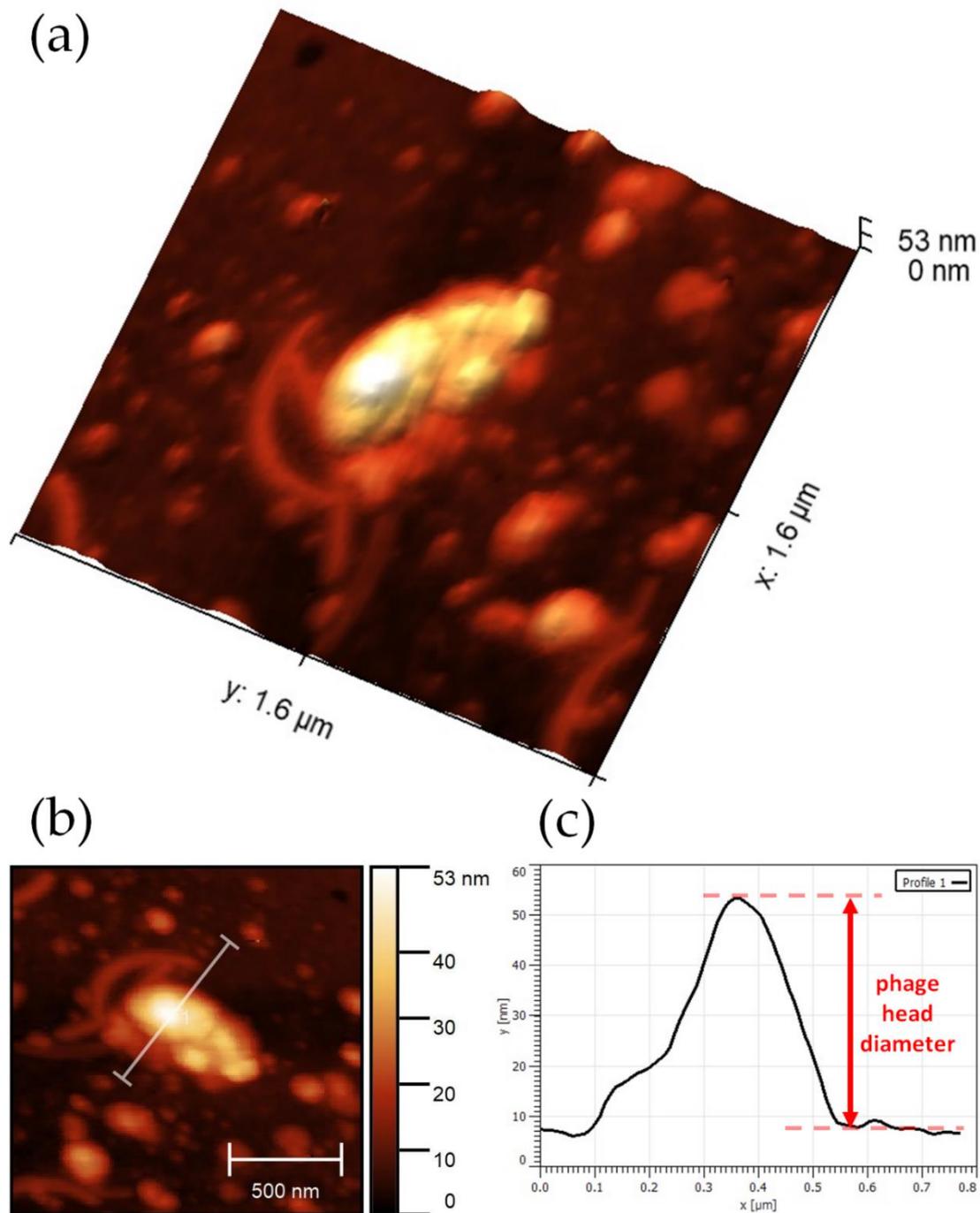


Figure S3. AFM of a ZCSE2 bacteriophage placed on HOPG surface. (a) 3D topography surface of the shows that the ZCSE2 has long head, tail, and a baseplate; (b) 2D view shows a section line where the profile in (c) is collected; The phage head diameter is found to be ~46.4 nm that fits within the TEM measurements.

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60 (a)

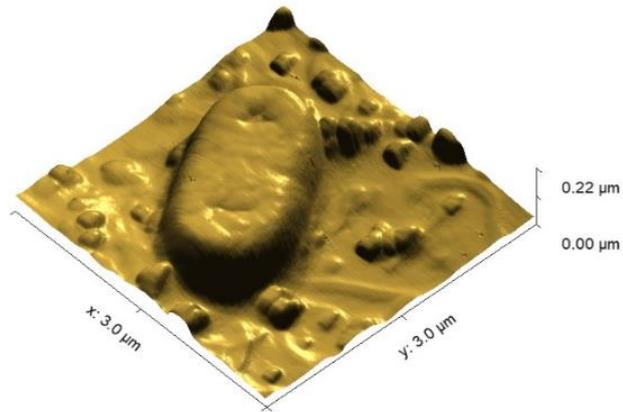
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66 (b)

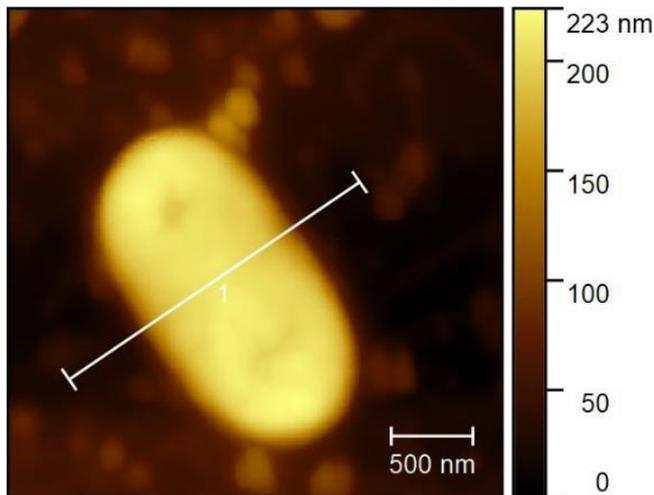
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72 (c)

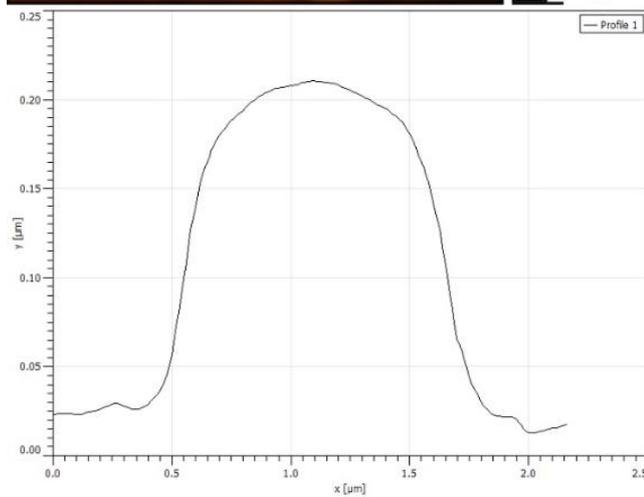
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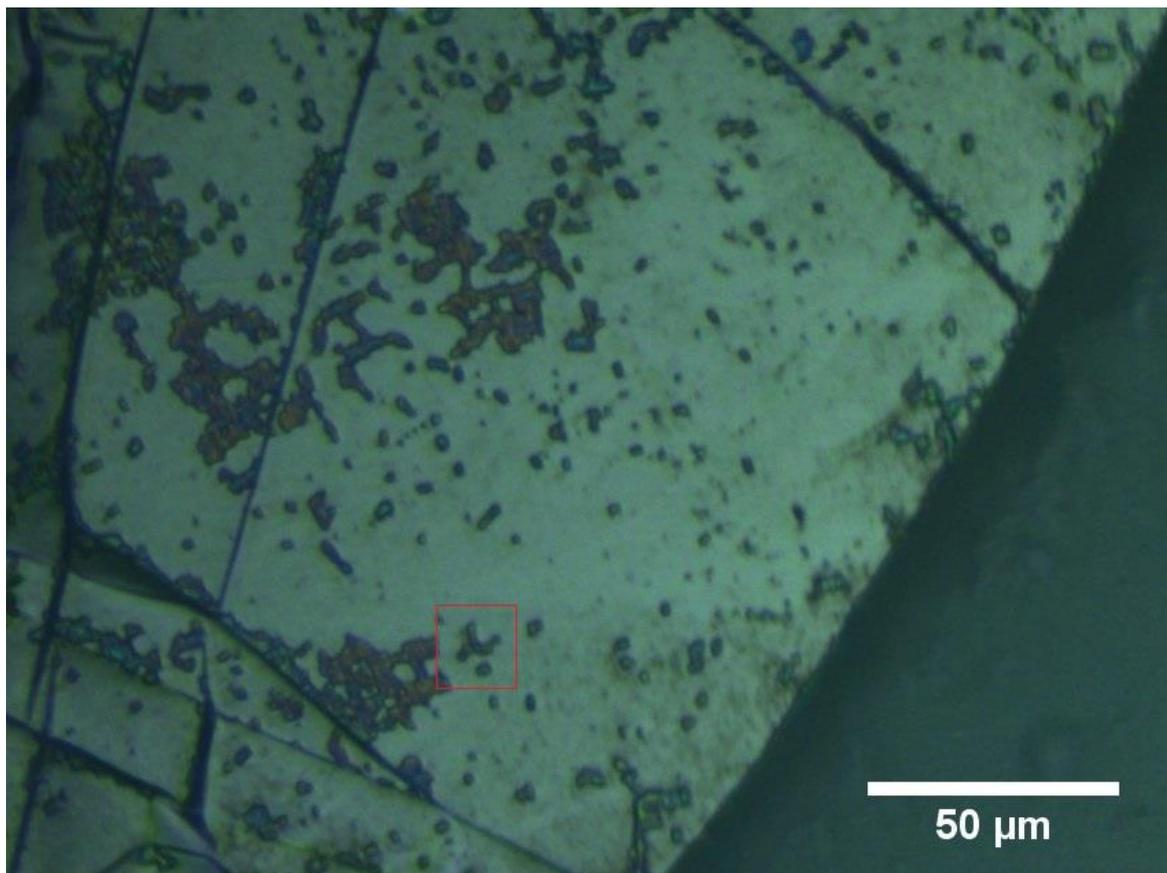


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Figure S4. AFM imaging of Salmonella Enteritidis WT Bacteria on the on HOPG surface with average height and width of $0.2 \mu\text{m}$ and $1.2 \mu\text{m}$ length, (a) 3D view, (b) 2D view with section line 1 across the bacteria, (c) profile of the cross-section line 1 in the 2D image.



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Figure S5. Optical microscope image of the bacteria with phages dispersed on HOPG surface. The red box is the position where the AFM images are collected in Fig S-9.

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86 **Supplementary Tables**

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88 **Table S1.** The EOP for ZCSE2 phage against a variety *Salmonella enterica* strains

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<i>Salmonella</i> Isolate	Average PFU/ml (\pm SD)	EOP
<i>Salmonella</i> Agama WT	5.2 (\pm 0.32)	0.54
<i>Salmonella</i> Amsterdam WT	5.3 (\pm 0.25)	0.54
<i>Salmonella</i> Atlanta NCTC 9986	7.2 (\pm 0.17)	0.74
<i>Salmonella</i> Bareilly NCTC 5745	8.1 (\pm 0.61)	0.84
<i>Salmonella</i> Derby WT	7.4 (\pm 1.21)	0.77
<i>Salmonella</i> Enteritidis HOOO WT	5.3 (\pm 0.3)	0.55
<i>Salmonella</i> Enteritidis SA029	6.9 (\pm 0.4)	0.72
<i>Salmonella</i> Enteritidis Harrison WT	7.8 (\pm 0.91)	0.81
<i>Salmonella</i> Hader WT	9.6 (\pm 0.65)	0.10
<i>Salmonella</i> Infantis NCTC 6903	7.1 (\pm 0.61)	0.73
<i>Salmonella</i> Kubacha WT	8.2 (\pm 1.04)	0.85
<i>Salmonella</i> Montevideo NCTC 5797	9.6 (\pm 0.75)	0.99
<i>Salmonella</i> Montevideo WT	6.5 (\pm 0.5)	0.68
<i>Salmonella</i> Thompson NCTC 2252	8.5 (\pm 0.25)	0.88
<i>Salmonella</i> Togla Amersham 5.8.95	5.4 (\pm 0.4)	0.55
<i>Salmonella</i> Typhimurium DT04 NCTC 13348	8.5 (\pm 0.25)	0.88
<i>Salmonella</i> Typhimurium LT2	7 (\pm 0.35)	0.72
<i>Salmonella</i> Typhimurium Rawlings WT	6.9 (\pm 0.67)	0.72
<i>Salmonella</i> Typhimurium S21344	4.4 (\pm 0.23)	0.46
<i>Salmonella</i> Typhimurium Turner WT	3.1 (\pm 0.17)	0.32
<i>Salmonella</i> Typhimurium U288	6.0 (\pm 0)	0.62
<i>Salmonella</i> Virchow WT	4.8 (\pm 0.26)	0.50

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92 **Table S2.** Statistical analysis of phage dimensions measured from TEM

Dimension	Number of counts	Mean (nm)	Standard deviation (nm)
Length (L)	17	165.6	18.2
Head Diameter (D)	17	34.9	4.8
Tail Diameter (d)	17	14.9	2.7
Head length	46	83.7	10.7

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