



Institute for
Infocomm Research

Innovating For Singapore as A Smart Nation



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Singapore's Smart Nation Vision



“A nation where people live meaningful and fulfilled lives, enabled seamlessly by technology, offering exciting opportunities for all.”

- Prime Minister of Singapore,
- Mr Lee Hsien Loong

Strategic Advantage 1 for Smart Nation – I²R's Strong ICT Foundation



INTELLIGENCE

- Machine Learning
- Semantic Understanding
- Text Mining
- Stream Processing
- Visualization
- Smart Grid
- Privacy Preserving
- Lightweight Cryptography
- iOS/Android OS Security
- Brain Computer Interface
- Ocular Imaging
- Medical Image Processing
- Biometrics
- Speech Recognition
- Speaker State Analysis
- Chatbots



COMMUNICATIONS

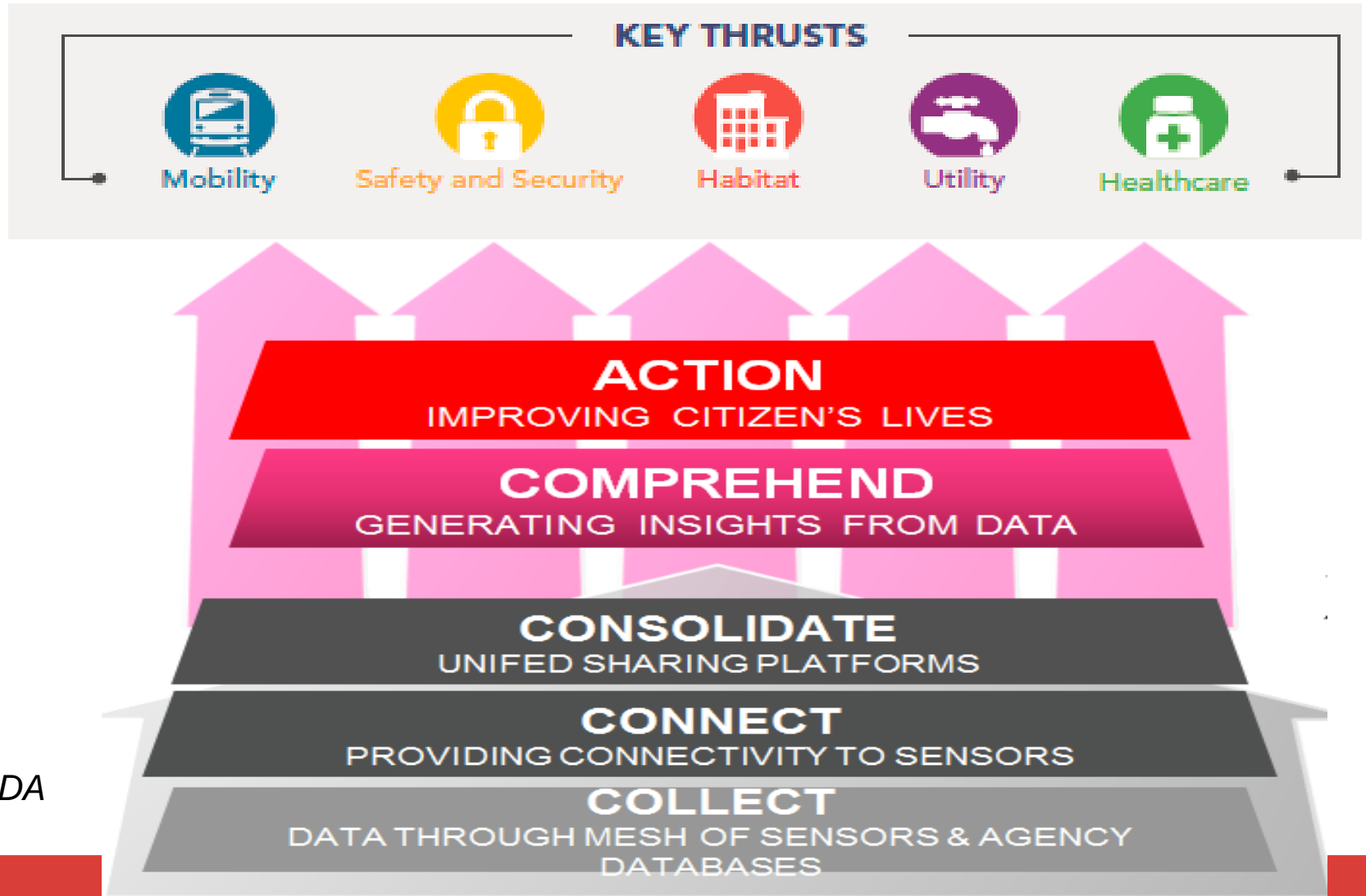
- MIMO
- Antenna Beam forming
- Cooperative Communications
- Meta-materials
- Satellite Communications
- LDPC
- Channel Models
- Network Coding
- Optical-Cross Connects
- Cognitive Radio
- Joint Source-Channel Coding
- Wi-Fi Test-beds
- TV White Spaces
- Dynamic Spectrum Allocation



MEDIA

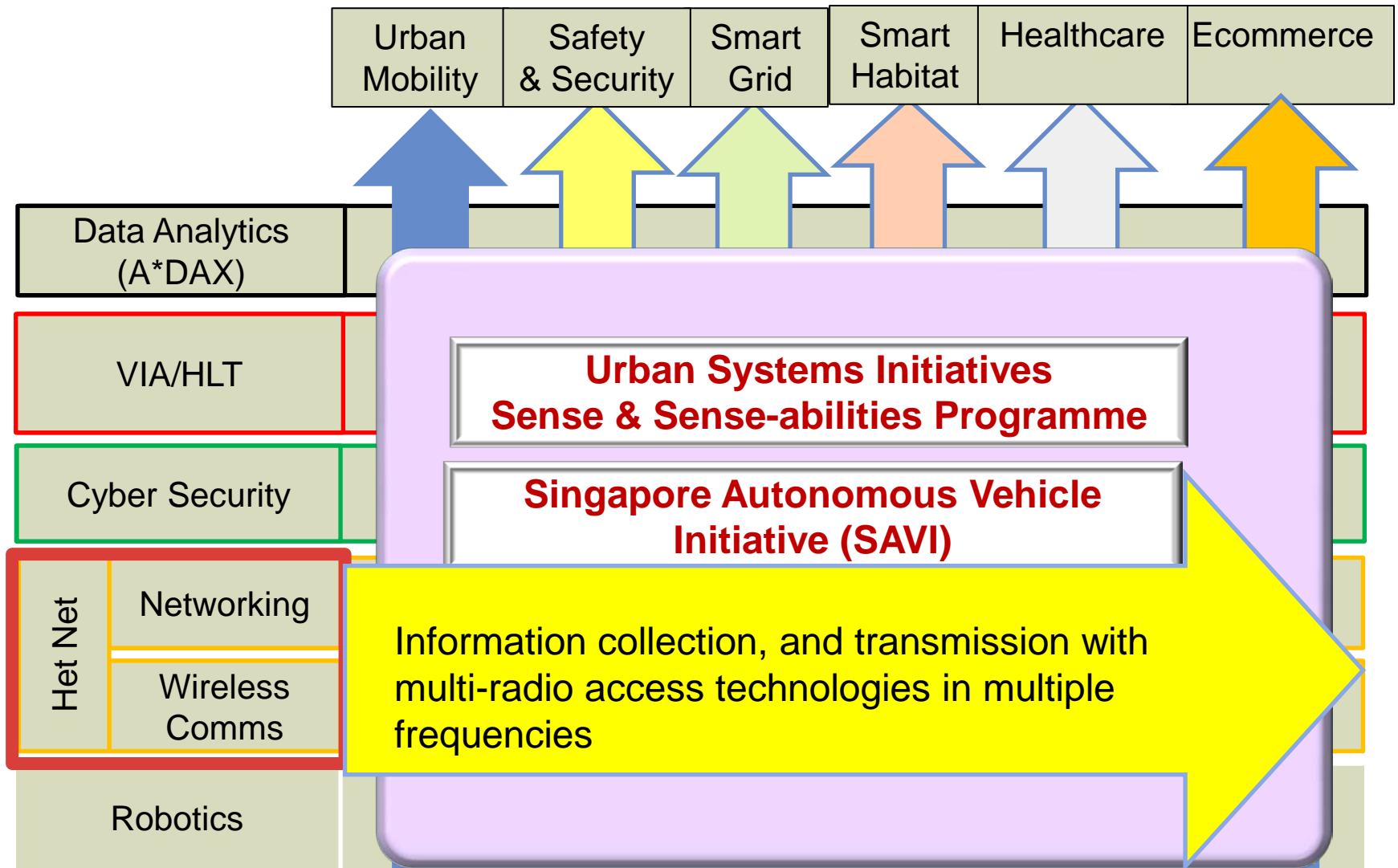
- MP4 SLS
- Scalable Audio
- Perceptual Audio
- H.265/HEVC
- Scalable Video
- Web Streaming
- Image Forensics
- Scene Understanding
- Multimedia Content Analytics
- Video Analytics
- HDR De-ghosting
- Image Dehazing
- Augmented Reality

Strategic Advantage 2 – Synchronise with Singapore's Smart Nation Initiative



Source: IDA

I²R: System Strategy for Smart Nation- Whole-of-I²R



Evolving ICM Landscape in Smart Nation



Exponential network data traffic growth



Widespread use of smart mobile consumer device and services



Digitisation of information and media content



CAPEX/OPEX reduction for sustainable ICT

Why HetNet

- Network is going through big shift in architecture
 - 1000X capacity
 - Billions of devices
 - 100-1000X Energy efficiency
 - Simple linear extension of current architecture may not work
- HetNet: Intelligent Integration of Multi-RAT, Multi-Layer, Multi-Network , Over Multiple Spectrums

Our Area of Focus

- WiFi offloading
- Multi-tier cellular

- DSA/OSA
- Spectrum reuse
- Spectrum re-farming
- MTC integration

**Seamless
Roaming**

**Resource
Sharing**

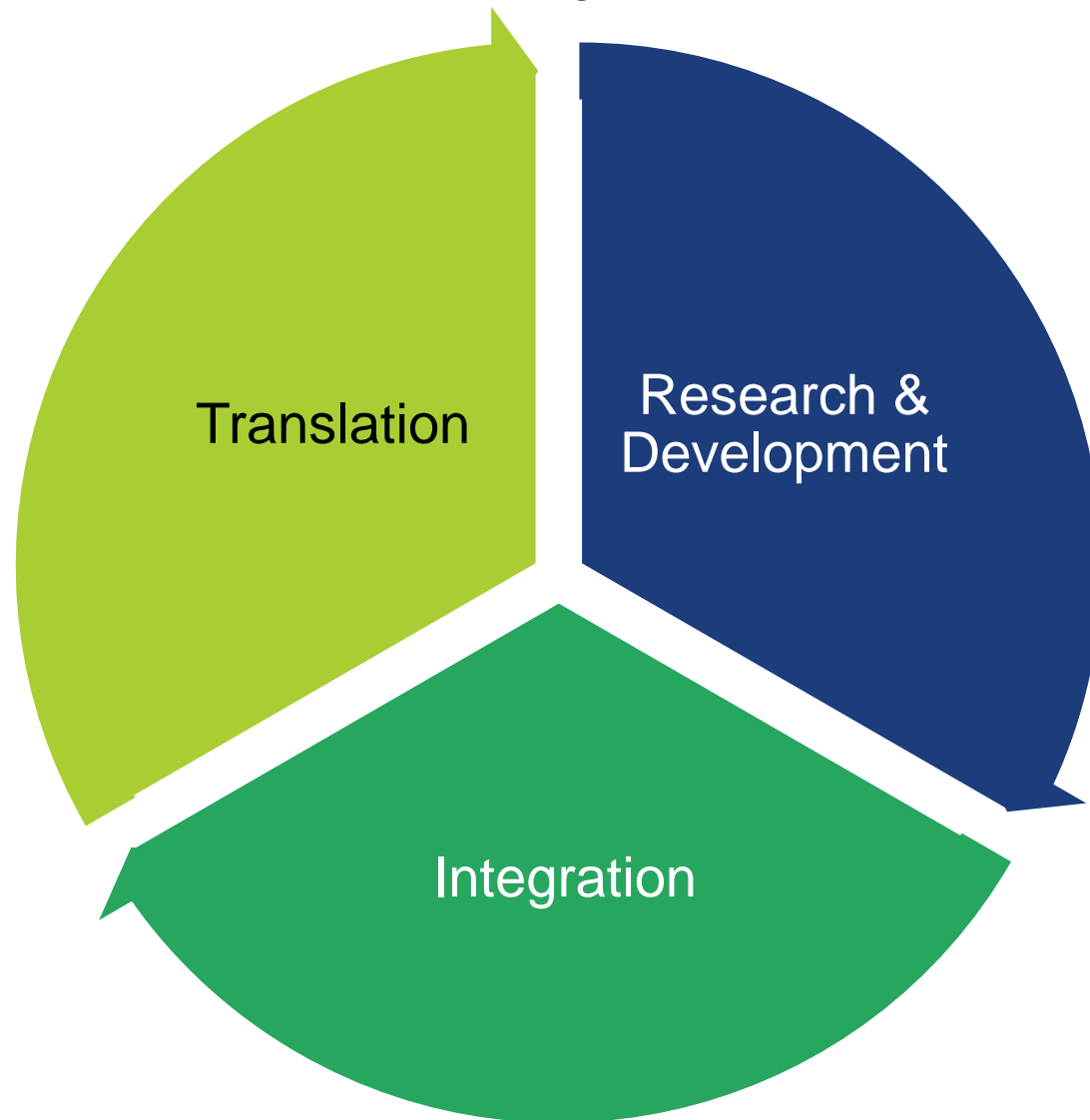
**Peak Data
Rates**

**Quality of
Service &
Experience**

- C-RAN/L-DAS
- Small cells

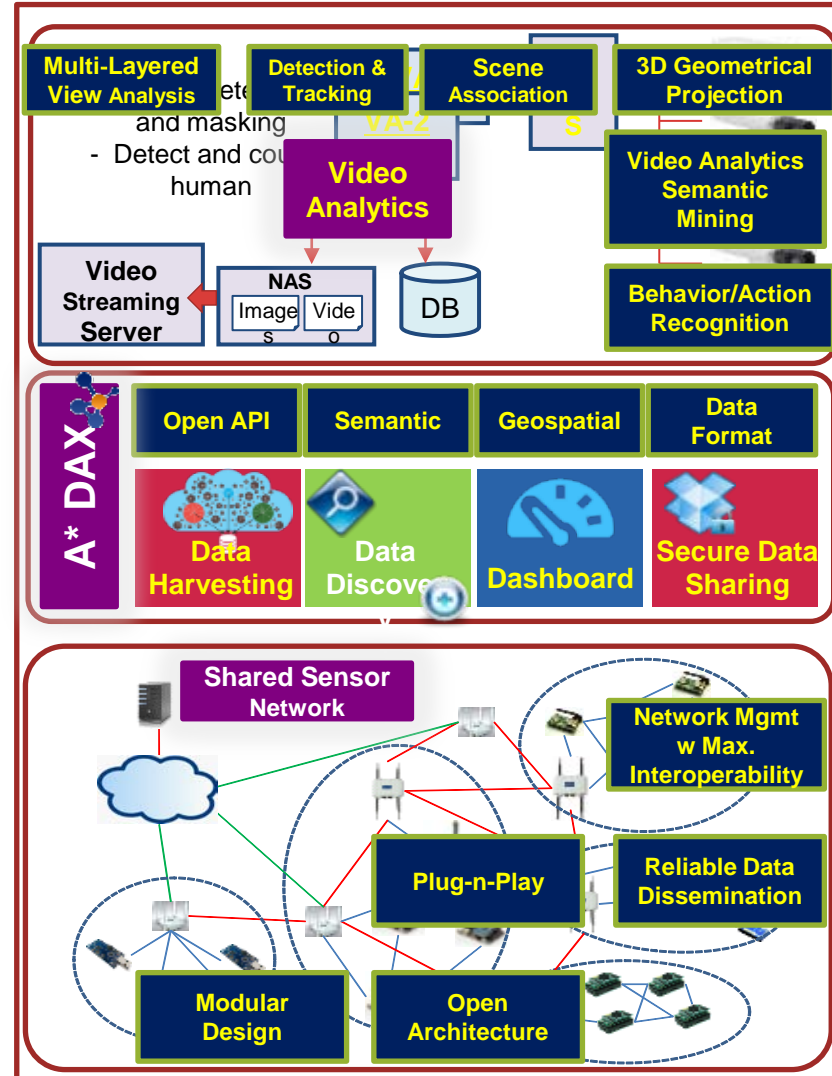
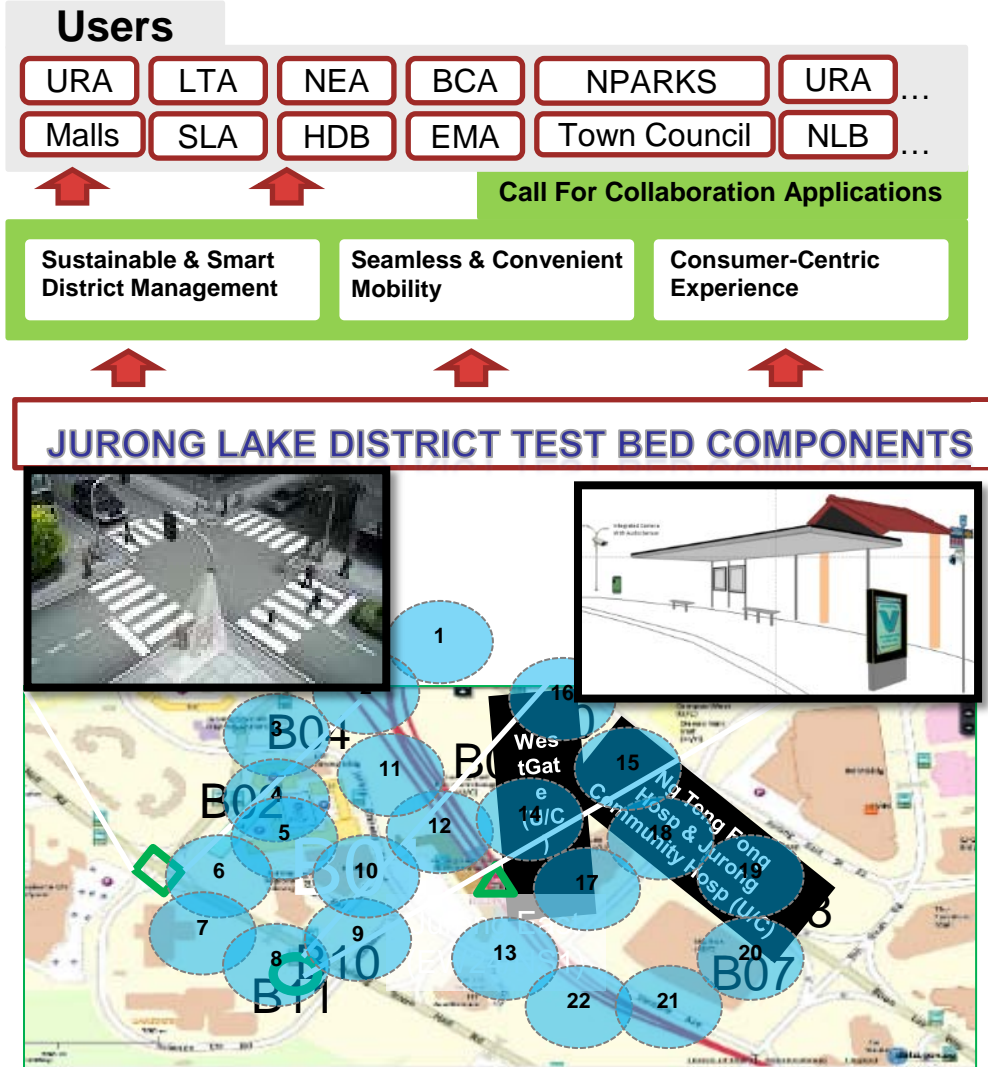
- Learning-based SDN
- Context-aware & location-aware resource management

Strategic Advantage 3: Supported by ICM Ecosystem



Co-Innovating for Smart Nation

I²R Integrated Capabilities for JLD Pilot and Trial





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Thank you

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