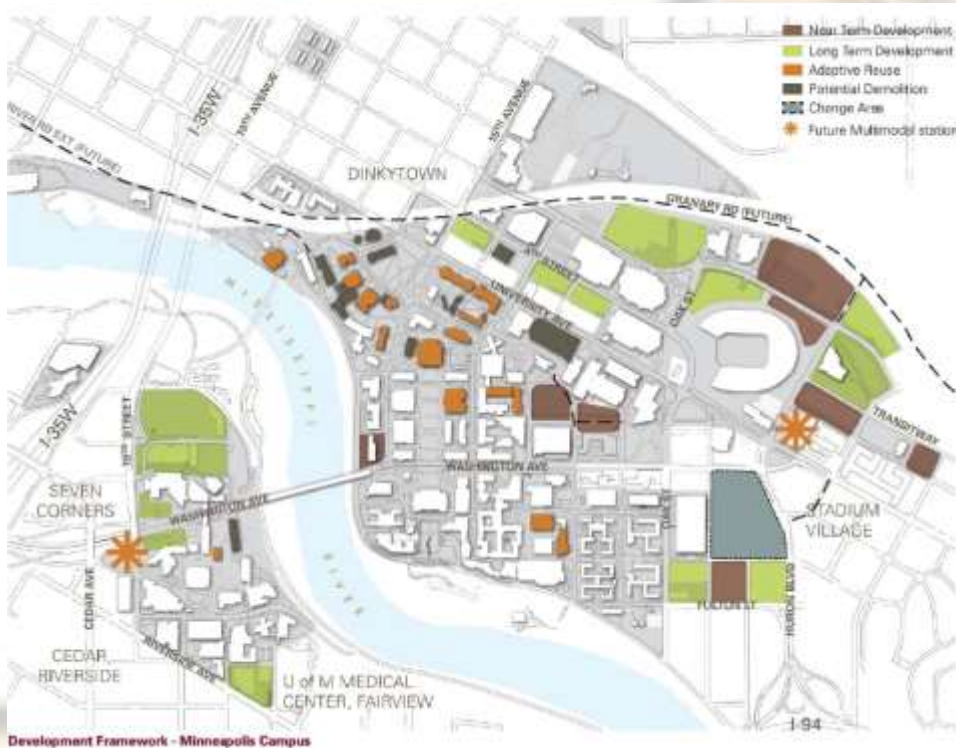
The background features the University of Minnesota logo, a large maroon 'M' with a gold outline, and the mascot, a smiling gold bear wearing a maroon sweater with a gold 'M' on it. The text is overlaid on this background.

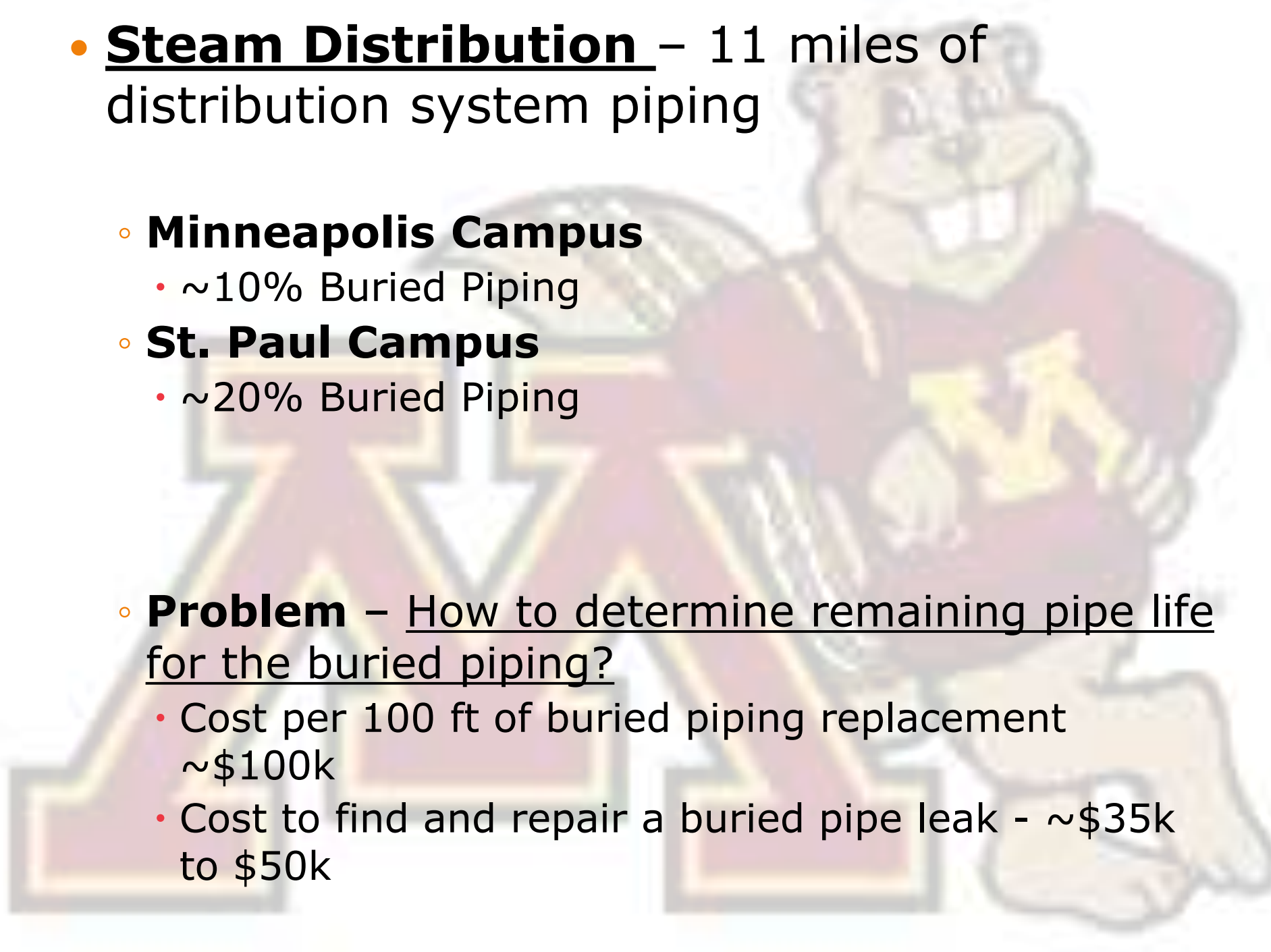
**UMN Distribution Piping  
Assessment Utilizing  
Advanced Guided Wave  
Technology**

# • University of Minnesota Twin Cities Campus

- 392 acres with 22 million ft<sup>2</sup> building floor space



- **Steam Distribution** – 11 miles of distribution system piping
  - **Minneapolis Campus**
    - ~10% Buried Piping
  - **St. Paul Campus**
    - ~20% Buried Piping
  - **Problem** – How to determine remaining pipe life for the buried piping?
    - Cost per 100 ft of buried piping replacement ~\$100k
    - Cost to find and repair a buried pipe leak - ~\$35k to \$50k

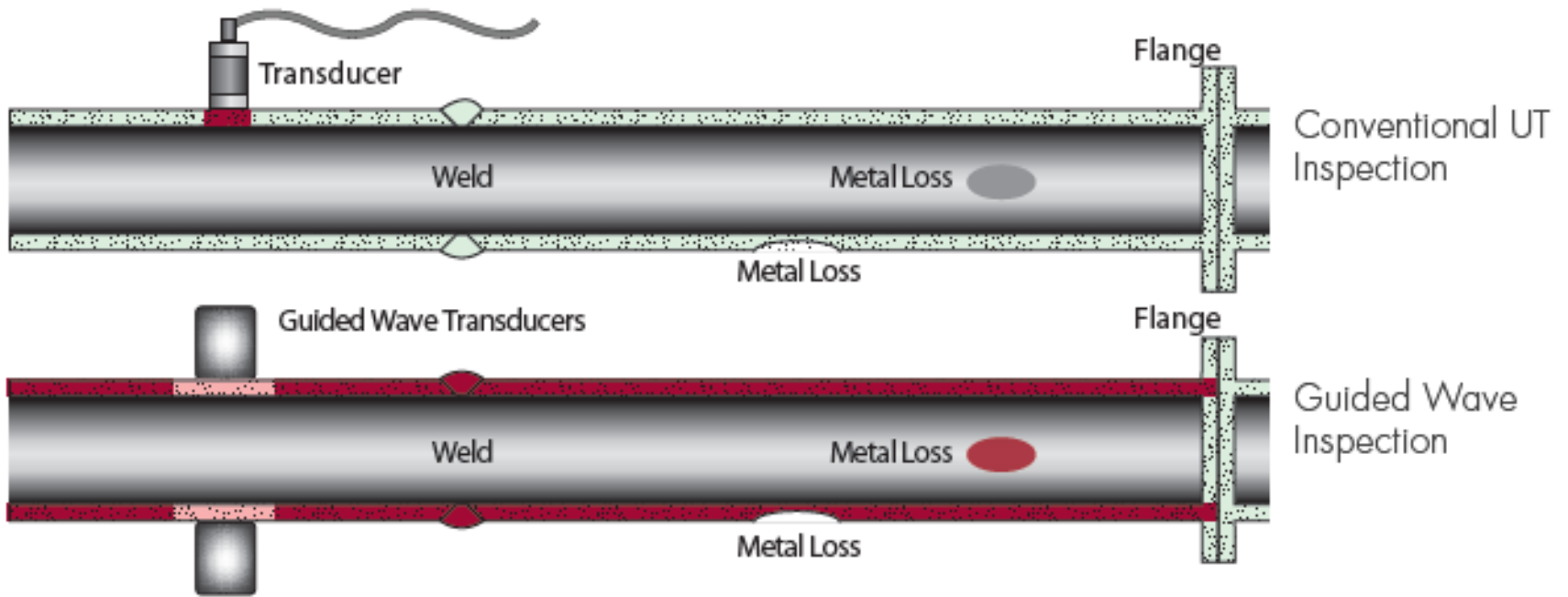


# **Potential Solutions**

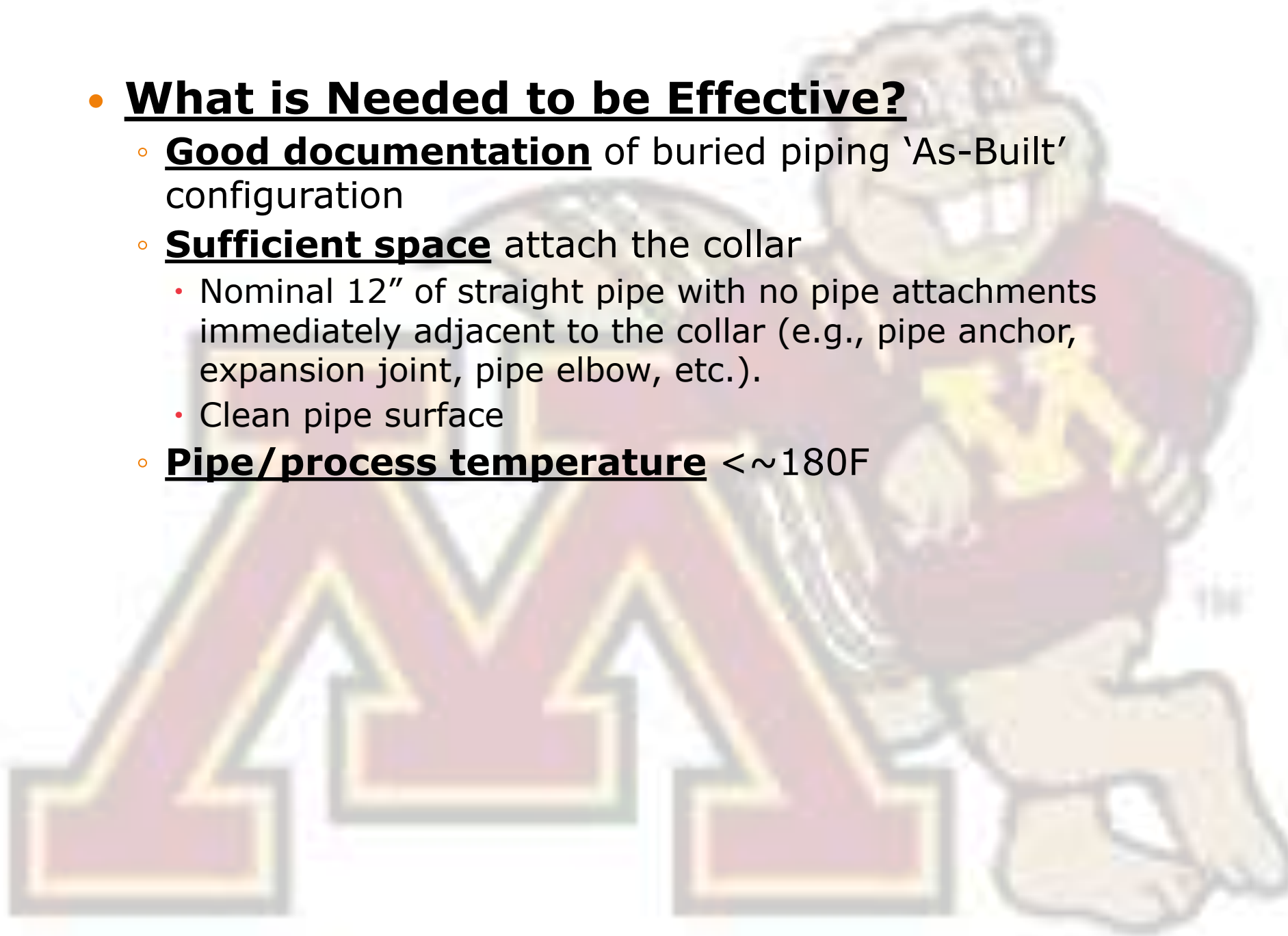
- **Excavate and inspect**
  - High cost
  - Positive/Actionable results
- **Thermal Imaging**
  - Good once a leak has developed, but doesn't provide a material condition assessment of the piping.
- **Use inspection pig (similar to oil/gas pipe line inspection technique)**
  - Problems dealing with expansion loops and smaller pipe diameters
  - Need to construct entrance/exit stations
- **Use Ultrasonic NDE techniques**
  - Most promising and potentially cost effective approach

- **Structural Integrity Associates – Guided Wave NDE Technology**

- Use a collar containing several ultrasonic devices to send a signal down the pipe to find discontinuities within the detector range



- **What is Needed to be Effective?**
  - **Good documentation** of buried piping 'As-Built' configuration
  - **Sufficient space** attach the collar
    - Nominal 12" of straight pipe with no pipe attachments immediately adjacent to the collar (e.g., pipe anchor, expansion joint, pipe elbow, etc.).
    - Clean pipe surface
  - **Pipe/process temperature**  $< \sim 180\text{F}$





- **What Can Be Identified?**

- The **specific location** of any pipe discontinuity
  - How far from the test collar
  - What position around the pipe
  - The significance of the indication (amount of wall loss)
- Given the pipe age when inspected and the evaluated condition, can **estimate remaining pipe life**.

- **What Impacts Results?**

- **Each attachment**, pipe weld, degraded portion reduces the length of piping that can be inspected from a single point.
  - Best case – upwards of 350 ft of pipe can be inspected.
- Requires a **trained technician** to take and evaluate the data.

# **Additional Comments** **and Questions**

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