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# *Policy Processing Architecture for the 3.5 GHz Spectrum Access System (SAS)*

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# Key Points

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- **Policy-Based Management (PBM) is useful for managing complex systems and networks**
  - E.g. Security Policy, Network Policy, etc.
  - Often a “formalization” of what would have been done anyway
- **Cognitive systems frequently apply PBM techniques**
  - Particularly useful with “declarative” policies
  - Helps to isolate external constraints, conditions (state), internally imposed constraints, etc.
- **The SAS is a cognitive system**
- **SAS will control other cognitive systems**
- **Suggests the need of a hierarchical PBM**

➢ ***The author encourages the use of more formal PBM techniques when architecting the SAS and systems it manages***

# Elements of a PBM / policy controlled system

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- **Policy often formatted as *if* "Event" *with* "Conditions" (state), *then* "Actions"**
  - Other formats as well
- **PBM elements that are widely used and defined for example in RFC 3198**
  - Policy Decision Point (PDP)
  - Policy Enforcement Point (PEP)
  - Policy Repository (PR)
- **Often these elements are logical / functional rather than explicitly defined components**
- **Many systems for example IEEE 1900.5-2011 add the following**
  - Policy Management Point
- **IEEE 1900.5-2011 introduces another important formalization**
  - System Strategy Reasoner Component termed SSR in this presentation
  - Not typically a PBM component

# Hierarchical PBM

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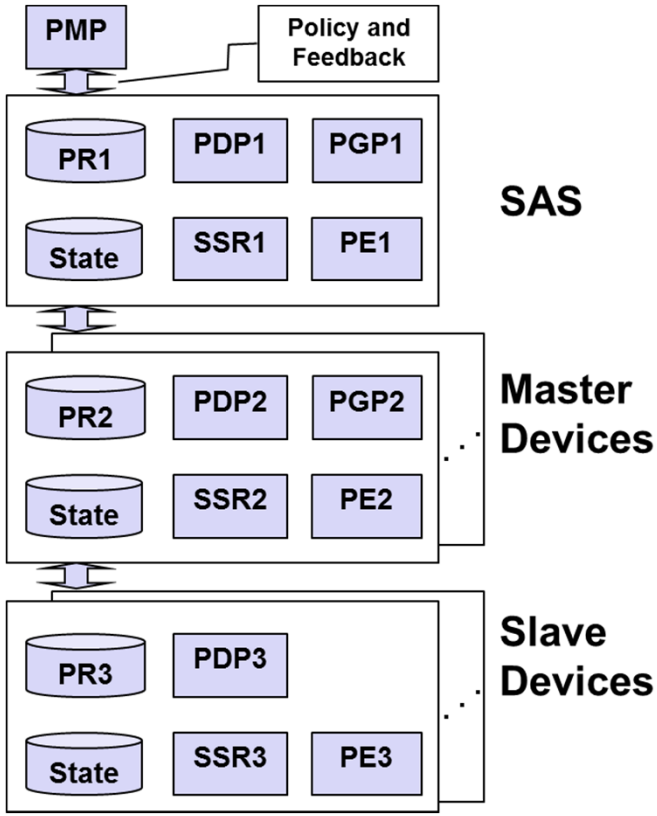
- **A cognitive system controlling other cognitive systems needs to generate policy for those systems**
  - Should be an autonomous process
  - Having a hierarchical framework is useful
    - Same components / interfaces applied recursively in tiers
- **Introduce a "Policy Generation Point" (PGP)**
  - Creates lower level policy consistent with high policies
  - Could be viewed as part of SSR
- **Introduce concept of feedback to policy elements on higher tiers**



# Single Tier Policy Controlled Cognitive System

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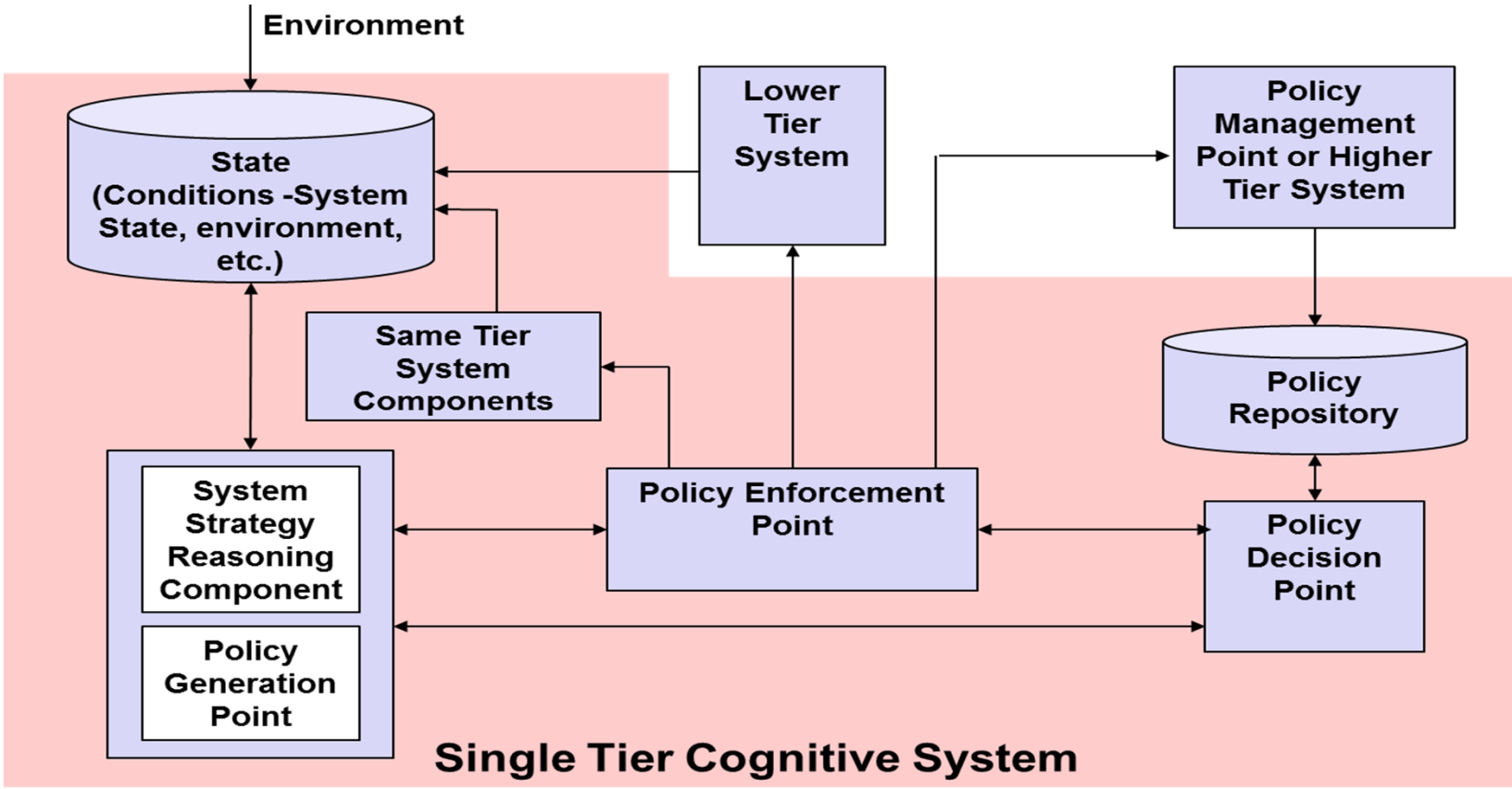

# Summary

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- **Policy-Based Management (PBM) can play an important role in the SAS and associated systems**
  - Important to understand where policy is generated, applied (decided) and enforced
  - Introducing PBM architectural elements facilitates analysis
- **Many PBM concepts have been standardized and additional work is on-going**
  - IETF RFC 2748, RFC 3198, RFC 2904
  - IEEE 1900.1-2008, IEEE 1900.5-2011
  - Etc.
- **A hierarchical PBM approach seems most appropriate for the SAS**

# References

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